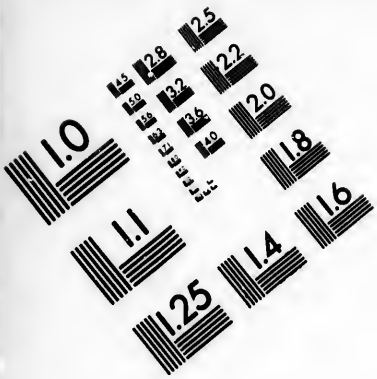


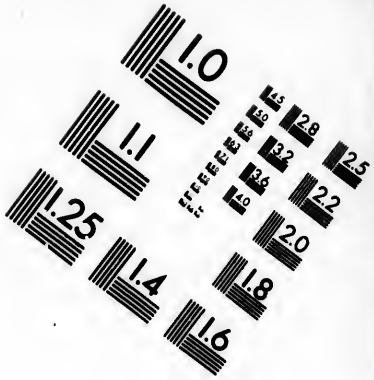
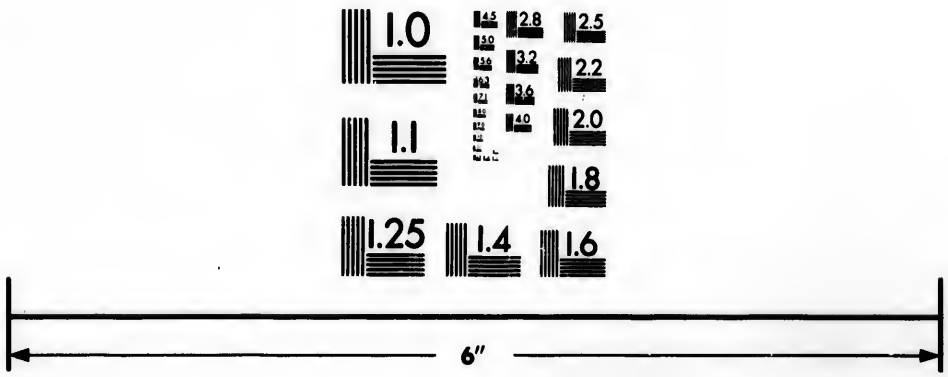


IMAGE EVALUATION TEST TARGET (MT-3)



Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

Technical and Bibliographic Notes/Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- ☐ Coloured covers/ Couverture de couleur
- ☐ Covers damaged/ Couverture endommagée
- ☐ Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- ☐ Cover title missing/ Le titre de couverture manque
- ☐ Coloured maps/ Cartes géographiques en couleur
- ☐ Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- ☑ Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- ☐ Bound with other material/ Relié avec d'autres documents
- ☐ Tight binding may cause shadows or distortion along interior margin/ La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure
- ☐ Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/ Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.

- ☐ Coloured pages/ Pages de couleur
- ☑ Pages damaged/ Pages endommagées
- ☐ Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- ☑ Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- ☑ Pages detached/ Pages détachées
- ☑ Showthrough/ Transparence
- ☐ Quality of print varies/ Qualité inégale de l'impression
- ☐ Includes supplementary material/ Comprend du matériel supplémentaire
- ☐ Only edition available/ Seule édition disponible
- ☑ Pages wholly or partially obscured by errata slips, tissues, etc., have been refilmed to ensure the best possible image/ Les pages totalement ou partiellement obscurcies par un feuillet d'errata, une pelure, etc., ont été filmées à nouveau de façon à obtenir la meilleure image possible.

☑ Additional comments:/ Commentaires supplémentaires: Irregular pagination : [vii] - xxi, [21] - 1204, [1307] - 1308 p. Pages 1305 & 1306 are missing.

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
							✓				

The copy filmed here has been reproduced thanks to the generosity of:

Medical Library
McGill University
Montreal

The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche shall contain the symbol → (meaning "CONTINUED"), or the symbol ▽ (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagrams illustrate the method:

L'exemplaire filmé fut reproduit grâce à la générosité de:

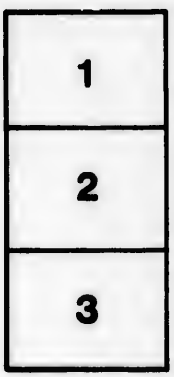
Medical Library
McGill University
Montreal

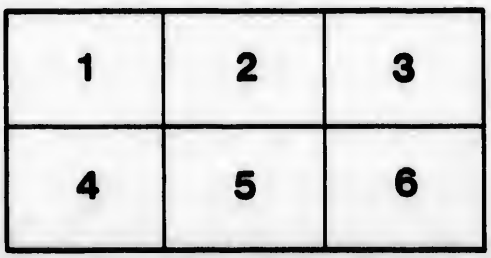
Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exemplaire filmé, et en conformité avec les conditions du contrat de filmage.

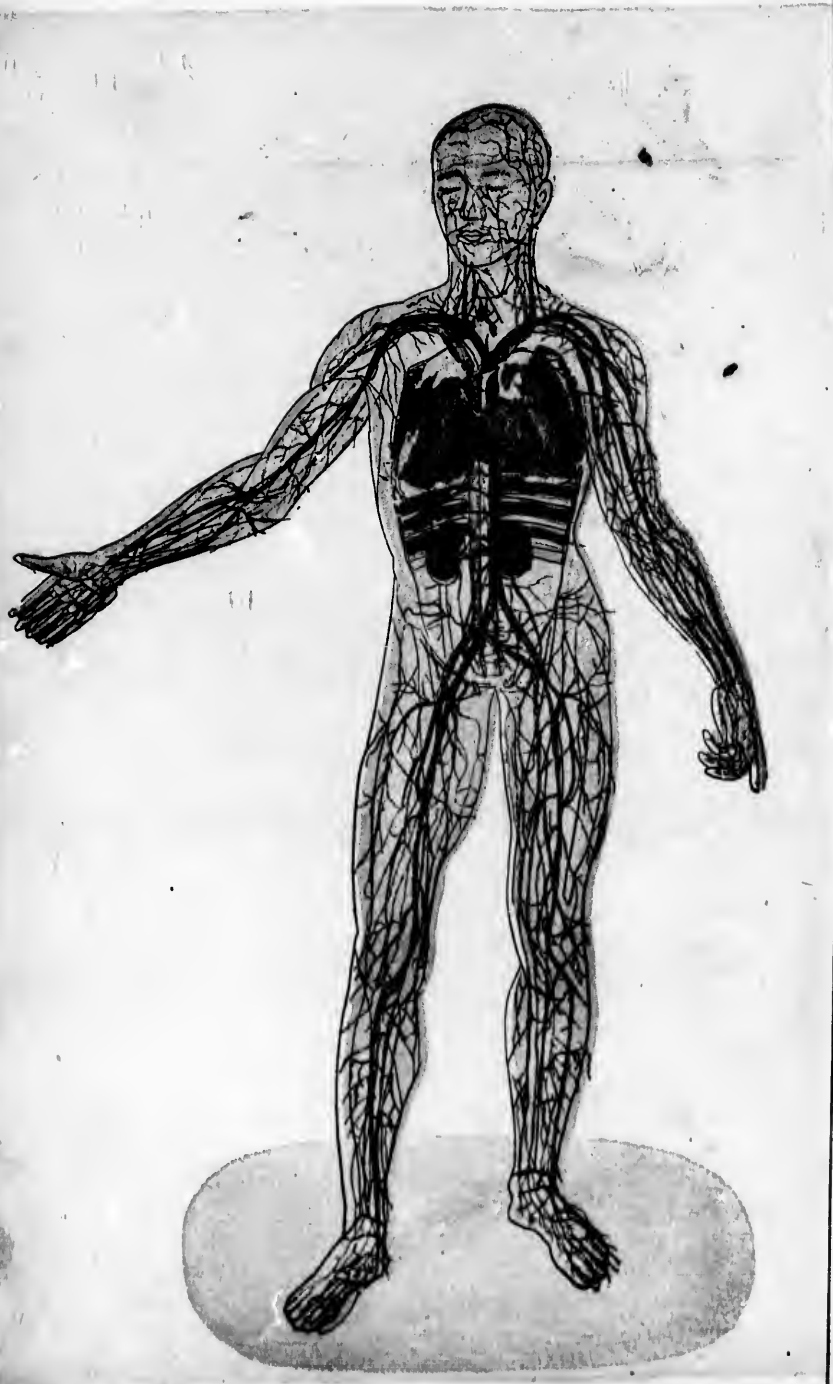
Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier plat et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plat, selon le cas. Tous les autres exemplaires originaux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminant par la dernière page qui comporte une telle empreinte.

Un des symboles suivants apparaîtra sur la dernière image de chaque microfiche, selon le cas: le symbole → signifie "A SUIVRE", le symbole ▽ signifie "FIN".

Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents. Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.







RE[illegible]D EDITION

OF

[illegible] PRACTICAL

HO[illegible]E PHYSICIAN

AND

ENC[illegible]LOPEDIA OF MEDICINE:

A [illegible] the Household

MA[illegible]AGEMENT OF DISEASE;

[illegible] Means of Prevention, and Symptoms of all

DISEA[illegible] OF [illegible]N, WOMEN, AND CHILDREN;

And [illegible] Treatment, with plain instructions for

THE CARE OF THE SICK.

[illegible] and [illegible] Directions for treating

WOUNDS, [illegible]JURIES, POISONS, &c

[illegible] English, by men who have had [illegible] in their various Departments [illegible] account of the

STRUCTURE AN[illegible] [illegible]NCTIONS OF THE HUMAN BODY
[illegible] AND RULES OF HEALTH.

[illegible]

[illegible]ENRY M. LYMA[illegible] | W. [illegible], A.M., M.D.
[illegible]HRISTIAN FEN[illegible] | WM. [illegible]KINSON, A.M., M.D.
[illegible] WEBSTER JO[illegible] | BUCHANAN [illegible], M.D.
M[illegible] KING, M.D.

[illegible] Engravings.

[illegible] furnished by [illegible]

[illegible] 1892

[illegible] CO.,

[illegible] ONTARIO

REVISED EDITION

OF

THE PRACTICAL HOME PHYSICIAN

AND

ENCYCLOPEDIA OF MEDICINE:

A Guide for the Household

MANAGEMENT OF DISEASE;

Giving the History, Cause, Means of Prevention, and Symptoms of all

DISEASES OF MEN, WOMEN, AND CHILDREN;

And Most Approved Methods of Treatment, with plain instructions for

THE CARE OF THE SICK.

Full and accurate Directions for treating

WOUNDS, INJURIES, POISONS, &c.

Free from technical terms and phrases, and written in plain English, by men who have had great experience and are acknowledged authorities in their various Departments.

Also a concise account of the

STRUCTURE AND FUNCTIONS OF THE HUMAN BODY
HYGIENE AND RULES OF HEALTH.

WRITTEN BY

HENRY M. LYMAN, A.M., M.D.
CHRISTIAN FENGER, A.M., M.D.
H. WEBSTER JONES, A.M., M.D.
W. T. BELFIELD, A.M., M.D.
WM. B. ATKINSON, A.M., M.D.
BUCHANAN BURR, M.D.
MORRIS L. KING, M.D.

Embellished and Illustrated by numerous PLATES *of a superb character, coloured after nature, and other fine Engravings.*

With valuable information on Draining, Drowning Emergencies, etc., as furnished by the Ontario Board of Health (copied with permission).

REVISED TO 1892.

WORLD PUBLISHING CO.

GUELPH, ONTARIO.

AUTHORS.

WILLIAM B. ATKINSON, A. M., M. D.,

PHILADELPHIA, PENN.,

Professor of Sanitary Science in the Medico-Surgical College, Permanent Secretary of the North American Medical Society, Medical Inspector of the Superior Council of Health of the State of Pennsylvania, First Vice-President of the North American Academy of Medicine, Corresponding Member of the Medico-Surgical Society of Bologna, Italy, etc., etc.

HENRY M. LYMAN, A. M., M. D.,

CHICAGO, ILL.,

Professor of Nervous Diseases, "Rush" College of Medicine, Chicago, Ill

---

CHRISTIAN FENGER, A. M., M. D.,

Professor of Pathology and General Practice, Chicago College of Medicine, Chicago, Ill. Formerly of Paris, France.

W. T. BELFIELD, A. M., M. D.,

Professor of Secret and Urinary Diseases, and "Cartwright" Lecturer on Medical Science of the College of Physicians and Surgeons, New York. Formerly of Vienna, Austria.

BUCHANAN BURR, M. D.,

CITY OF NEW YORK,

Physician of the Dispensary of the North-West, and afterwards Assistant to the Professor of Diseases of Women and Children in the Medical College of the "Bellevue" Hospital, City of New York.

MORRIS L. KING, M. D.,

CITY OF NEW YORK,

Surgeon of the "Roosevelt" Hospital, and Assistant to the Professor of Diseases of the Eyes and Ears in the Polyclinical College of Medicine of the City of New York, etc.

H. WEBSTER JONES, A. M., M. D.,

LONDON, ENGLAND,

The celebrated Specialist for Diseases of Women and Children.

PUBLISHERS' PREFACE.

The publishers, in undertaking the preparation of this work, realized to the fullest extent the great importance of its production in a careful and thorough manner. To accomplish this it was necessary to place its authorship far above the merest suspicion of weakness or inefficiency.

It was a matter of no small difficulty to secure as authors seven physicians standing at the head of their profession; firstly, as eminently successful practitioners; secondly, as lecturers highly appreciated in the foremost schools of the land; thirdly, as medical writers of marked erudition; and fourthly, as specialists of deep investigation and large experience.

They have labored indefatigably, and have harmonized their efforts to produce a work, practical, thorough and complete. They have given to the public unreservedly the knowledge which long experience has taught them. We can state with confidence, that they have not been selfishly actuated by financial remuneration only, but inspired by a spirit of philanthropy, by a generous desire to benefit mankind, they have written for the good of the people. There are many works which are of incalculable value to the physician, who is learned in all the technicalities of his profession; yet most of them are but sealed letters in the hands of the multitude. The authors have departed from the ordinary path of scientific writers, and have given us this matter in plain language, and as free as possible from medical or technical terms.

The publishers would further state, that although an immense amount of money has been expended in preparing this work, yet they owe a debt of endless gratitude to the authors, for giving to the public such rich and successful experience in so practical a form as is contained in the succeeding pages.

PRINTED BY
DUDLEY & BURNS,
FINE BOOK AND JOB PRINTERS,
11 COLBORNE STREET
TORONTO.

AUTHORS' PREFACE.

In preparing this work, the authors have endeavored to accomplish two objects:

First, to furnish such practical information as may be serviceable to those who, from force of circumstances, cannot procure the personal attendance of a medical adviser.

Second and chiefly, to convey a general idea of the nature of disease and the principles of treatment; to present an outline of rational and scientific medicine. It is highly desirable that the public should learn to appreciate the true position of the scientific physician; to recognize not only what he is able to accomplish, but also what he can *not* do. In the care of the body it is preeminently true that an ounce of prevention is worth a pound of cure. The most valuable and tangible services of the physician are rendered in his capacity of medical adviser; his chief duty is and should be the prevention rather than the cure of disease.

This fact has guided the authors in writing these pages. While they have in every case presented the most approved treatment for the various diseases which afflict so large a portion of humanity, they have especially endeavored to furnish such information as may protect against the attacks of these diseases.

The authors feel that in this attempt to popularize medical science, they are rendering a service to their professional brethren as well as to the public at large. A little knowledge is a dan-

gerous thing for a patient to possess; it makes him the prey and plunder of every advertising quack. The more intelligent a patient becomes, the more he appreciates the absurdity of remedies advertised to cure any one of forty different and distinct complaints. He realizes that medicine is not magic nor sleight-of-hand, but an art founded on a science, and that the best expositor of medicine is the scientific physician.

INDEX
TO
GENERAL DIVISIONS.

TABLE OF CONTENTS.

CONSTITUTIONAL DISEASES.

DISEASES OF THE THROAT AND CHEST.

DISEASES OF THE ORGANS OF CIRCULATION.

DISEASES OF THE HEART.

DISEASES OF THE DIGESTIVE ORGANS.

DISEASES OF THE INTESTINES.

DISEASES OF THE LIVER.

DISEASES OF THE KIDNEYS.

DISEASES OF THE NERVOUS SYSTEM.

DISEASES OF THE SKIN.

VENEREAL OR PRIVATE DISEASES.

DISEASES OF THE EYE AND EAR.

SURGICAL DISEASES.

POISONS AND THEIR ANTIDOTES.

SMOTHERING:

DISEASES OF WOMEN AND CHILDREN.

ANATOMY AND PHYSIOLOGY.

HYGIENE.

CARE OF THE SICK.

MEDICINAL PLANTS.

ADMINISTRATION OF MEDICINE.

HOW TO CHECK THE SPREAD OF CONTAGIOUS OR INFECTIOUS DISEASES.

DOCUMENT PREPARED BY THE BOARD OF HEALTH OF ONTARIO.

TREATMENT OF THE DROWNED.

ANATOMY AND PHYSIOLOGY.—*Addenda.*

BANDAGING.

ADDENDA.

CONSTITUTIONAL DISEASES.

REMARKS.

Many of the diseases which will be discussed in these pages affect primarily and chiefly a certain limited part of the body, the remainder of the organism either escaping all disease or merely suffering in sympathy with the affected part. A familiar example is the ordinary felon. Such affections are classed as *local* diseases. In distinction from these, there are numerous diseases which seem to affect no one part of the body more than others, but which cause serious interference with the entire organism and all its functions. Such affections, of which intermittent fever, or "ague," is a familiar instance, will be described under the name of *Constitutional Diseases* in the present section.

Among the most important and frequent of constitutional diseases are the *infectious* diseases, including the familiar *fevers*. Indeed, most of the infectious diseases induce in the subject of them a considerable degree of fever; though it cannot be, in general, stated that the converse of this proposition is true—that the fevers are necessarily infectious.

SPECIFIC FEVERS.

The word fever is applied to a certain group of symptoms, the most prominent of which consists in an increased heat of the body. Yet there are also other characteristics which are usually associated in all of the diseases designated as fevers. The most common

characteristics are a premonitory stage (technically called the period of *incubation*), during which there may be no other symptom of disease than general lassitude and indisposition on the part of the patient. Then follows a more or less pronounced *chill*, which may be so violent as to shake the entire body of the victim, or may, on the other hand, consist merely in a sense of coldness. With this occurs the characteristic rise of temperature, the *fever*, accompanied by thirst, dryness of the skin, increased force and frequency of the heart beat, and usually by pain in the head, back and limbs. All these symptoms may occur after a wound or injury, in which case the disease may still be called a fever—a *surgical* or *wound* fever. But there are also numerous instances in which the group of symptoms characteristic of fever occurs without any injury or wound, indeed without any *local* cause in any part of the body; these are termed the *essential* fevers. It is found, furthermore, that while all cases of essential fever present the features already indicated as characteristic of fever, yet they differ among themselves as to the details of the disease: as to the duration of the premonitory stage, the violence of the chill, the degree of increased body heat, the duration of the fever, the seat of the pain, the effect upon the various functions—heart, brain and skin, for example. Hence, while all of these fevers have certain features in common, yet they differ one from another in other characteristics, so that we recognize numerous distinct diseases, all denominated fevers because including a marked increase of body heat, and yet designated by special names because evidently due to different causes. These are the specific fevers—scarlet fever, small-pox and measles, for example. The specific fevers are all infectious. By this statement it is not meant that the disease is necessarily communicated from one individual to another—for the word *contagious* is used to indicate transmission from one person to another. When we say that a disease is *infectious*, we mean that it is due to the entrance into the body of some external agent, in some instances certainly a minute organism. Most of the infectious diseases are, it is true, contagious also; that is to say, the agents which have induced the disease in one individual, readily escape from his body into those persons with whom he may come in contact—as is familiarly illustrated to us in small-pox. On the other hand, there are infectious diseases—that is, diseases induced by the presence of foreign agents (organisms) in the body, which do not seem capable of transmis-

sion from one to another, but can be contracted only in certain regions. Intermittent fever, or ague, for instance, is, so far as we know, never communicated from one person to another, but can be acquired only in certain so-called *malarial* districts; yet intermittent fever is eminently *infectious*, though not contagious. With regard to three of the specific fevers, it has been already demonstrated that the cause is a microscopic organism, a plant, which finds access to the body through the lungs or skin, and by its growth within the human organism, occasions the derangement of function which we know as fever. We have every reason to believe that the same general cause underlies all of the specific fevers—that each is due to a definite and special agent, and that this agent is a vegetable organism.

It is customary to discuss the various specific fevers under different categories. Thus, those which are distinguished by the unbroken continuance of fever—the absence of intermission—are designated *continued* fevers; such are typhus and typhoid fever. Then, again, there are fevers distinguished by the intermittent character of the temperature—a day or two of fever being followed by a similar period of natural body heat, that is, absence of fever. These are known as *periodical* fevers, among which are intermittent, remittent and yellow fevers. Still a third class is distinguished by the occurrence of eruptions on the skin, and are hence designated *eruptive fevers*. The most familiar examples of this class are small-pox, scarlet fever, measles.

ERUPTIVE FEVERS.

Each of the eruptive fevers is characterized by the development of a rash on the skin, by which it may be distinguished from the other fevers of its class. There are, it is true, other features—the duration of the incubative period, the degree of fever, the duration of the disease, the location of the pain, etc. For convenience of description, it may be said in advance that the course of any eruptive fever is best described in three periods or stages. *First*, the stage of *invasion*, beginning with the first manifestations of ill health, and terminating with the first appearance of the erup-

tion; *second*, the stage of *eruption*, which succeeds the former and endures until the eruption disappears; *third*, the stage of *desquamation* during which the skin recovers its natural condition. In distinguishing between the various eruptive fevers, especially in children, it is particularly important to note the duration of the stage of incubation and the time of the appearance of the eruption.

Small-Pox.

Within the past eighty years the entire relation of this disease to the human family has undergone a complete revolution. It is no longer the dread and scourge of nations, but a comparatively infrequent and harmless visitor, and we may confidently hope that when it shall be possible to confer upon all the benefits of vaccination we may completely eradicate the disease from the human species. It is interesting to note that the number of cases of small-pox in civilized communities has been diminished, not by any decrease in the severity of the disease, but simply because we have acquired, through vaccination, the power to resist its attacks. For among the tribes which have not employed vaccination small-pox is as destructive to-day as it was in Europe before the time of Jenner; at that time 50,000 persons are said to have died of this disease in England alone. In 1837 small-pox attacked the Mandan Indians; within a year only twenty-seven individuals remained out of the population of 150,000. In consequence of the general introduction of vaccination, small-pox has not only ceased to be the most formidable of the plagues that afflict humanity, but has even become one of the rarer of the infectious diseases. Even among the unvaccinated, the disease is not so fatal as in former years, the mortality now being only about one case in seven or eight. Yet in consequence of the gravity and evil after-effects of the disease, as well as of its contagiousness, it is important that every case should be early recognized; for which reason a somewhat minute description will be given.

Stage of Invasion.—The disease usually begins with a chill, and is distinguished from the other eruptive fevers by the extreme violence of this chill; in some cases a series of chills recur in the

course of a few hours. This chill, which marks the beginning of the fever, usually occurs about ten or twelve days after exposure to contagion. Previous to the chill, there may have been some lassitude, languor, and perhaps wandering pains in different parts of the body, especially in the abdomen, the small of the back, and the head. The beginning of the fever is also usually accompanied by nausea and vomiting; the tongue is coated, the bowels usually constipated. In children, convulsions are a common occurrence; in adults, delirium is not infrequent. There may be also various additional symptoms, such as retention of urine and partial loss of power in the limbs. On the other hand, the symptoms may be so mild as to attract no special attention. The severity of the subsequent fever, and the extent of the eruption are usually proportional to the severity of these symptoms in the stage of invasion. In these cases, in which the patient feels but slightly indisposed before the appearance of the eruption, he may not be compelled to keep his bed any time during the attack; while there are cases in which the onset is so overwhelming that the patient dies before the eruption has had time for complete development. On the third day after the chill, usually—sometimes on the second, fourth, or even sixth day—an eruption begins to appear, marking the beginning of the

Stage of Eruption.—A most striking feature, which marks very accurately the beginning of the eruption, is the cessation of fever, which may have been quite intense for two or three days previously. At the same time that the fever ceases, the symptoms usually improve: the pains are less severe, the mental disturbances, if present—delirium, convulsions, etc.,—often cease, and the patient is more comfortable.

The rash usually appears first upon the face, especially around the mouth and on the chin; at nearly the same time the neck and wrists are affected, then the breast and arms. The extension of the rash over the entire body usually requires two or three days, so that six or seven days may elapse after the initial chill before the entire eruption has appeared. The rash at first takes the form of small red spots, sometimes exhibiting a purplish tint; the center of these spots becomes hard and somewhat elevated, the rash resembling at this period somewhat the complete eruption of measles—a resemblance which has occasioned serious errors in diagnosis. At this time even the inexperienced can usually recognize the nature

of the malady; for the eruption on the wrists feels very much like small shot under the skin. Within twenty-four hours it will be noticed that the tops of these little bodies constituting the rash are filled with a clear watery liquid, this change usually occurring first in that part of the rash which first appeared, that is, on the face, wrists and neck. During the next two days these little drops of watery fluid increase in size so as to become an eighth of an inch or more in diameter; but it is not until the fifth day of the eruption that the characteristic appearance—the feature which distinguishes the small-pox rash from all others—is visible—*the depression in the center*. The top of the vesicle, as the little collection of watery fluid is called, is nearly flat except that its middle is drawn downward, making an appearance resembling that of the navel; it is hence technically termed *umbilicated*. This is, as has been said, the most characteristic feature of the small-pox eruption, and the one which is relied upon for a decision in doubtful cases. In most instances, it is true, the experienced physician can give a positive opinion so soon as the shot-like rash appears upon the wrists; indeed he may be confident even previous to this time, from the history of the case, that it will prove to be small-pox. Yet there are instances, in which the attack is very light, the patient does not feel anything more than a slight indisposition—and perhaps even attends to his avocation—in which the rash consists merely of a few scattered spots. In such cases a positive opinion can rarely be given until this peculiar feature, the *umbilication* of the vesicles appears. So, too, there may be at times doubt as to whether the disease is small-pox or chicken-pox, for in the latter disease large vesicles resembling those of small-pox, but *not* umbilicated, are observed.

If the case be severe and the eruption very profuse, many of these vesicles may coalesce, running together so as to form blisters of considerable size. Yet even here the characteristic umbilication can usually be observed. Up to this time the vesicles have been clear and transparent, containing only a watery fluid; but about the sixth day after the first appearance of the first eruption, this watery fluid contained in the vesicles becomes turbid and white—that is, *suppuration* occurs. The vesicles, or *pocks*, as they may now be called, become distended with fluid, the central depression or umbilication disappears, and the pocks become pointed. At the same time the patient, who has been for several days nearly or quite

free from fever, becomes again the subject of a fever equal or exceeding that with which the attack was ushered in.

Before referring in detail to this *secondary* fever, it should be remarked that the eruption is not limited to the skin. For, simultaneously with its appearance on the cutaneous surface, it may be seen also, though to a less extent, on the mucous surface of the mouth and throat. In these places it does not, it is true, exhibit exactly the same appearance as on the skin; the spots are surrounded by a whitish area, and do not exhibit the entire course—the change into vesicle and pock already described. Instead of this, there not infrequently occur minute ulcers, even while the rash on the skin is still in the vesicular stage. In many cases the eruption is not limited to the mouth and throat, but may extend also down the wind-pipe to the lungs; in these instances the breath is usually extremely offensive. So, too, the other mucous membranes may become the seat of the disease; that of the eye—called the *conjunctiva*—not infrequently suffering from the appearance of several pocks; indeed, the ulceration consequent upon these pocks may destroy the eyesight by rendering the front of the eye white and opaque. So, too, the mucous membrane of the genital organs, especially in women, may become the seat of the small-pox eruption. The most dangerous complication arising in connection with the mucous membranes is the swelling of the larynx, whereby the air admitted to the lungs is greatly diminished in quantity, and suffocation may be imminent.

The *secondary*, or suppurative fever, begins, as already indicated, with the change in the character of the fluid filling the vesicles, usually about the sixth day after the appearance of the eruption. The intensity of this fever is usually proportional to the extent of the eruption, being insignificant when there are but a few scattered pocks, but very severe in the cases where the vesicles have coalesced into blisters—the so-called *confluent* variety. The general surface of the skin now gives indication of inflammatory action; the spaces between the pox are red; there is often swelling of the eyelids, and of the face, perhaps also of the hands and feet. This latter feature, by the way, is a welcome sign, since it is the general experience that cases of confluent small-pox, in which no such swelling occurs, rarely recover. The skin is not only red and swollen, but also painful; the mouth and throat are sore from the presence of the pocks, and a considerable quantity of mucus—so-called salivation—

is often observed. In severe cases, the symptoms already referred to as possible during the stage of invasion are frequently noted—delirium, convulsions, and partial loss of power in the limbs.

On the seventh, eighth or ninth days of the disease the pocks or *pustules* become converted into scabs; they break, and their contents dry and harden into crusts. Those parts of the skin which have been thickly studded with pocks may be now almost entirely concealed by the mass of scabs, so that the face may look as if covered with a mask. Meanwhile the skin exhales a characteristic, extremely unpleasant odor. The repulsive appearance of the skin covered with crusts taken in connection with this sickening odor, combine to render small-pox one of the most loathsome diseases with which we are acquainted. However, in most cases the patient's general condition begins to improve so soon as the scabbing commences; the fever subsides, the appetite usually improves, and the distressing mental symptoms may also cease, so that the convalecsence of the patient may be said to begin with the commencement of the scabbing. In severer cases, however, the patient's condition remains serious for some days yet. The fever persists; there is considerable annoyance from the ulcers left by the broken pocks, for it may be expected that the site of each pustule which has broken and discharged its contents, will be an ulcer, the depth and extent of which varies with the size of the previous pustule. It is these ulcers in which the unsightly scars or "pock-marks" originate.

An attack of small-pox, therefore, usually lasts, in those who recover from it, about three weeks, recovery being complete about four or five weeks after exposure to contagion; that is, after twelve days of *incubation* there are three of *invasion*, five to seven for the *eruption*, four or five for the *scabbing* process, and six to ten for the removal of the scabs and the healing of the ulcers. These various periods, and hence the entire duration of the disease, may vary somewhat, but the time already indicated may be considered a fair average. The discolored spots marking the sites of the pocks may be visible for several weeks subsequent to recovery, especially when the skin becomes cold. In many of these spots pitting occurs; in some the skin gradually assumes its natural appearance.

Several accidents may unfavorably complicate the course of small-pox. The various mucous membranes may be permanently somewhat affected by the eruptions; many months may elapse

before the voice, for instance, is entirely recovered. So, too, bronchitis, and even pneumonia (inflammation of the lungs) sometimes occur. The skin of the face and body is frequently affected with erysipelas; vision is sometimes seriously impaired, or even entirely lost. The inflammation may extend from the throat into the ears, and thus result in deafness. A serious disease of the kidney may supervene, and female weaknesses sometimes date from an attack of small-pox.

Such is the course of ordinary small-pox, yet cases occur in which, either from the depraved condition of the patient's constitution at the time of exposure, or from the reception of an unusually large amount of the contagious matter, the disease exhibits a far more violent course, and is termed *malignant* small-pox. In such cases the vessels contain, not a thin watery fluid, but a reddish, bloody liquid; there may be even extravasations of blood (black and blue spots) into the skin in different parts of the body. These cases are sometimes called *hemorrhagic* small-pox. The general condition of the patient indicates from the start a fatal termination, which usually occurs within a week. The individual is commonly delirious or maniacal, completely prostrated, and succumbs before the formation of pocks is complete.

Cause.—There is, unquestionably, a specific poison or *virus*, the entrance of which into the body occasions this disease, though this virus has not as yet been isolated. So far as we are aware, the disease is never contracted except by exposure, direct or indirect, to the emanations of a previous subject of the disease. Many cases, it is true, are known in which it seems impossible to trace the connection with other patients suffering from small-pox, since individuals who have not consciously approached even a dwelling of a small-pox patient are stricken with the disease. But it is also known that very slight and indirect exposure is sufficient to convey the specific virus. It is not necessary to touch an individual already afflicted, nor even to approach his sick room. It may suffice merely to touch a garment which has once, even years before, enveloped the person of a small-pox patient, or which has hung in his vicinity. Indeed, it is impossible to trace all the possible ways in which contagion may be conveyed from one case of small-pox to another individual. In large cities a contagion most frequently occurs by passing afflicted individuals on the street, by riding in the same street car or carriage,

even after the small-pox patient has left the vehicle. The disease may be probably communicated at any time, and during all stages of its progress, but it is especially contagious during the period of scabbing and drying. Even after the surface of the skin is entirely healed, the patient should not for a time mingle with other individuals. The body of one who has died from small-pox is a fruitful source of contagion, since instances enough are on record in which individuals have contracted the disease by simply gazing upon the face of the dead.

The susceptibility to small-pox, as to all other known infectious diseases, varies extremely in different individuals in different races, and under the influence of conditions which are as yet unknown. Some persons are, as is well known, insusceptible to the disease as well as to vaccination; others, again, have had small-pox twice, or even three times. The African and the Indian races are far more susceptible to its ravages than are the whites. Then, again, at intervals of a few years, the general susceptibility of the community seems to be increased so that cases of small-pox become far more numerous than usual.

A point of considerable interest is the fact that the child in the womb may experience the disease with its mother, and thereby acquire, before birth, the usual immunity conferred by one attack of small-pox. In most cases of small-pox in pregnant women abortion or miscarriage occurs; yet instances enough are on record in which healthy children have been born, exhibiting the characteristic pitting of small-pox, and possessing no susceptibility to the disease or to vaccination. In other cases again, in which a pregnant woman has small-pox, the fœtus in the womb escapes entirely, while the most singular fact is that the fœtus may experience the disease, while the mother, through whom the exposure was effected, escapes, either because of a previous attack or because protected by vaccination.

While there is no reason for believing that an attack of small-pox can be or ever has been shortened, or "aborted," by artificial means, yet there is a prevalent belief among physicians that this process occurs during certain epidemics of small-pox. That is to say, cases have been known in which individuals presented all the symptoms indicating the invasion of small-pox, and yet no eruption occurred; yet such individuals are thereafter insusceptible to small-pox and to vaccination alike.

The mortality from small-pox varies, like the susceptibility to it, with the age of the patient, and with certain unknown conditions of atmosphere or soil which favor the occurrence of epidemics. The average among scattered cases—the so-called *sporadic* cases—is probably not greater than one in nine or ten; yet in epidemics and in communities where vaccination has not been extensively practiced, the mortality may reach a much larger figure. A fatal result occurs more frequently in the second week of the disease than at other times; thus Gregory found that of 168 fatal cases death occurred in ninety-nine during the second week, in thirty-two during the first, in twenty-one during the third, in nine during the fourth and in seven during the fifth week. Generally speaking, the danger may be said to be indicated by the extent of the eruption.

Treatment.—There is as yet no means known whereby an attack of small-pox can be cut short or in any other way interfered with; the disease once established, must run its course. Yet small-pox, like the other eruptive fevers and infectious diseases generally, is self-limited. The patient is sure of a cure if he can only manage to survive until the natural termination of the disease occurs. The object of treatment, therefore, is simply to sustain and assist the afflicted individual; to support his strength, allay so far as possible the fever and other annoying symptoms of the disease. One of the first requisites, therefore, consists in good nursing and hygiene. The comfort and welfare of the patient alike will be promoted by a free supply of fresh air; his fever will be diminished and his pains assuaged by warm baths, or where this is impracticable, by frequent sponging with warm water; his thirst may be quenched by the use of cold drinks, ice water, lemonade or effervescing drinks. Persistent vomiting is a troublesome symptom to treat, but may be often controlled by permitting the patient to hold pieces of ice in the mouth until melted, or by administering equal parts of lime-water and milk, say a tablespoonful every two hours. If there be a tendency to constipation, a saline laxative, such as the citrate of magnesia, may be employed; at the same time a teaspoonful of sweet spirits of nitre may be given four or five times a day. If the mouth and throat be sore they may be frequently washed and gargled with a solution of the chlorate of potash—one drachm to the ounce of water. If vesicles form in the

eyes, also, extreme care should be taken to secure perfect cleanliness by frequent washings with simple water; yet this complication, because capable of such serious results, should always be entrusted to the care of the physician.

One of the most important indications in most cases of small pox is the necessity for the employment of nourishing, easily-digested food. The patient has, of course, little or no appetite, and his digestion is further impaired by nausea, and perhaps by the soreness of his mouth and throat, during the primary fever—the stage of invasion. Reliance may be placed upon milk, broths, and similar sick-room fare; but during the second week certainly it will be necessary, in the vast majority of cases, to employ alcoholic stimulants in some shape; whisky-punch is perhaps the best form.

The most important object of treatment, though one which cannot always be successfully accomplished, is the avoidance of scars or "pitting." It is scarcely necessary to mention all of the plans which have been devised for the accomplishment of this end; the fact that so many have been recommended, indicates that none can always be relied upon for success. In the writer's experience, the best plan consists in touching the largest vesicles with a pointed stick of the nitrate of silver (lunar caustic) on the second day of their appearance; then poultices of linseed meal or bread and milk may be applied over the entire face for four or five days, until the vesicles have become umbilicated; then collodion, mixed with one-twentieth part of glycerine, may be applied to the vesicles by means of a camel's hair brush, so thick as to make an artificial skin. This may be renewed every day or two.

While we endeavor faithfully to discharge our duty to the patient himself, we may not forget the interests of others. It is scarcely necessary to remark that the individual should be isolated so far as possible from others, especially that no children should be permitted to run any risk of contracting the disease. At the very first manifestation of small-pox, every one who has been or can be exposed to the contagion, should be at once vaccinated; for since the stage of incubation of the vaccine matter is several days shorter than that of the small-pox virus, it is possible, by immediate vaccination, to escape the small-pox, even after exposure; and even if the vaccination be performed too late to prevent the attack of small-pox, the disease will be nevertheless less severe than would otherwise have been the case.

Then, again, it must not be forgotten that the patient is capable of communicating the disease even during his convalescence—indeed, after the skin is entirely healed; and that all the articles of whatever nature present in the room during his illness may also convey the disease after months have elapsed. The patient should, therefore, never be allowed to come into contact with any person until a week or so after the scabs have all fallen off and the surface is entirely healed; not until he has by repeated fumigations and disinfection destroyed, so far as may be, all the effluvia emanating from his person. As for the bedding and body linen, the most effectual method of disinfection is by burning them; if this be impossible, they, as well as the carpets and furniture of the room, should be disinfected by the use of bromine, as will be described under the head of "Disinfection."

Varioloid.

Varioloid, or modified small-pox, is a name used to indicate the disease either as it occurs in those who have been previously vaccinated, or as it occurs as the result of direct and intentional inoculation from a patient suffering with small-pox. Since, in these latter days, the latter practice has been discontinued, the term varioloid now designates small-pox as modified by previous vaccination. It is, of course, essentially small-pox—presents the same features, though in a less intense degree. It is rarely fatal, and usually occasions the individual comparatively little indisposition. The vesicles are usually few in number, widely scattered; the fever is slight, the chills and pains far less severe. Indeed, many a patient with varioloid is astounded to learn from his physician that he has small-pox. Yet, while the individual himself suffers so little inconvenience, he is just as dangerous to others as the most malignant case of small-pox; he should, therefore, observe the same precautions for the protection of others as if he were himself seriously ill. It is probable that much of the promiscuous dissemination of small-pox in our large cities is accomplished, in great measure, by these cases of varioloid, since many such individuals find it unnecessary to interrupt their usual avocations.

Vaccination.

It had been for centuries known in the Orient that the severity of small-pox was much diminished by the actual transfer of the specific virus from one patient to another; that individuals so inoculated suffered less severely from the ravages of the disease than those who acquired it in the usual way of exposure. This practice of inoculation had been long and extensively employed in Turkey, when in 1718, an English lady, Lady Mary Wortley Montague, visiting Constantinople, became personally convinced of the value of this measure. She had the courage to submit her own son to inoculation, and was the means of introducing the practice into England, whence it spread over various parts of the Continent. It might be proper to add, though not exactly pertinent to the present topic, that the same principle—inoculation from a diseased to a healthy animal—has been since, and still is, extensively employed to diminish the ravages of certain diseases which afflict domestic animals. In the latter half of the same century, Edward Jenner, an English physician, arrived at a most important discovery on the same subject. It had long been reported among the peasantry that individuals who had contracted from cows a certain pustular disease —cow-pox—remained ever after insusceptible to small-pox. Jenner investigated by a series of observations extending over twenty years the actual facts in the case. He found that the pustular disease to which cows are subject could be communicated to man by simple contact; that the result was the production of a few vesicles resembling those of small-pox, and that individuals so inoculated resisted all attempts at inoculation with the virus of small-pox. In 1798, Jenner published this discovery to the world, and commenced public demonstrations of the truth of his conclusion. His discovery was bitterly contested and ridiculed, as discoveries have always been, and will continue to be, in conservative England. The practice, however, was soon extensively tried in other countries; vaccination was first performed in America and in Austria, in 1799. Even before Jenner's death, sufficient evidence had accumulated to convince the world that his was the greatest and most valuable discovery up to that time recorded in the annals of medicine. "The fruits of this transcendantly important discovery have been the saving of an incalculable number of lives, which would otherwise have been destroyed by one of the most loathsome of diseases, and

the prevention, to an extent which cannot be computed, of the disfigurement and other distressing effects which small-pox is apt to produce, when it does not prove fatal. Of all the benefactors who have ever lived, no one has conferred on mankind such immense, palpable and timelasting benefits."—*Flint*. The investigations of the present century have shown that Jenner's belief of the identity of small-pox in the human subject and in the cow, was correct; furthermore, that horses and sheep are subject to essentially the same disease, which may be communicated from one species to the other, or to man. The facts, as at present ascertained, are that inoculation of the cow with small-pox virus produces in that animal a modified form of small-pox, and that the inoculation of the human subject again from such an animal produces a modified small-pox—that is, vaccination. As to the importance and value of vaccination, there can be and is no question whatsoever; there are, it is true, certain fanatics in England who decry the practice, because instances occur in which the vaccination of one individual from another has resulted in the transfer, not only of the vaccine material, but also of a contagious disease. It should be remarked that, while such an occurrence is possible, while indeed several well authenticated instances are reported and acknowledged, yet this occurrence is so rare as to be almost without significance; thus, Auspitz reports that only two instances of such transfer of contagious disease occurred in 12,000,000 of vaccinations performed in Germany. It is further evident that the exercise of proper care on the part of the physician in the selection of the subject from whom he takes his vaccine matter would obviate the danger; and, furthermore, that there can be no possibility of such transfer when the material is obtained directly from the cow. There are, it is true, certain disadvantages in the employment of animal virus; the sore produced is usually more severe and painful than that produced by human virus. On the whole, the most desirable material is, doubtless, that obtained by one or two transmissions from the cow, through healthy human subjects.

Vaccination may be performed either with the fresh matter or with the same after it has dried, or, finally, with the scab from the arm of the human subject or from the udder of a cow. The matter, technically called *lymph*, may be taken from the vesicles from the fifth to the eighth or ninth day after vaccination. The lymph is usually kept on ivory points, or in quills; but, treated in

this way, the lymph, as well as the scab from the arm, lose their specific power in a month or so. In order to preserve this power, the lymph has been drawn into capillary tubes and then sealed; it has also been preserved by admixture with glycerine and water. The best, because the surest, method consists in transferring the lymph directly from one arm to another; in this way, too, it is possible to inspect the source and to avoid the transfer of any contagious disease. For the introduction into the system, several methods have been used; the exact manner is not important, since the object is to introduce the material under the skin without drawing blood enough to flow. One way is to make a series of shallow scratches, linear and transverse, with a lancet previously dipped in the lymph; or, such scratches can be made with a clean lancet, and a paste made of the scab can be rubbed over the surface. Another way is to introduce the point of the lancet, held *parallel with the arm*, just far enough to deposit a particle of the lymph, or scab, under the skin, but not far enough to provoke a flow of blood. The position usually selected—on the outside of the arm—is preferable for many reasons; not the least of which is the facility afforded for subsequent inspection of the scar in after years. It is desirable to vaccinate at two or three points so as to afford a greater chance for success. The age at which vaccination should be first performed may, of course, vary somewhat with circumstances. If the child be in good health, the vaccination may be made in the third month of life; if there be especial danger of exposure to small-pox, the vaccination may be made even earlier; under these conditions, too, slight indisposition on the part of the child should not be permitted to postpone this act of protection. The period during which a single vaccination affords protection against small-pox varies extremely. Instances are known in which, after a single successful vaccination in early life, the individual has remained insusceptible to the disease, as well as to subsequent vaccination; on the other hand, cases are known in which small-pox has been contracted within three or four years after vaccination. Generally speaking, it may be advisable to attempt a revaccination at periods not greater than five years; in cases of unusual exposure to small-pox—as during epidemics of this disease—this period may be abbreviated. Some physicians submit themselves to vaccination every year, usually without success, though occasionally the vaccination will quite unexpectedly "take." It is evident that noth-

ing is to be lost, though much may be gained, by vaccination at comparatively short periods. It is also important that the vaccination should be intrusted to a competent person. Although so simple an operation, it requires, nevertheless, considerable skill to insert the material under the skin without causing the flow of so much blood as to wash away the lymph. Then, again, the quality of the virus is all important, and should be vouched for by a reliable person. Much of the dissatisfaction consequent upon vaccination, doubtless, results from the fact either that the operation was improperly performed, or that the material used was not of the proper quality.

"On the third day after vaccination (the operation being usually performed on the arm near the insertion of the deltoid muscle) red points, slightly elevated—that is, small papules—are apparent at the spots where the vaccine virus was inserted. On the fourth day the papules are more developed and reddened. On the fifth day vesicles are discovered. The vesicles increase, presenting an umbilicated appearance, and on the eighth day they attain their full development, being elevated from two to three lines, and measuring one-third of an inch in diameter. The vesicles, like those of small-pox, are multilocular (flattened at the summits), and contain a transparent viscid liquid, called the vaccine lymph. On the seventh or eighth day a red areola is apparent, extending from one to three inches around the pocks, increasing in redness until the ninth or tenth day, and the contents of the vesicles become more or less purulent. At this time there is usually slight fever, with some local pain and itching; the vessels of the arm become swollen, and the glands in the arm-pit may become enlarged and tender. On the tenth or eleventh day the fever subsides, and the redness around the pocks diminishes. A dark spot soon appears on the center, and gradually extends over the whole of the pocks. The pustules dry up, and by the fifteenth day they are converted into black, hard scabs, which fall off, usually, by the twenty-fifth day from the date of the vaccination. During the progress of the vaccine affection, vesicles, having the distinctive characters of cow-pox, have sometimes been observed on other parts of the body. It is probable that these are caused by the patient scratching the vesicles on the arm, and carrying thereto lymph containing the virus, on the finger nails, to parts where, owing to abrasions of the skin, self-vaccination is the result.

Experiments show that between the fourth and the ninth or tenth day, the characteristic vesicles may be multiplied at will, by revaccinating with lymph from the vesicles produced by the primary vaccination. Permanent scars denote the situation of the vaccine pocks. The scar, provided the vesicles have pursued a regular course, and subsequent ulceration has not occurred, is characteristic, presenting a series of depressions, or pits, each of which represents the site of one of the cells composing a vaccine vesicle."—*Flint.*

Several of these features are important, as indicating a successful vaccination, and constitute a permanent record of the operation. Thus, on the fourth day, there should be a small, red elevation; this should become a vesicle on the fifth day and depressed in the center — *umbilicated* — on the tenth or eleventh day. The scabs should not fall off before the eighteenth or twentieth day. The separation of the scar into compartments is also an important feature. There is a prevalent belief among physicians, supported by certain observations, that the security against small-pox is increased by several inoculations at the same time; in other words, that the protection increases with the number of the vesicles formed up to four or five. Simon reports that of nearly 6,000 cases of small-pox contracted after vaccination, the mortality among those who asserted that they had been vaccinated, but who could exhibit no scar, was 21¾ per cent.; among those with one scar, 7½ per cent.; among those with two scars, 4 per cent.; among those with three scars, 1¾ per cent.; among those with four or more scars, ¾ per cent. It is a prevalent belief among physicians that vaccination affords briefer security against small-pox nowadays than was the case eighty years ago; and it is supposed that the explanation of the fact lies in the general use of *humanized* virus—that is, virus which has passed through several human subjects since leaving the cow, and has been thereby somewhat weakened. This belief has led to a general employment of animal virus, and the establishment of numerous depots for this material. That vaccination should become the universal practice is unquestionable; though there may be individuals who, though unvaccinated, have never contracted small-pox, yet there are also individuals who escape cholera and yellow fever. The security of a few does not alter the fact that the vast majority are susceptible, and that protection is afforded by vaccination.

Chicken-Pox.

This disease, technically known as *varicella*, is somewhat insignificant, because rarely, if ever, fatal. It is confined almost entirely to children, though cases are known in which adults also are affected. It is a highly infectious disease, and presumably spreads only by contagion.

Symptoms.—The appearance of the eruption is generally preceded by slight constitutional disturbance for about twenty-four hours. There is some fever; possibly nausea and vomiting. The rash usually appears first on the body, and afterwards on the face and head. It is well characterized from the eruption of small-pox, by the fact that it is *from the first* composed of *vesicles* (blisters), and not of hard *papules* (pimples). On the fifth or sixth day the vesicles begin to dry; by this time they may be as large as small peas, and are surrounded by a broad red margin. They soon scab and fall off, rarely leaving scars. Not infrequently a second crop of vesicles appears during the first three days.

Treatment.—The indisposition attending this disease is so slight as to require nothing more than the simplest home treatment; a saline laxative, such as the citrate of magnesia, occasional sponging and light diet will fulfill all requirements. It is desirable to isolate the child, so as to protect other children.

The only point of special interest in connection with chicken-pox is the possibility of confusion with small-pox. This mistake is often made, sometimes even by physicians, who unguardedly give an opinion before the characteristics of the respective diseases become manifest. Two points may be recognized by the non-professional: in small-pox the rash begins as hard papules, and become vesicles only after the lapse of several days; in chicken-pox the rash consists of vesicles from the outset. In small-pox the vesicles exhibit the characteristic ***umbilication***, which is *wanting* in chicken-pox.

Scarlet Fever.

This disease, technically called scarlatina, is distinguished by a great diversity of symptoms as well as by varying degrees of severity. The mildest form is comparatively trivial in its effects upon the individual, while its severest form is one of the most destructive diseases with which we are acquainted. Physicians generally distinguish for convenience three varieties of the disease, according to the degree of severity, and to the amount of complication in the throat. These varieties are called *scarlatina simplex*, *scarlatina anginosa*, and *scarlatina maligna*. It must be understood, however, that these are not distinct diseases, but merely convenient terms for the designation of different manifestations of the same disease.

Cause.—Scarlatina, like the other infectious diseases, is due to a specific virus or poison, as to the exact nature of which we are not yet informed. Like the other infectious diseases, it seems to arise only by communication from individuals who are already afflicted. Some cases, it is true, cannot be traced to contagion, but seem to arise quite spontaneously, without previous exposure to the disease; but it must be remembered that scarlet fever, like small-pox, can be communicated by articles of clothing or of furniture which have once been impregnated with the virus. Yet it by no means follows that exposure to the contagion will induce the disease. This general principle is applicable, of course, to all infectious diseases. There must be not only exposure to contagion, but also a certain susceptibility on the part of the exposed individual, in order that the disease may be developed. Yet the susceptibility to scarlet fever seems to be less general than in any other of the infectious diseases; for it is no uncommon observation that several of the children, even in the same family, who are exposed at the same time to the scarlet fever contagion, escape the disease. Indeed, it is even observed that while one child in a family suffers from the disease, others living in the same house during the entire illness of the first, escape completely. Such facts as these have caused some physicians to doubt the contagiousness of scarlet fever. But it must be remembered that there is precisely the same ground for doubting the contagiousness of any other infectious disease, since

similar facts, not perhaps so numerous, can be adduced in regard to each. The specific virus of scarlatina, like that of certain other infectious diseases, retains its power of inducing the disease for months, and may be transferred in the clothes of the attendants or visitors.

The disease rarely occurs twice in the same individual, although such repetition is more frequent in the case of scarlet fever than of most of the other infectious diseases; instances are known in which the same individual has suffered even three times from scarlet fever. The disease occurs most frequently in the third and fourth years of life; the susceptibility to it seems to decrease rapidly after the fifth year, and almost subsides in adult life. During the first and second years also the susceptibility seems to be slight, for cases in children of that age are certainly rare. Instances are reported in which the fœtus has contracted the disease before birth, though such cases are certainly far less numerous than the analogous ones of small-pox.

Symptoms.—The period of incubation, so called—that is, the interval between exposure and the first manifestation of the disease—is shorter in scarlet fever than in most of the eruptive fevers. It is usually stated at two to five days, though it seems to vary between one and six days. At this interval, after exposure there commonly occurs a pronounced chill, which may, however, be absent. Another symptom is usually vomiting, a symptom rarely absent in children. The child in many cases complains of soreness of the throat and pain upon swallowing, though it is a by no means constant symptom. When it does occur there is usually also considerable reddening of the inside of the throat, and swelling of the glands at the angle of the jaw. The other symptoms vary with the intensity of the attack. In some there is intense fever, headache and general prostration, perhaps even delirium; on the other hand, there may be no indication of constitutional affection except slight fever.

This stage of invasion usually lasts only twenty-four or, at most, forty-eight hours. On the second day there appears, usually first on the body and limbs, rapidly extending over the entire surface, a brilliant scarlet rash. While this is the usual order of its occurrence, it sometimes happens that the rash will be first perceptible on the face and neck. It consists at first of minute red specks or dots, which soon run together, forming irregular shaped patches;

yet even in these patches it can be seen, upon close inspection, that the redness is not uniform and continuous, but is made up of a mass of minute points of a deep red color, while the intervening skin is tinged less intensely red. The color disappears upon pressure with the finger, and white lines may be made by drawing a pencil or a finger-nail over the surface. The redness is usually most intense and persistent on those parts where the skin is especially thin and delicate—along the inner surface of the arms and legs and at the elbow. In some instances the entire surface is continuously red, producing the appearance which has been likened to that of a boiled lobster. The surface is usually smooth, but may cause a feeling of minute elevations. Sometimes very small watery blisters may be scattered over the skin.

The patient is usually annoyed by a general itching sensation which may amount even to positive pain; the skin is somewhat swollen, a condition which becomes evident when the patient attempts to close the hands, or places the feet upon the floor. Just as there are great differences in the intensity of the skin eruptions so the soreness of the throat may vary extremely; at times the entire difficulty seems to be concentrated in the throat. In all cases, probably, there is more or less swelling of the tonsils, and usually a whitish deposit upon their surface; in the severer cases the swelling in the throat becomes so great as to prevent the patient from swallowing anything but liquids, and even to interfere seriously with breathing, so that the voice acquires a nasal twang. Sometimes there is an escape of blood into and on the surface of the throat.

The tongue usually presents certain characteristic appearances in scarlet fever; it is often sprinkled over with projecting red points, looking as if it had been dusted with red sand. Later the coating of the tongue is cast off, leaving its surface clean and red, the points above described now projecting so as to resemble the appearance of a strawberry; hence the name *strawberry tongue*, an appearance quite characteristic of this disease.

In scarlet fever the appearance of the eruption is not accompanied as in small-pox by a cessation of the fever; on the contrary the constitutional symptoms are often increased; the degree of fever is more intense during the eruptive stage of scarlet fever than in any of the other eruptive fevers. During this stage, too, the most serious mental and constitutional symptoms occur; delirium is usual,

and convulsions (in children) very common; hence the greatest care is required on the part of the attendants, since patients not infrequently injure themselves, even precipitate themselves from windows during such delirium.

The eruption ordinarily lasts four to six days, though here, too, variations occur. Of fifty-four cases reported by Jenner, the rash disappeared on the fifth day of the disease in one case; in three cases on the sixth day; in five cases on the seventh day; in thirteen cases on the eighth day; in twelve cases on the ninth day; in eight on the tenth; in four on the eleventh, and in two on the thirteenth, fourteenth and sixteenth day respectively.

Stage of Desquamation.—About the sixth day the rash begins to fade, and in the succeeding days the surface of the skin is cast off in the shape of scales, usually of small size, like bran, though some times in large pieces; indeed the entire skin of a finger of a hand may be cast off entire like the finger of a glove. This *desquamation* may last from six to twelve days, or may not be finished for several weeks.

Such is the history of an ordinary mild case of scarlet fever without complications; yet a large number of cases, whether mild or severe during the original disease, are accompanied by complications which are often more serious in the permanence of their effects than any feature of the disease itself. Among these complications are serious affections of the throat. These are so common that one variety of the disease has been accordingly named *scarlatina anginosa*. In these cases (which are probably sometimes considered diphtheria) the swelling and ulceration in the throat and the consequent interference with respiration are so great as to concentrate the attention upon this part of the body. The rash is usually slight, and may be overlooked. The tonsils become enormously enlarged, ulcerated, covered with a brown film or *false membrane*, and often produce a great amount of matter; in these cases the glands around the angle of the jaw are greatly enlarged and sometimes become abcesses, which either break spontaneously or are opened. Another complication, especially apt to occur in these cases of severe sore throat, is deafness, partial or complete. The reason for this lies in the fact that the cavity of the ear is connected with the throat by means of a bony channel called the *eustachian tube*. The inflammation may, and frequently does, spread from the throat into and

through this tube into the middle ear; the result is the formation of matter—an abscess—in the ear and the consequent loss of hearing. In some cases there may be recovery of a certain amount of hearing even after suppuration has occurred in the ear. Sometimes the local disease in the throat is so violent as to cause extensive mortification of these structures,—*sloughing*—and this may extend even to the mouth. Then, again, a severe inflammation of the larynx (the upper part of the windpipe) may cause speedy death. Sometimes, too, the membrane surrounding the brain, and even this organ itself, becomes inflamed, resulting in more or less permanent derangements of the mental functions. From the same cause paralysis of the face or of the limbs may follow. Sometimes, too, affections of the eyes, resulting in serious impairment of vision, are observed.

But one of the most frequent and serious complications of scarlet fever is inflammation of the kidneys. It would seem, indeed, that this should be regarded almost as an essential part of the disease, though in a considerable number of cases the kidneys resume their natural state soon after the fever subsides. The complication with inflammation of the kidneys is indicated by swelling of the skin —*dropsy*— usually first noticed under the eyes, and then spreading over the face, trunk, and extremities. A certain amount of dropsy is a usual feature in all but the mildest cases of scarlet fever, and it is often one of the last symptoms to disappear. But a dropsy which persists for some time after recovery usually indicates serious inflammation of the kidneys. This inflammation may exist without noticeable dropsy, and can be, under these circumstances, detected only by an examination of the urine, microscopical as well as chemical. In every case of scarlet fever the physician should acquaint himself by frequent examination of the urine as to the condition of the kidneys; for, though everything else may go on well, the patient may succumb to this kidney disease even at a time when convalescence seems at hand. In every case in which, after the appearance of the eruption, the patient has repeated convulsions, or lies stupid and unconscious, the condition of the kidneys may afford a key to the situation.

Scarlatina Maligna, or Malignant Scarlet Fever.

Under this name is designated an affection which oftentimes exhibits none of the features of scarlet fever, but is recognized as such by its occurrence among children during an epidemic of the disease. The patient seems simply overwhelmed by some acute poisoning; lies prostrate, perhaps unconscious, with cold extremities. There is usually no fever; death commonly occurs in a few hours, before the appearance of an eruption or other characteristic features of scarlet fever.

Then, again, there are cases in which the throat affection and the general appearance and history of the patient indicate that the disease is scarlet fever, although the characteristic rash may not appear; and there are still others in which the rash may be insignificant in quantity, while the skin is reddened in patches by the escape of blood into its structure.

One characteristic feature of scarlet fever, as distinguished from all other eruptive diseases, is the rash; after this has been seen a few times it is usually easy of recognition subsequently. Scarlet fever is especially apt to be mistaken for measles; several points of distinction will be mentioned subsequently, and it will suffice here to call attention to a few items: the brevity of the stage of invasion (one or two days prior to the appearance of the eruption); the intensity of the fever; the appearance of the throat difficulty before the rash on the skin becomes visible, and the persistence of the fever after the rash has appeared. The difficulties in recognizing the disease occur in those mild cases in which the eruption is very slight without any soreness of the throat; also in those instances (scarlatina anginosa) in which there is little or no eruption, but severe affection of the throat. In some of these cases even the experienced physician may be compelled to decide by the surroundings of the patient — the prevalence of an epidemic of scarlet fever, for instance.

Treatment.— With our present means we have no power to cut short scarlet fever any more than the other infectious diseases. The remark made as to the treatment of one holds good for them all: that the object is to support and guard the patient from the ravages of the disease. In ordinary mild cases of scarlet fever no formal treatment is necessary; the child should be sponged or

immersed in a hot bath several times daily, half a teaspoonful of sweet spirits of nitre may be given every four hours (if the child be three or more years old); if there be constipation a saline laxative may be given.

One of the troublesome features is the management of the throat affection. Fortunately, this feature is absent in many cases except in a slight degree; for these the old remedy of muriatic acid and honey in equal parts as a gargle (diluted with water) may suffice. In severer cases it becomes necessary to cleanse the throat several times a day with camel's hair brushes or similar instruments. After gargling with water or with a solution of carbolic acid (one part to twenty of water) the brush may be swept over the grayish or brown surfaces, removing any particles that may be easily detached; after this a clean brush is dipped into a solution of nitrate of silver (twenty grains to the ounce of water) and the ulcerated parts of the throat are penciled with this. These throat cases, too, are often benefited by the application of cold cloths, frequently changed, to the neck.

If the fever be very high and mental symptoms prominent, great advantage will often be derived from the *wet pack*. For this purpose a sheet may be wrung out of water having a temperature of 70 degrees F. The patient, divested of all clothing, is wrapped in this sheet, and covered with several blankets. In the course of half an hour or so, the individual is usually perspiring freely, and feels greatly refreshed, and often enjoys tranquilizing sleep. This measure may be executed two or three times daily; there is no danger of "driving in the rash," according to the popular prejudice.

In the severer cases, whether complicated by affections of the throat or not, an important feature of the treatment is the administration of light and nutritious food. The usual fare—milk, eggs and broth—must be in such cases supplemented by alcoholics in some form, egg nog or milk punch. To the same end it is advisable to administer quinine regularly; for a child of three years the dose may be one-half to one grain four times a day.

Another indication for treatment in scarlet fever is the itching which so often annoys the patient. A popular, though not especially desirable, remedy consists in lubricating the skin with lard; a preferable substitute is a solution of glycerine, either in simple water or in rose or cologne water—one part of glycerine to four of rose water.

In cases of mental disturbance—stupor, delirium and convulsions—the source of the difficulty is often the failure of the kidneys to discharge their functions properly. In such instances the greatest hope of relief lies in brisk purging and in the wet pack.

There are cases, too, in which there is no evidence of inflammation of the kidneys until after the peeling off—desquamation—has begun, so that dropsy may become apparent a week or two after the crisis of the disease has passed. This must not, however, be considered as an indication that the patient has taken "a fresh cold," for it is usually a portion of the disease itself.

Measles.

The disease, also known as *morbilli* and *rubeola*, is of far less importance, with regard to the immediate danger to life, than either small-pox or scarlet fever; and yet there so often follow in the train of measles complications which may have a permanent effect upon the health and vigor of the individual, that the disease is, nevertheless, one of considerable importance. Moreover, it is important to be able to recognize measles because of the similarity of this disease with scarlet fever, and the consequent possibility of mistaking one for the other.

The period of incubation—the interval between exposure and the onset of the symptoms—is from ten to fifteen days; then occurs the *stage of invasion*. The onset of the disease resembles a severe cold or an attack of influenza. The individual sneezes repeatedly, and there is an acrid discharge from the nostrils; the eyes are also usually inflamed, red and watery. There is, also, soreness of the throat, hoarseness, and a dry, painful cough. At the same time there is usually a chilly sensation, perhaps shivering, but rarely a distinct and pronounced chill. Then begins a fever, usually less intense than that of scarlet fever; the appetite is impaired; nausea and vomiting may occur; there are wandering pains in various parts of the body, especially in the head and limbs; there is general debility and languor. In children more marked symptoms, such as convulsions and bleeding at the nose, may occur; sometimes, too, the disease is ushered in with an attack of false croup.

After a time, which varies somewhat, though averaging about four days from the beginning of the symptoms, there occurs the *stage of eruption*. The rash is usually first seen on the forehead and temples, rapidly spreading over the face and neck. Within forty-eight hours the entire body and extremities are covered. It will be noticed, therefore, that the spread of the rash in measles is less rapid than in scarlet fever or small-pox.

The rash begins with minute red specks similar to those of the scarlatinal rash, except that the color is a less intense red; the rash of measles, moreover, is usually arranged in somewhat crescentic patches. The specks at this stage resemble the pimples of small-pox before the formation of vesicles, but they do not give that shot-like sensation to the finger; they are more like flea bites. The eruption is often attended, like that of scarlet fever, with considerable itching, and there may be some swelling of the skin, especially on the face. Sometimes a few vesicles may be observed among the dark red patches. The fever continues until about the fourth day after the appearance of the rash, when both fever and eruption gradually disappear. The rash begins to fade where it began to appear—on the face.

Most of the symptoms which were present before the appearance of the rash—the inflammation and discharge from the eyes, nose and throat—continue during the eruption.

Stage of Desquamation.—The fading of the eruption and the scaling of the skin occupy ordinarily four to eight days. The skin does not peel off to the same extent as in scarlet fever, the scales being always small and not patches. The fever which has persisted during the eruption now begins to decline, though the cough and inflammation in the eyes may continue for some days subsequently.

Such is the history of an ordinary case of measles; there are several variations from this type, and several complications may aggravate the gravity of the disease. The affections of the eyes, nose and bronchial tubes, though quite characteristic of this disease, are sometimes wanting; and there are cases which are unmistakably measles, though the peculiar rash is but imperfectly developed. Sometimes, too, severe cases of measles, like those of scarlet fever, are characterized by the escape of blood from the blood-vessels into the skin, making diffuse dark-red patches.

Among the complications which often follow measles are obstinate affections of the eye and of the larynx, and severe inflammation of the lungs; somewhat less frequently there occur attacks of diphtheria and true croup. A possible complication also is deafness, originating in the same way as was described in connection with scarlet fever.

The more important points distinguishing this disease from scarlet fever and small-pox are the length of the period of incubation, the long interval after the first symptoms before the rash appears, the affection of the eyes, nose and air passages, the appearance of the eruption first on the face and its gradual extension over the body, the dark-red color of the rash and its arrangement in circular or crescent-shaped patches. Until the appearance of the rash it is impossible to decide definitely upon the nature of the complaint, and hence in those exceptional cases in which the rash does not appear a definite diagnosis is almost impossible.

Treatment.—The directions already given for the treatment of mild cases of scarlet fever apply equally well to measles, except that in the latter complaint there is rarely any necessity for local treatment of the throat. Sometimes it becomes necessary to make cold applications to the eyes, or to administer a few drops of paregoric for the cough. The usual indications for treatment consist in the complications already described. Only one requires especial notice here—the tendency to consumption, which seems to be conferred in some cases of this disease. This should be borne in mind in the after-treatment of measles.

Roseola.

This affection, sometimes called false measles, is a disease of no gravity, but possessing a certain importance, because it is necessary to avoid confounding it with scarlet fever or measles.

In most cases a certain amount of constitutional disturbance—headache, loss of appetite, sometimes nausea and vomiting, a slight chill and some fever, precede for a day or two the eruption. This appears finally as rose-colored spots, which are not raised into pimples, but disappear temporarily upon pressure. It appears upon the trunk more commonly than upon the face, and usually lasts not

more than two days. It is readily distinguished from scarlet fever and measles by the absence of the throat affection in the one case and of the inflammation in the eyes and nose in the other case; moreover, the rash is easily distinguishable from those of the two diseases named; it requires no treatment.

Table exhibiting the differences between small-pox, scarlet fever and measles.

Measles.	Scarlet Fever.	Small-pox.
The period which elapses between exposure to contagion and the beginning of the disease is usually *seven* to *fourteen* days.	The period between exposure to contagion and the beginning of the disease is variable, often *three* to *six* days, but may be several weeks.	The period between exposure to contagion and the beginning of the disease may vary from five to twenty days, and usually about *ten* days.
Fever is moderate; it does not decrease, but often *increases* when the eruption appears.	Fever is intense; continues without interruption after the eruption appears.	The fever is usually high; it subdues when the rash appears.
The eruption makes its appearance on the *fourth* day, first on the *face* and neck; it spreads *gradually* for two days over the rest of the body.	The rash makes its appearance on the *second* day, first on the *neck and chest*; spreads over the entire body *rapidly* in eight to ten hours.	The eruption makes its appearance on the *third* or *fourth* day, being first seen *around the mouth* and on the *forehead*.
The eruption appears as *crescent-shaped patches*, the intervening skin being healthy.	The rash is spread *uniformly* over the skin, without intervening patches of healthy skin.	The rash consists at first of *pimples* which become a day later watery *blisters*. Finally these blisters become white, and are drawn in at the center—*umbilicated*.
The rash lasts *five* days, at the end of which time the skin peels off in very *fine scales*.	The eruption lasts *six* or *seven* days, when it begins to peal off in *large flakes*.	
The tongue is coated and red at the edges.	The tongue is covered with numerous fine red points, which give it the name "strawberry tongue."	The tongue is heavily coated and often swollen.
Running of the eyes and nose and *bronchitis* are usually *present*.	There is *rarely* any noticeable *bronchitis* or *running of the eyes and nose*.	There is no running at the eyes or nose, and not often bronchitis.
Sore throat is very *rare*.	*Sore throat* is always *present*.	Sore throat is often present, but not so marked as in scarlet fever.
The *mind* is *not* affected.	The mind is usually affected; there may be *delirium* and *convulsions*.	The mind is often affected; delirium and convulsions may occur.
There is no *secondary fever*; that is, after the first fever has subsided, which happens during the second or third day after the appearance of the rash, no further fever occurs.	There is no *secondary* fever	*Secondary fever always* appears after the rash has been visible for several days.
Measles is often followed by chronic bronchitis, consumption and inflammation of the eyes.	Scarlet fever is often followed by *Bright's disease*, *dropsy*, inflammation of the eyes, deafness, and enlargement of the glands about the throat; sometimes by paralysis.	Small-pox is not usually followed by other diseases, though the pocks may result in serious damage to the eyesight, as well as cause unsightly scars on the skin.

ESCARLATINA.
SCARLATINA.

SARAMPION.
MEASLES.

Diphtheria.

One of the most frequent and important affections, next to the essential fevers, is diphtheria. This disease prevails often as an epidemic, and in the intervals between these epidemics is always more or less prevalent. Unlike many of the infectious diseases, it seems to be independent of ordinary hygienic regulations—attacks all classes of the community, and at all times of the year. It is supposed that Washington and the Empress Josephine were among its victims during epidemics.

While the disease thus may occur quite unexpectedly, yet it is equally certain that a large number, if not the majority, of cases designated diphtheria by some physicians, as well as the non-professional, have no right whatsoever to that name. For diphtheria is a general, a *constitutional affection*, usually manifesting itself, it is true, by inflammation in the throat, among other symptoms, but by no means comprised in a local inflammation, whether in the throat or elsewhere. The numerous cases in which the throat is red and sore, and perhaps a few whitish points are visible on the tonsils—such cases are not necessarily diphtheria, and in fact have rarely any of the characteristic signs of diphtheria. There may be, it is true, mild cases of the disease, in which the constitutional symptoms are not sufficiently severe to invalid the patient completely; yet in most instances, even when the local disturbances in the throat are not severe, the patient is nevertheless unquestionably ill.

Symptoms.—The symptoms of diphtheria, while agreeing in most essentials, present wide diversities in the degree of those features. One of these differences occurs in the development of the disease. Sometimes the onset is very rapid and acute; the patient suffers a severe chill, followed at once by a high fever. In other cases, again, the commencement is gradual and insidious; the patient complains for some days or a week of vague and indefinite illness, perhaps even without alluding to any unusual soreness in the throat. It may even happen that the discovery of the throat affection is made accidentally, especially in the case of children. The consideration of the symptoms may be, for convenience, divided into those which affect the system generally, and those which are associated immediately with the inflammation in the throat.

The sensibility of the throat would seem to be somewhat diminished in this disease, since there is rarely so much pain and soreness as would seem inseparable from the extreme swelling and inflammation that are seen actually to exist. A point which should never be forgotten in household practice is to inspect the throat whenever an individual is suffering from any indefinite ailment; if this were a more general practice, mothers would often be spared the surprise and chagrin which occurs when, upon the first visit of the physician, he discovers in the throat of the child, who may have been ill several days, a thick, white coating of diphtheritic membrane. The act of swallowing is sometimes accompanied with considerable pain, but not necessarily so, even though the throat be considerably inflamed. Another symptom which may be present early in the disease is a paralysis of certain muscles concerned in swallowing, so that this act is but imperfectly performed; as a result fluids return through the nostrils. In these cases there may also be an acrid discharge from the nose, causing soreness of the adjacent parts of the skin. Then, again, the simple mechanical effect of the swelling in the throat may interfere seriously with swallowing, and even breathing.

Although the local affection is usually manifested first, and chiefly in the throat, yet it is not necessarily limited to this part of the body, but may extend also into the larynx. Under these circumstances, the symptoms of true croup are added to those of diphtheria. Weakness of the voice, a peculiar character of the tone, difficult, labored and audible respiration, with the characteristic " croupy " cough, mark the spread of the disease to the larynx. This, however, is not an extremely common complication; many symptoms indicating difficult respiration may be caused by the swelling in the throat, without any interference with the larynx. For diphtheria proper is entirely distinct from croup in the location of the throat inflammation, as well as in its essential nature.

As has been said, there are mild cases in which the patient is scarcely compelled to take his bed; yet the gravity of the case is not always indicated by its severity at the outset. There is not usually so high a grade of fever as characterizes scarlet fever; at times, indeed, the skin seems only naturally warm to the hand. An occasional symptom is the rupture of small blood vessels, causing reddish spots on the skin; a similar rupture in the vessels of the nose accounts for the bleeding from the nostrils which is some-

times observed. There is no skin eruption characteristic of diphtheria, although various forms of rash not infrequently occur during the course of the disease.

The digestion is quite deranged, even before the swelling of the throat makes swallowing difficult. This derangement of digestion is indicated, as in other constitutional diseases, by loss of appetite, coating of the tongue, often vomiting. This is a symptom of considerable practical importance and gravity, for it interferes seriously with the success of efforts for sustaining the patient's strength, and in probably no other disease is his strength so soon exhausted as in diphtheria. The mind is not usually affected unless the case terminate fatally. In children, it is true, convulsions occur, as they may from other causes, even when slight. Dropsy, so frequent in scarlatina, is an unusual symptom of diphtheria.

The disease may last one to two weeks, before the patient begins to convalesce. Fatal cases may, of course, terminate much sooner. There is a malignant form of diphtheria which, like malignant scarlet fever, may destroy the patient's life before the characteristic symptoms of the disease are manifested. Yet diphtheria is by no means over when the patient begins to convalesce, since some of the numerous complications may seriously impair his health for months subsequently.

Perhaps no other of the infectious diseases brings in its train such a number and variety of complications as diphtheria. First of all is the paralysis of the muscles concerned in swallowing and in articulation. These muscles may not be affected until the severer symptoms of the disease have subsided; and they may recover their power within a few weeks; so long as the difficulty endures, there will be difficulty in swallowing; and fatal accidents have been known to occur from this very cause—the food passing into the windpipe and causing strangulation. Sometimes it is even necessary to feed the patient through a stomach-tube. The paralysis may also affect other muscles than those engaged in swallowing; the muscles of the eye are occasionally affected, the iris being paralyzed so as to keep the pupils dilated. The result is that the patient is unable to read ordinary print, becomes, in fact, far-sighted; then again the arms or legs—often the latter—may exhibit partial or complete paralysis. There may be impairment of sensation also, as well as of motion; that is the power of feeling may be partly or completely lost. This loss is usually limited to a portion of the face; or there may be loss

of power to perceive light; there may be also a change in direction of one or both eyes—the individual is, in other words, cross-eyed. So, too, the muscles concerned in breathing may become paralyzed, giving rise to difficulty in the performance of this act, and even causing danger from the failure to breathe. There may be also impairment of the muscles concerned in the evacuation of the bowels and bladder; also impairment of sexual power and instinct.

The characteristic feature of diphtheria, by which alone we are enabled to express a positive opinion as to its nature, is the peculiarity of the local inflammation; this, it is true, is usually found in the throat, but not necessarily so, since we recognize as diphtheria cases in which the same local inflammation is found on other mucous membranes, those of the intestine and of the female genital organs especially. As seen in the throat, the first appearance is usually redness accompanied by swelling of the tonsils; the surface of these is soon covered with a thin grayish substance, which, in the course of a day or two, is much increased in thickness and becomes white or ash-colored. This substance—the diphtheritic membrane—varies much in its extent and location. In bad cases it forms an almost unbroken sheet over the tonsils and perhaps on the back of the throat as well; but in most instances it appears merely in small patches scattered over the tonsils and back part of the mouth and pharynx. The gray membrane is surrounded by an intensely red area. When these gray patches are detached there appears to be a bright red surface with numerous bleeding points. Furthermore, the detachment of one layer may be followed by the formation of a second and even of a third membrane on the same spot. In this characteristic—the bleeding surface upon gentle removal of the membrane—is found one of the characteristics of the diphtheritic as distinguished from other gray patches in the throat. It is no uncommon thing to find, even in healthy throats, and especially in those subject to a little catarrh, grayish white spots, particularly on the surface of the tonsils. These should not be mistaken for diphtheritic membrane; they are not surrounded by the intensely red area, they do not cling to the surface with the same tenacity, nor do they leave when detached a bleeding surface. These are the cases which are so often miscalled diphtheria.

The true diphtheria is usually accompanied by swelling of the glands at the angle of the jaw; this swelling may subside with the affection in the throat, or may result in the formation of abscesses.

Cause.—Like the other infectious diseases, diphtheria is due to a specific virus or poison; that it is eminently communicable, admits of no doubt, though it seems, with our present knowledge, that it may also originate without previous exposure of the individual to a patient suffering from the disease. The malignant form of diphtheria occurs especially as an epidemic. It is an interesting fact, that these epidemics were unknown in America between 1771 and 1856, while since this latter date they have frequently visited all parts of our land. Such an epidemic is often restricted to a particular section of country; it may even prevail on one bank of a stream, while the other side escapes unvisited. The greatest susceptibility to the disease appears to be childhood, between three and twelve years especially; yet people of all ages are susceptible to a greater or less extent.

The chances for recovery from diphtheria vary extremely with many circumstances. The scattered, so-called sporadic, cases are attended with far less mortality than the average epidemic. One of the dangers is from an extension of the inflammation to the larynx; such cases usually terminate fatally. A second peril is from exhaustion; in some instances, as has been already narrated, death occurs within a day or two, before the local effects of the disease have been manifested in the throat. Such cases evidently die overwhelmed with the violence of the poison; and many other instances occur in which the patient, though resisting for days the onset of the disease, finally succumbs before the condition of his throat is such as to imperil life. A third danger is one which cannot be foreseen, and scarcely explained, that is sudden fainting, from which the patient cannot be aroused; this has repeatedly occurred in individuals who were apparently convalescent, but who, upon some unusual effort, even getting out of bed, have swooned and died. In view of this fact, it is important to use especial care during the convalescence from diphtheria, particularly in those who have suffered from severe attacks. If death occurs from simple exhaustion, it is apt to happen during the second week of the disease.

Treatment.—The treatment of diphtheria resolves itself into two chief aims: general treatment, that is the support of the patient's strength; and local measures, to subdue and restrain the inflammation in the throat. For this latter purpose, measures vary according to the severity of the inflammation and to the effect upon the throat. It will rarely be advisable to use strong caustics; in

most cases a gargle of some antiseptic properties will best answer the purpose. One of the best of them is the following:

Hyposulphite of soda, - -	Three ounces.
Glycerine, - - - -	Two ounces.
Water, - - - - -	Six ounces.

Half an ounce of this solution may be placed in a glass of water and used as a gargle at short intervals. If the patient be a child too young to gargle, this solution may be applied directly to the throat by means of a camel's hair brush. Much comfort and benefit will also be derived from permitting the patient to hold pieces of ice in the mouth until dissolved. Instead of the above solution, the familiar mixture of muriatic acid and honey in equal parts; lime water; carbolic acid (one part to twenty of water), may all be employed. If there be much difficulty in breathing, relief will be obtained by saturating the atmosphere of the room with steam; or a tent may be made out of a sheet and placed around the bed; a kettle of boiling water may be made to discharge its steam into this tent, and thus accomplish the desired object. Cloths wrung out in hot water may also be applied to the neck.

Yet the greater reliance must be placed upon the constitutional treatment, for which alcohol in some form is absolutely indispensable. There is but little danger of intoxicating the patient. Half an ounce of brandy may be given every hour to a patient twelve or thirteen years old, with the best results, if the case be one of extreme exhaustion. Another important agent is quinine, a grain of which may be administered in the whisky or brandy every hour or two during the day. If the patient be very young, say three or four years old, half a teaspoonful of brandy and a quarter of a grain of quinine would be a sufficient dose. Sometimes considerable difficulty is experienced in persuading the patient to take nourishment. The danger from this must be recognized and necessary measures employed to meet the requirements of the case.

In cases where the larynx is obstructed by the formation of false membrane, the outlook is extremely serious; yet, even in these, it is sometimes possible to save the life apparently lost, by making an opening into the windpipe—an operation technically called tracheotomy—whereby the imminent danger, suffocation, is averted. This fact is mentioned here, not because the operation should ever be undertaken by other than a skillful surgeon, but simply to emphasize the value of tracheotomy in proper cases. There

are, it is true, instances in which the patient must eventually die of exhaustion, and the result could not be averted by the simple admission of air to the lungs. Yet it is equally true that there are many instances where death occurs from suffocation, and in which a timely performance of tracheotomy would undoubtedly have saved life, as it has done in numerous other instances. The difficulty lies in the fact that parents obstinately refuse to listen to any suggestion for the use of the knife until it becomes evident that the child must die, and then the operation is, of course, too late; and there is no doubt that the responsibility for many a child's death rests upon the unreasoning dread and prejudice of the parent against an operation.

Typhoid Fever.

The onset of typhoid fever, unlike that of the eruptive fevers and of most infectious diseases, is gradual and insidious. In a large number of cases, patients are unable to fix definitely the date at which their ailment commenced, since the beginning of the disease is so imperceptible. It is, therefore, impossible to say just how long the stage of incubation endures, though the average seems to be from three to ten days.

During this premonitory stage the patient, while usually able to continue his avocation, is nevertheless not in his usual state of health. He experiences chilly sensations, shivering, perhaps even pronounced chills occurring at irregular intervals, perhaps often repeated At the same time he suffers from headache, usually in the forehead, his mental faculties seem enfeebled, he is unable to concentrate his attention with the usual vigor, and feels generally prostrated and languid. Impairment of appetite, nausea, and even vomiting are not unusual symptoms. There is usually a tendency to diarrhea, which is aggravated if the patient incautiously takes a laxative. A frequent symptom is bleeding at the nose without apparent cause. After these symptoms have endured perhaps a week, the individual is compelled to give up his occupation and take to his bed.

The recognition of typhoid fever depends not so much upon any one special symptom as upon the grouping of numerous features after a certain arrangement. It is therefore desirable, in

discussing the symptoms of the disease, to refer in detail to the changes presented by different parts of the system.

Symptoms.—During the first few days there is no especial change in the countenance, unless it be a persistent, dull red flushing of face. As the disease progresses, usually by the time the patient takes to his bed, there is an unusual lack of expression, a degree of listlessness and even of stupidity, which attracts attention. There are cases, indeed, in which the severity of the attack seems to be expended upon the nervous system, so that one is inclined to overlook the other symptoms in the evidence of mental derangement. In such cases the patient, even before taking to his bed, may seem half deranged, taking no notice of questions until repeatedly addressed to him, and then muttering incoherent replies. The skin is usually somewhat reddened, especially on the face; and this redness, while disappearing upon pressure of the finger, returns in a sluggish way never observed during health. This same appearance of the skin may be found, also, upon the abdomen and upon the arms, indicating a feebleness of the circulation.

During the first week in bed the patient, if not too stupid and listless, complains of a dull, aching pain in the head. His complaints become less frequent toward the beginning of the second week, probably not because the pain is less severe, but because the patient's ability to perceive pain is less acute. For about the beginning of the second week the symptoms of mental derangement usually become prominent; in the majority of cases delirium occurs —not the violent, active delirium which we are accustomed to associate with that name, but a low, muttering delirium quite in accord with the physical debility of the patient. The first evidence of this is often given by the patient upon awakening from sleep; he is evidently confused, cannot recall where he is, and answers questions incoherently. At a later period he talks constantly in a low, feeble tone, usually repeating frequently that he wants to go home, and often accompanying this wish by feeble efforts to get out of bed. No mental restraint is possible, since so soon as one effort to rise has been defeated the patient makes another attempt. If not carefully watched, the individual will leave his bed, if physically able to do so, walk out of the house, usually in his night clothes, and may even wander a considerable distance away until he falls exhausted. There is no apparent coherence of ideas; the patient's thoughts

seem merely a succession of dreams which have no relation to his actual condition. There are exceptions to this type of delirium, in which the patient is active and boisterous, shouts, makes forcible efforts to rise, and may even display a belligerent spirit for his attendants, requiring forcible restraint. Then again his delirium, instead of being a mere succession of disjointed ideas, may take the shape of a fixed delusion, the patient imagining himself extremely rich or powerful. It is usually the case that, while the patient talks somewhat coherently, he has no idea of the meaning of his words, on which account no reliance can be placed upon his answers. This fact should be borne in mind, in endeavoring to elicit information from the patient as to his own feelings of pain, etc. In exceptional cases there may be no evidence of delirium throughout the entire illness, though the patient even then rarely has, after convalescence, any distinct recollection of what occurred during his sickness.

Associated with the delirium is an utter indifference to everything in the shape of physical comfort and welfare. The patient asks for nothing to eat or drink, though the mouth may be dry and parched and the unfortunate person be constantly endeavoring to moisten his lips with his tongue; flies are allowed to creep over his face without any indication of annoyance on his part; he will lie listlessly in one position in the bed until the skin becomes sore. In grave cases it often happens that the patient will evacuate the bowels and bladder in the bed, apparently from simple indifference. Sight and hearing are usually impaired; at any rate, light and noise of unusual intensity are required to attract even the slightest attention. One of the features of this disease, which must never be forgotten in its treatment, is the patient's inability to sleep. During the first few days, before his mind becomes benumbed, he usually complains of this exhausting lack of sleep; but later he is as indifferent to this as to everything else, and lies in a condition which may seem to the bystander sleep, but which is practically a condition of wakefulness. He is easily aroused, but lapses at once into this semi-unconscious state. Doubtless this lack of sleep contributed largely to the exhaustion which constitutes one of the greatest dangers. One of the features of this condition is a twitching of the tendons or "sinews," in the wrist especially, though there may be a similar appearance in the muscles of the face and limbs. In grave cases there may be general convulsions, which usually shortly precede death.

There is usually no appetite; indeed, the patient can sometimes be fed only by force; yet in exceptional cases food is readily taken throughout the entire illness. Thirst seems always prominent as a symptom; even when the patient's mind is so blunted that he does not ask for a drink, he may take it with avidity when administered.

The teeth become covered during the second week with dark brown or black matter, called *sordes;* this is especially abundant in unusually severe cases; the gums may be swollen, and bleed readily upon pressure; the tongue presents characteristic appearances. At the beginning, that is, before the patient assumed the recumbent posture, the tongue is heavily coated white, yellow or brown, and indicates an unusual lack of moisture. During the first week of the disease proper, the surface of the tongue usually becomes brown, hard, dry and glazed; it seems divided into small sections, like mosaic work, and may be deeply cracked. When asked to protrude the tongue, even in the early stage of the affection, the patient complies with apparent difficulty, the tongue refuses prompt obedience, and when finally protruded is very tremulous. Having put out his tongue, the patient sometimes forgets to withdraw it until reminded of it—another indication of the tardy and uncertain character of his mental acts.

Another usual symptom is diarrhea; the stools are usually very thin, watery and of a yellow color, though these characters are not invariable or necessary. The abdomen usually becomes somewhat distended with gas, and a gurgling sensation may be felt by pressure with the hand just above the right groin. In the earlier weeks of the disease, pressure upon this spot often causes the patient to wince; indeed, there may be tenderness over a considerable part of the abdomen. This is to be explained by the fact that typhoid fever usually causes ulceration in the intestine just at that point which lies in the right groin. This ulceration explains several of the unfortunately frequent and dangerous incidents of the disease. The first of these is hemorrhage from the bowels. This may occur at any time in the latter part of the disease, and even during convalescence. Without any warning or premonitory pain the patient passes a large quantity of blood from the bowels, the hemorrhage sometimes continuing until the individual faints. Notwithstanding the alarming appearance from this accident, the result is not necessarily fatal. Another and almost invariably fatal result of this ulceration in the bowels, is *perforation* of the intestine; that is, the

ulceration extends through the wall of the intestine, permitting the contents to escape into the abdominal cavity. The result is a fatal inflammation of this cavity, termed *peritonitis*. This accident, too, may occur without especial cause or warning, at any time during or after the third week; it sometimes happens while the patient is convalescent.

During many cases of typhoid fever an eruption is observed on the skin of the abdomen and chest, sometimes also on the back; this rash consists of a few scattered red pimples, an eighth of an inch or less in diameter. This eruption, if it appear at all, becomes visible during the second week. In this, as in other severe affections, there are often observed minute watery blisters scattered over the neck and chest particularly. The patient not infrequently has a short dry cough, and may even raise a little mucus. An occasional complication usually involving a fatal result is an inflammation of the lungs, pneumonia.

Cause.—Typhoid fever is another of the infectious diseases which is to be ascribed to a specific virus or poison. Yet the present state of our knowledge would indicate that the disease is not directly communicated by contact of the sick with the well individual. The disease seems capable of manifesting itself without previous exposure to this disease; yet it is unquestionable that the excretions — the stools — of a typhoid fever patient may be the means of disseminating the disease among healthy people. The contagion is conveyed in the water of wells and cisterns, as has been amply demonstrated by observations upon the German and Austrian soldiery, as well as by cases in civil life. City physicians are well aware that typhoid fever is specially apt to occur in those dwellings in which, however elegant the general appointments, the sewerage is defective, as indicated by the odor from the traps.

Typhoid fever, while occurring during all seasons of the year, is especially frequent in the fall, at which time it may amount almost to an epidemic. The average mortality varies extremely, being of course greater during epidemics; at these times there may be one fatal result in three or four. At other times, however, the average mortality is rarely more than one in six or seven.

Treatment.—The object here, as in other infectious diseases, is simply to assist the patient to bear the ravages of the disease; hence the chief measures will consist in such food, medicine and

hygienic arrangements as will conduce to the preservation of the patient's energies. It is impossible to cut short the disease.

Nowhere in medicine is there more imperative demand for *good nursing*. This constitutes indeed the most important part of the treatment of typhoid fever. It is not necessary to repeat in detail directions which have been already several times given as to the management of other fevers; it is sufficient to say, in brief, that fresh air, frequent lukewarm baths, or the use of the wet pack every day, when the fever is high, an abundance of nourishing food — *liquid* food — with a liberal allowance of alcoholic stimulants. In the early weeks of the disease the headache may be so severe as to require treatment. This may be relieved by the application of ice water, alcohol and water, or cologne water to the head, or by the use of the ice cap. It will generally be found advisable to shave the head so soon as the disease is definitely recognized as typhoid fever. In order to break up the distressing inability to sleep, it will be desirable to give an opiate, say 20 drops of laudanum. The diarrhea requires no checking unless the stools are extremely thin and watery, and are passed more than four times a day. In this case we may administer ten drops of laudanum every four hours for one day. It is not advisable for the non-professional to attempt to control the bowels, since the source of great danger lies in the intestines, and the peril may be aggravated rather than diminished by the remedies used. Instead of laudanum, ten drops of the oil of turpentine may be administered in a teaspoonful of simple mucilage four times a day. The energy of the household can be better directed to the preparation of the diet. One thing should never be forgotten, that no solid food should be given to a typhoid fever patient until his convalescence is complete; for the passage of undigested particles along the intestine may not only aggravate the ulceration, but also provoke hemorrhage or perforation of the intestine — those especially dreaded accidents. As early as the second week it will be necessary, in the greater number of cases, to administer wine or whisky, which may be best given in the shape of milk punch. If the pain and distension of the abdomen are considerable, benefit may be derived from the use of flannels wrung out in hot water and sprinkled with turpentine over the abdomen. So long as the patient's mental condition permits, pieces of ice may be held in the mouth, and after that cold drinks may be administered. Care should be taken to keep the mouth and teeth free from sordes.

During the convalescence from typhoid fever, especial care must be taken to avoid violent effort, since such effort favors perforation of the intestine and hemorrhage — accidents which have been known to happen weeks after the symptoms of the fever had subsided. The patient should be taken into the open air early and often, but not permitted to walk or strain in any way until he has recovered a fair degree of strength.

Typhus Fever.

This disease presents an extreme similarity to the one just described — typhoid — as is indicated by the respective names. Indeed, it was for a long time uncertain whether they were really two separate and distinct diseases, or were merely two manifestations of the same disease. The question, however, has long since been decided, not only by a closer study of the appearance of the disease, but also by the evidence that they occur under different circumstances and from different causes. Typhoid fever occurs, as has been stated, not only as epidemics, but also in *sporadic* or scattered cases, which may occur in any class of society, and among individuals whose hygienic surroundings are good. Typhus fever, on the other hand, is almost always traceable to the accumulation of the effluvia from human bodies, especially when closely crowded. It occurs in the crowded and filthy quarters of towns, in ill-kept jails, on board ships, and in military camps. It is especially frequent in the winter, because during this season people are more closely crowded in these locations, and spend a greater number of hours per day in the close and foul air of their dwellings. So common, indeed almost exclusive, is the origin of this disease in crowded quarters, that it is variously termed *ship fever*, *jail fever*, and *camp fever*. In our country it is usually confined to the large cities on the sea coast, to which it is brought by ships, especially by the emigrant vessels arriving from Ireland. This is well illustrated in an epidemic which occurred in the years 1861–5, in New York city. A committee of the Medical Board of Bellevue Hospital, appointed to investigate the origin of the disease, ascertained that the first case observed was that of a child who had come from Ireland to this country two weeks before the development of the disease. From this child the fever attacked other individuals in the same tenement house and in an adjoining building, so that sixteen cases of the disease occurred

in the two houses within three months. During the two succeeding years the cases of typhus fever which were received into Bellevue Hospital came almost entirely from these houses and their immediate vicinity.

Unlike typhoid fever, the disease under discussion is eminently contagious. While typhoid fever seems to be communicated through the discharges of the patient, and by the use of infected drinking water, it is by no means established that it is ever acquired by simple contact with a sufferer from the disease; typhus fever, on the other hand, is readily communicated by simple presence in the patient's room. This was well illustrated in Bellevue Hospital, during the epidemic to which reference has already been made. At this time there were in the hospital twenty-two resident medical officers, of whom fifteen were attacked by typhus fever; ten of these fifteen acquired the disease while performing medical duty in the fever wards, two others while taking care of an associate who had contracted the disease. Quite a number of the hospital attendants, and of patients admitted to the hospital for other complaints, also contracted the disease. Yet immediate contact with a patient seems to be necessary, and even then the danger of contagion is much diminished if the room be well-aired and ventilated.

Symptoms.—The stage of incubation seems to be somewhat shorter than that of typhoid fever, and the patients are usually compelled to take to bed within two or three days after the manifestation of the first symptoms. During this time the appearance and history of the case are essentially the same as in typhoid fever, with the exception of one feature: the signs of intestinal difficulty—diarrhea, pain, tenderness, and swelling of the abdomen—are usually absent. The countenance usually exhibits the same features as in typhoid, except that mental activity is arrested earlier in the disease, and hence the dull, listless expression is earlier exhibited. The delirium and prostration are manifested earlier, as a rule, than in typhoid fever. The tongue presents less frequently the brown, glazed, fissure appearance characteristic of typhoid, but is more commonly covered with a thick black coating. The symptoms indicating inflammation of the bowels, characteristic of typhoid fever, are usually absent in typhus; hemorrhage from the bowels and perforation of the intestines are accordingly rare events.

The skin, too, usually presents a marked difference between the two diseases. An eruption very similar indeed to that of typhoid, but more profuse and generally distributed, is, in the great majority of cases, present at some period in every case of typhus fever. The spots, too, are not raised as in typhoid fever, but are simple discolorations of the skin which cannot be distinguished by the finger from the surrounding skin; they are smaller than the papules of typhoid, do not come and go as in the case of the latter, and sometimes terminate in small hemorrhages.

Typhus fever is usually of shorter duration than typhoid, the average period being fourteen to sixteen days. It attacks adults more frequently than children, though the latter are by no means exempt.

Treatment.—The general principles recommended for the treatment of typhoid fever are applicable also to this allied affection, yet one feature, important as it is in the treatment of typhoid, is absolutely essential in all cases of typhus fever, and that is fresh air. The accumulated experience in hospitals, camps and jails shows that the mortality is immensely reduced by treating these cases in open air, tents, or sheds, the other essential remaining essentially the same. During the New York epidemic, already referred to, the average mortality in the hospital wards was one case in six, while in the tents on Blackwell's Island it was but one case in seventeen.

Relapsing Fever.

This disease occurs comparatively rarely in this country, but is a familiar visitor in Europe and in Asia. The cases that are seen in the United States are generally importations from abroad. Like typhus fever, it occurs especially in overcrowded districts and houses, and is a so frequent accompaniment of famine in Ireland that it has been called "famine fever."

The onset of the disease is usually abrupt; there appears to be no stage of incubation. The patient, previously in good health, suddenly experiences a chill, followed at once by intense fever. Nausea and vomiting are frequently present, and the patient is occasionally jaundiced. The extreme prostration and the abdominal

symptoms characteristic of typhoid and typhus fever are absent; so, too, the mental disturbances usual in these other diseases are not observed.

The most marked feature of this disease is the one indicated by its name—the *relapses*. The fever lasts at first from five to seven days, at the end of which time the patient apparently recovers, and may even resume his avocation. At the end of another seven days, however, a second attack follows, identical in all essentials with the first; sometimes after another interval of freedom from fever, a third attack similar to the preceding occurs. The features of the disease may vary somewhat; the duration of the febrile stage may vary from three to ten days, and the intermission between the febrile attacks may likewise vary. It may also happen that the interval between the attacks is not a perfect cessation of the fever, but merely a fever of diminished intensity.

Cause.—In every case of this disease which has been carefully investigated, whether in Europe or in India, there has been found a microscopic organism of spiral form, and exhibiting active movement. These organisms—technically called *bacteria*, a species of vegetable—are found in immense numbers in the blood of these patients during the febrile attack. It is all but established that the disease is due to the presence of these organisms in the patient's blood.

The Malarial Fevers.

The so-called malarial fevers are all distinguished by a certain variation in the degree of the fever at different periods of its continuance. They all occur in certain well-defined, often extensive, regions of country, and are most abundant during certain seasons of the year.

Intermittent Fever.

Intermittent fever is marked by the occurrence of febrile attacks at regular intervals, and by the freedom from fever between the attacks; hence the distinguishing name, "intermittent." This

disease receives various popular names in different sections of the country, among them "fever and ague," "chills and fever," "swamp fever," "shakes," "Panama fever," etc., though in different sections of the country the intensity and persistency of the fever vary, yet its essential features remain unchanged in all.

Symptoms.—The attack is usually sudden, a chill occurring in an individual who had previously exhibited no sign of ill health. In other cases there are certain premonitory symptoms for several days or a week previous to the chill. These previous symptoms are not especially characteristic nor indicative of any particular disease; they consist chiefly of languor, indisposition for effort, loss of appetite, pains in the head and limbs; perhaps this latter is the most frequent and characteristic spmptom, the patient sometimes complaining that "the marrow of the bones aches."

The febrile attack may be for convenience divided into three stages—the cold, the hot, and the sweating stage.

Cold Stage.—The first pronounced manifestation of the disease consists in a sense of chilliness, often beginning in the small of the back and thence extending throughout the body. Sometimes there is nothing more than this simple sensation of coldness; but in the majority of instances there is a decided chill, accompanied by violent muscular tremors, causing the patient's teeth to chatter, his entire body to tremble, and often making the bedstead rattle. During this chill there may be a bristling of the hairs on the skin, the appearance familiarly known as "goose skin." During this stage the appearance of the patient would indicate that his body was extremely cold; and that the patient has this impression is shown by the eagerness with which he envelopes himself in blankets and hugs the fire. Yet the fact is that during the chill the heat of the body is very materially increased, as is shown by placing the thermometer under the tongue or in the arm-pit; yet at the same time the extremities may actually show a lower temperature than that of health. During this time the patient is extremely wretched, the countenance pale and anxious, the general surface of the body pallid or livid; the patient sighs and groans, and often shows an unusual degree of irritability.

The cold stage may last from a few moments to several hours, averaging perhaps half an hour; occasionally the shiverings and sensations of coldness are so slight as scarcely to attract attention.

In these instances some other unusual condition may take the place of the ordinary health; thus the patient may be extremely nervous and peevish, or very drowsy and stupid. In children the cold stage may be accompanied by convulsions.

Hot Stage.—After the chilly sensations have ceased there occurs a transition to the opposite condition, sometimes abrupt, but commonly gradual. The chilly sensation is alternated with flushings of heat, until finally a decided fever is developed. The skin becomes extremely hot, the face flushed and the headache is intense. Thirst is usually a marked symptom. This stage may last from one to ten or twelve hours.

Sooner or later the fever ceases and the patient becomes bathed in profuse perspiration; the annoying symptoms, headache, thirst, etc., disappear; the body heat actually returns to the natural standard as shown by the thermometer. The patient usually falls into a refreshing slumber, from which he awakens without any symptoms of the disease, but still exhausted by its effects. For a period which varies with different types of the disease the individual now remains free from the active symptoms, though still conscious that he is not enjoying his usual health and strength. This consciousness is realized in a few days by a return of the original symptoms. Various types of the disease are recognized according to the number of days which intervene between the ferbile attacks. There are accordingly three usual types of intermittent fever. In the one the fever called the "paroxysm," occurs daily, and the type is accordingly called *quotidian;* in the second type the paroxysm occurs every other day — the *tertian* type; in the third variety the chill and fever recur on the third day subsequent to the first attack — the so-called *quartam* type. These different varieties differ one from another chiefly in the intervals, and not in the features of the paroxysm itself. The majority of cases are of the quotidian type, the paroxysm occurring every day. Next in frequency comes the tertian variety. The other types are far less common, though instances are known in which the paroxysm recurs on the fifth, sixth, seventh and eighth day. Then, again, there are cases in which one of the ordinary types is duplicated, two sets of paroxysms being manifested by the same patient. The commonest of these is called the double quotidian, in which two chills occur each day. Another variety is the double tertian, in which the paroxysm occurs every day, but the attacks on suc-

cessive days occur at different hours, and may differ in other ways, while those on alternate days correspond in all respects, the hour included. So there may be numerous other combinations in which the chills occur after other types than those mentioned.

The onset of the attack may happen at any hour of the day or night, though rarely beginning at night. In the majority of cases the paroxysms begins in the morning, and are usually repeated after the regular interval at almost precisely the same hour of the day. In other cases the paroxysm occurs later on succeeding days, the interval elapsing remaining the same, but the date of commencement being gradually retarded, the chill occurring half an hour or an hour later on succeeding days. So, too, the paroxysms may occur earlier on successive days, anticipating half an hour or an hour. If this departure from the ordinary type occurs after the disease has existed for some time, it is generally an indication that the end of the disease is approaching.

The duration of intermittent fever is not a definite time, as is the case with the eruptive fevers, but may be indefinitely extended. It does, sometimes, cease spontaneously, but, on the other hand, may be continued for weeks and months. So, too, a single attack does not secure immunity against subsequent relapses — another point of difference and distinction from the eruptive fevers. Indeed it seems that one attack of intermittent fever predisposes to subsequent ones, and that an individual who has once suffered from the disease, may have a relapse months or years after removing from the malarial district. For some time after the striking symptoms of the disease have ceased, the thermometer will show a certain increase in the body heat at the time when the paroxysm would otherwise have been expected. During the intermissions between the attack the conditions of different patients vary extremely; some individuals seem comparatively well, appetite and digestion are good, while in others, during the entire intermission, the patient complains of debility and prostration.

Many variations from these, the classical types of intermittent fever, may occur. First among these may be mentioned the so-called "dumb ague"— attacks in which the chill is absent or obscure, while the other symptoms are apparent. Sometimes only a chill or a fever, or a profuse perspiration, constitutes the entire attack, the other features being lacking; yet this solitary symptom — chill or fever or sweat — recurs daily, or every other day, at the

same hour, indicating the malarial origin of the disease. These cases may present the usual symptoms, aside from the paroxysm itself,—that is, the prostration and debility may be well marked. Another variety of malarial poisoning consists in the regular recurrence of pain in some part of the body. Perhaps the commonest form is what is popularly known as "brow ague," in which the pain is located in the forehead. In other instances neuralgia occurs in the face or the arm, or in the chest. The regular return of such a pain should lead one to suspect that the difficulty is of malarial origin, and should be treated accordingly. Still, again, there may be other local affections, such as dysentery and cough, which recur at the same intervals as an ordinary malarial paroxysm, and yield readily to the same treatment — quinine — while resisting measures usually adapted for the relief of these complaints.

The complication which is met with especial frequency in individuals who have long been subject to malarial difficulties, particularly those who have long resided in malarial districts, is what is popularly known as "ague cake." This consists in an enlargement and hardening of the spleen, in consequence of which this organ can readily be felt under the ribs at the left side of the abdomen, and may, indeed, be so increased in size as to occupy a considerable portion of the abdominal cavity. This affection rarely occurs, except as has been already stated, in the obstinate chronic cases of individuals who have been long subject to malarial influence, and have employed only unsatisfactory methods of treatment. Yet there are many of these long-continued cases in which no pronounced "ague cake" occurs; yet a slight enlargement of the spleen, perceptible only upon close examination, may occur in any case of the disease.

One of the noticeable features of malarial influence, rarely absent in cases which have been protracted a considerable time, is marked *anæmia*—that is, a deficiency of the red globules of the blood, in consequence of which the skin loses its natural reddish tint, and acquires a pallid, even ghastly, appearance. This pallor usually exhibits a certain tinge of yellow, so that the skin may be, in many cases, aptly called straw-color. This pallor may persist long after the paroxysms themselves have ceased; such individuals frequently suffer, also, from dropsy, as the result of the depraved condition of the blood.

Cause.—The malarial fevers, and all the other manifestations of malarial influence, are due to a specific virus—a miasm, which is presumably like the virus of other infectious diseases, a vegetable organism. This miasm is generated particularly in marshy localities, though it is not confined to such districts. It is developed only in warm climates, never at a temperature lower than sixty degrees Fahrenheit. The activity of the virus is arrested if the temperature sinks to the freezing point. It is most frequently found and in the most virulent form, in the neighborhood of dense foliage, districts which have long been known as malarial have lost the power to produce this miasm after the forests have been cut down. This malarial influence can be transported by winds to a considerable distance from its source, and may hence appear in regions not usually malarial. This miasm is also produced in previously healthy localities by turning up the soil, by breaking prairie and by laying out roads.

This malarial poison is generated only during the hot months; hence it happens that cases of malarial disease are most frequent in the summer and autumn. It is more abundant in the air by night than by day, whence the chances for contracting it are greater during exposure to night air. The air near the surface of the earth is more highly charged than that which lies some distance above; hence it may happen that individuals living in the upper stories of a house escape infection, while those sleeping in the lower part of the same building contract the disease. Another peculiarity lies in the fact, that the period during which the virus may lie dormant in the system is not only indefinite, but may extend over months, perhaps even years; as a result of this, individuals may exhibit the disease long after they have ceased to be exposed to it.

Treatment.—For the cure of intermittent fever there is, as all know, one remedy which can be relied upon, and several others which rarely fail—in the various substances found in Peruvian bark, particularly quinine and similar alkaloids. In the last few years several other extracts of Peruvian bark have been made—cinchonia, cinchonidia among them—which seem to possess the same properties as quinine, though in a less degree; and they possess for many people an extreme advantage, in that they are far less expensive than that costly drug.

To cure intermittent fever, then, one needs quinine, and that only. It was formerly the custom to "prepare" the patient, as it was called, for the use of the quinine by giving him several days treatment with cathartics, emetics or other medicines. Such preparatory treatment is, however, unnecessary. The drug may be administered at once, and can be relied upon to stop the paroxysm. Yet it is true that medicines given during the chill, or fever immediately following it, are not apt to be absorbed from the stomach; hence it is advisable to postpone the administration of drugs at least until the sweating stage begins.

During the chill the patient may be comforted, as well as benefited, by external warmth, such as wrapping in blankets, by the application of hot bottles to the feet, and by hot drinks. During the fever the body heat may be palliated by the use of cold water, or of some of the mineral waters, if convenient. When the sweating stage is fairly begun, the quinine or its equivalent may be administered. Many plans have been proposed for the administration of quinine in intermittent fever. The general principle should be observed that the drug proves most effective when given at the shortest possible interval after the paroxysm. If it be administered during the sweating stage, the probabilities for preventing the next paroxysm are greater than if the administration of the drug be delayed. As to doses, the usual plan is to give an amount which will produce at once evidence of the constitutional effects of quinine — evidence which is indicated by ringing of the ears. For an adult the quantity necessary to produce this effect varies from ten to twenty grains. This may be administered in one dose, but can be preferably given in several smaller doses, which shall be taken before the next paroxysm begins. This plan has the advantage that no more of the drug need be given than is necessary to produce ringing in the ears. It is, therefore, advised that an adult take five grains of the drug as soon as the sweating stage has begun, and that this dose be repeated, at intervals of three or four hours, once, twice or three times. By this time the effects of the drug will be manifested in the ringing in the patient's ears. If the chills have been recurring daily, it is quite possible that a paroxysm will occur on the first day after the quinine has been taken, though this paroxysm will probably be less severe than usual. If the disease has been of the *tertian* type (the chills occurring on alternate days), it is probable that no chill will occur if the quinine be administered as above directed. Others recommend

that one grain of the drug be given every hour until about fifteen grains have been taken. This plan has no particular advantage over the former, though usually successful.

As to the manner in which quinine should be administered, there is a diversity of tastes; sometimes it becomes necessary to devise especial means, since there are individuals who seem unable to endure, without great physical distress, saturation of the system with quinine. The usual method, and one which answers the purpose in the vast majority of instances, is simply to dissolve the drug in acidulated water. The following formula can be used:

Sulphate of quinine - -	20 grains.
Dilute sulphuric acid - -	20 drops.
Syrup of orange peel - -	Half an ounce.
Water to make - - -	2 ounces.

A tablespoonful of this can be taken and repeated as above directed. One of the great disadvantages in the use of quinine is its extremely bitter taste. This can be evaded in various ways — by the use of the gelatine wafers, which are softened with water and then wrapped carefully around the powder, making a mass which can be swallowed without permitting the quinine to reach the surface of the mouth; or the drug can be taken in the shape of sugar-coated pills, the only objection to which is, that they are unreliable unless fresh. The drug may also be given to advantage in empty capsules, which may be procured at the druggists, into which the powder can be poured, and which can then be completely closed and swallowed. Though we rely upon the quinine administered during the first day or two to stop the manifestations of the chill and fever, yet it is not asserted that the malarial influence is thereby abolished; indeed, we know, as already stated, that, although the patient is apparently free from fever after the paroxysm ceases, yet there is a certain increase of his bodily temperature for many days after the apparent cessation of the difficulty. Hence it is desirable to continue the quinine in small doses — say four or five grains daily — for several weeks. If the patient be unable to endure quinine, (which sometimes causes most unpleasant and annoying headaches and feeling of general prostration) any one of several other remedies may be employed with reasonable prospect of success. The sulphate of cinchonia usually produces less violent head symptons than quinine itself. If this remedy be also objectionable, and no other preparation of Peruvian bark be employed, recourse may be

had to arsenic, which is almost as efficacious as quinine itself. It may best administered in the compound known as "Fowler's Solution," which may be given to an adult in doses of six to ten drops three times a day in water.

A most important item in the treatment of those who have had malarial difficulty for any considerable time, is the administration of iron, for these patients have suffered serious depreciation of the blood through the loss of the red-blood globules—a loss indicated by their intense pallor. For such cases, quinine alone is impotent to restore health, but the addition of iron insures success. So, too, the dropsy, which not infrequently follows long exposure to malarial influence, will be best remedied by the administration of iron rather than by any measures addressed directly to the treatment of dropsy; for this dropsy depends not upon any disease of the kidneys or heart, as is often the case with dropsy, but merely upon the impoverishment of the blood, which is remedied by the use of iron; in this way, therefore, we may remove, not only the anæmia, but also the accompanying dropsy. A good formula for this purpose is the following:

Sulphate of quinine - - - - 20 grains.
Pill of carbonate of iron - - - 60 grains.

Mix and divide into 20 pills. Take one after each meal.

Pernicious Intermittent Fever.

The ordinary intermittent fever, just described, is rarely attended with any immediate danger to life; if there be ultimately any serious effects from the disease, those effects are traceable rather to the impoverishment of the blood and the enlargement of the spleen, than to the immediate features of the disease. But there are forms of malarial disease which occur in the same districts where the ordinary intermittent fever is experienced, that are distinguished by the overwhelming violence of their onset, which sometimes prove fatal within a few hours. These forms are variously designated as *pernicious*, *malignant* and *congestive*. In the South and West this variety is commonly termed *congestive chills*. This pernicious form of the disease occurs at certain periods in malarial regions, particu-

larly in the lower portion of the Mississippi valley and in some parts of the banks of the great lakes.

It is extremely important to be able to recognize the malignant character of this disease, more especially since it may be developed in the course of a simple intermittent fever; that is, after the patient has had one or more paroxysms of the ordinary variety. For if anything can be done, it must be done early. It is said that in the cases of ordinary intermittent, which gradually develop a malignant character, the different features of the paroxysms are not plainly marked; that is, the cold stage is not accompanied by any pronounced chill, nor the hot stage with so much fever. Indeed, the patient may pursue his avocation in the intervals between the paroxysms, and be thrown entirely off his guard, until the malignant character of the disease suddenly manifests itself.

Symptoms.—The symptoms of this affection vary within wide limits. Unlike the ordinary intermittent, the first paroxysm of the pernicious variety may occur in the night, as well as by day; or, as has been remarked, the malignant feature of the paroxysm may be unexpectedly developed after the patient has had several paroxysms of the ordinary variety. Then the skin suddenly becomes extremely pale and shrunken; there is usually a cold, clammy perspiration; the countenance betrays extreme anxiety, which is indicated also by the nervous restlessness of the patient. In the worst cases, the mind is at once affected; the patient becomes either unconscious, and lies in a state of stupor, or he becomes wildly delirious, has convulsions, and then passes into a state of unconsciousness. In this state the breathing is slow and snoring—*stertorous*, as it is technically called. If the patient retain consciousness, he complains of intense thirst and a sensation of extreme internal heat, though his skin, particularly that of the extremities, is cold and corpse-like. Usually there is violent vomiting and purging, the matter discharged being thin, watery and often tinged with blood. The malignant paroxysm does not always present the same stages of the ordinary attack. It may be that after this profound chill a febrile reaction will occur, in which case the fever is apt to be intense. Oftener, however, the reaction from the cold stage is but partial; the patient's skin and extremities become warmer, and he lies in a state of profound prostration, without developing the usual symptoms of the hot stage. In a large number of cases, indeed, death occurs either during the

cold stage, or before the febrile reaction has been completely established. If he survive the first six or eight hours, the chances for life depend largely upon the probabilities of escaping subsequent paroxysms. In some cases, especially if proper treatment be promptly employed, but one such paroxysm occurs; if subsequent attacks are experienced, they resemble more the ordinary simple intermittent paroxysms. If a second malignant attack follow, as it may on the succeeding day, the chances of the exhausted patient for surviving are correspondingly diminished, and a third attack is almost invariably fatal.

Cause.—So far as we are at present aware, the pernicious or malignant form of intermittent fever differs from the ordinary simple variety in intensity rather than in kind. The same difference is familiar to us in other infectious diseases; thus we recognize a malignant form of scarlet fever in which the patient is overwhelmed in a few hours by the violence of the attack, though he may have contracted the disease from an individual suffering with the ordinary form of scarlatina. So, too, we recognize a malignant form of small-pox, which may be contracted by contagion from simple small-pox. Inasmuch as pernicious intermittent fever occurs in the same localities as the simple variety, and since it often begins apparently as a simple intermittent fever, and its features are merely those of the simple variety intensified, it seems but reasonable to assume that the pernicious variety of intermittent fever is merely a more intense exhibition of the ordinary intermittent virus.

Treatment.—As already indicated, the treatment of pernicious intermittent fever is a matter of vital importance, since without it, a very considerable majority of the cases would doubtless prove fatal; as it is, the mortality is probably not greater than one case in eight.

Much can be done in the way of preventing pernicious fever by interrupting the paroxysms before they assume the malignant character. During the seasons when malignant cases are prevalent, no time should be lost in arresting every case of intermittent fever, no matter how simple and light the attack may seem. When the features of the pernicious attack are developed there are two objects to be accomplished by treatment: one, to bring the patient under the influence of quinine as soon as possible; the other, to induce reaction from the chill. The latter, it is evident, requires immediate attention; it is

useless to attempt the administration of quinine while the patient lies in a state of profound collapse, which usually characterizes the cold stage; for medicines introduced into the stomach will not be absorbed, and even if inserted under the skin by means of a small syringe, the circulation is so feeble that but little effect could be hoped for. The measures best adapted for promoting reaction vary somewhat with the features of the case, but always include stimulation of the skin and of the circulation. Heat may be applied best of all by putting the patient bodily into a hot bath; if this be impracticable, hot bottles or flat-irons may be applied to the feet and along the spine. The skin of the trunk and its extremities may be vigorously rubbed with alcohol or brandy containing a little red pepper; if there be much vomiting or purging, a mustard plaster should be applied over the stomach, or indeed over the entire abdomen. In all such cases it is to be remembered that mustard *blisters*, and although blisters would probably not be formed so long as the patient remains in the collapsed state, yet it must not be forgotten, in the excitement of the moment, that the plasters should be removed when the patient reacts from the chill. These measures will also serve to stimulate the circulation, which is one of the objects of the treatment; this can be furthered by the administration of alcoholic stimulants in some form — brandy or whisky may be given; hartshorn may be applied to the nostrils; if a physician be in attendance, he will doubtless inject ether or alcohol under the skin. If the mental symptoms have been prominent from the beginning, especially if the patient have been unconscious and stupid, a full dose of calomel — say five grains — may be given at once. It was in just these cases that the old practice of bleeding from the arm celebrated its triumphs; yet in the revulsion which has followed the abuse of that practice of bleeding, medical men would to-day scarcely practice or advise this measure. So soon as the signs of returning heat and strength are manifested, it is desirable to avoid pushing the stimulation, since the result will be to intensify the fever that usually follows.

The second object of treatment is to bring the patient under the influence of quinine, with the hope of preventing a repetition of the chill, which would otherwise occur on the succeeding day. Five to ten grains of quinine should be given at once and repeated every three hours until the usual evidences of its effects — roaring in the ears — occur. In these cases there should be no trifling with any of

the usual substitutes for quinine, though these may answer well enough the simple intermittent, for it should be remembered that unless the patient can be saturated with this drug at once, he will probably succumb to an attack on the succeeding day. Promptness and boldness are indispensable for the successful treatment of this malignant disease; yet it must be borne in mind, that it is possible to do damage by excess of quinine, as has been shown by the induction of long-continued or permanent deafness and blindness.

In addition to the free use of quinine, it may be well to keep the patient in bed for the next two or three days, especially during the hours when a recurrence of the paroxysm may be expected. During these hours the patient should be kept warm by artificial heat—hot bottles and similar measures—and by hot drinks. A dose of laudanum, say twenty drops, will be also efficient.

Remittent Fever.

This disease may be, and by some is, regarded rather as a modification of intermittent than as a distinct disease; yet, while evidently due to the same cause and occurring under the same circumstances, they present so many distinctive features as to justify their recognition as two distinct diseases.

Remittent fever is also and more popularly designated *bilious* fever, or *bilious remittent*.

Symptoms.—The disease usually begins quite abruptly, without any warning in the shape of previous indisposition on the part of the patient; yet there are instances in which the usual premonitory symptoms of malarial fever are present. The paroxysm begins with a chill, more or less marked. This chill, like that of simple intermittent fever, usually occurs in the early part of the day, and not at night. After the chill occurs the usual fever, which does not subside ordinarily in six or eight hours, as is the case with simple intermittent fever, but continues twelve, twenty-four, or even forty-eight hours. At the end of this time—usually during the night—there is a marked decrease in the intensity of the fever; the skin becomes moist, the pains subside, and the patient usually obtains repose. This aspect of the case differs, however, from the same stage of intermittent fever, in that the fever in remittent does not entirely subside. There is, in other words, no complete disappear-

ance of the fever, although it is so much decreased as to render the patient quite comfortable. In the one case there is complete *intermission* of the fever, in the other only a *remission*, hence the difference in the names. After a remission lasting from two or three hours to one or two days, a second paroxysm occurs. In this second attack the chill may be less severe than in the first, or even be entirely absent; the fever is, however, renewed with as much or more intensity than at the first attack. Thus a series of paroxysms may follow, separated by intervals or remissions of irregular duration. After a time these remissions become less marked, so that the fever finally assumes the *continuous* form. This fever lasts two or three weeks, at the end of which time it often assumes the form of simple intermittent, or it terminates in a condition, to be presently described, called *typho-malarial* fever.

Remittent fever presents marked evidences of constitutional disturbances; nausea and vomiting are almost invariably present, and are frequently prominent symptoms. The matters ejected from the stomach are of a greenish or yellowish color; there is usually much pain and uneasiness over the region of the stomach, and considerable tenderness, on pressure, at the same spot. Jaundice is a not infrequent symptom.

The name *typho-malarial* fever is applied to a condition which is often the continuation of the remittent fever. The remissions become less marked, the fever, therefore, more continuous; while at the same time the patient's general condition acquires a similarity to that presented by typhoid fever. There is, however, no reason for believing that the specific virus of typhoid fever is present in these cases; indeed, we know that the inflammation and ulceration of the intestine, so characteristic of typhoid fever, are lacking in the so-called typho-malarial fevers. The symptoms so common in typhoid fever — the general prostration, impairment of mental function, delirium, stupor, physical debility — are found in several conditions which are not typhoid fever, but which are usually designated by a name indicating this resemblance to typhoid. Thus we speak of a *typhoid pneumonia*, by which we mean not that the patient has typhoid fever and pneumonia together, but that he is suffering from pneumonia (inflammation of the lungs), and has sunk into a state of nervous prostration and physical exhaustion which is so commonly observed in typhoid fever. So when we say that the patient has typho-malarial fever, we mean not that he has both typhoid and

malarial fevers, but that he is suffering from malaria poisoning, and at the same time has sunk into an exhausted condition similar to that which is usually found during typhoid fever. It is, of course, possible that an individual should be affected by the one virus while still suffering from the other, and thus become compelled to endure the ill effects of both at the same time; yet such is not necessarily the case in typho-malarial fever.

As already indicated, the symptoms of typho-malarial fever present some of the characteristics of typhoid fever, as well as of malarial poisoning; the fever no longer presents remission, but has become continuous; the mind previously clear is now affected; there is active delirium or passive stupor; the face is dark and flushed, the head hot, the skin dry and harsh, the tongue brown, heavily coated and deeply fissured; the teeth are often covered with sordes. This change of remittent into typho-malarial fever is apt to occur during the second week of the disease, and can probably always be averted by proper care and treatment during the first week. This treatment consists, like that for all forms of malarial poisoning, first and chiefly in the use of quinine or its equivalent. If this be promptly done by the method already indicated in speaking of simple intermittent fever, it is reasonably certain that the disastrous terminations of the disease can be avoided. Before the use of quinine, remittent fever was a formidable disease, of which Charles the Fifth, James the First, and Oliver Cromwell are said to have died. Even after the development of unfavorable symptoms of the disease, such as the disappearance of the remission, and the appearance of the typhoid symptoms, the chief reliance in treatment must still be upon quinine; it would be well to administer five grains of this drug every four hours, until the characteristic effects are produced upon the ears. If the typhoid symptoms are so prominent as to demand attention, they must be treated after the manner described in discussing typhoid fever.

Physicians recognize also a disease known as *pernicious remittent* fever, also called *malignant* and *congestive*. This bears to simple remittent fever the same relation already described as existing between simple intermittent and pernicious intermittent fever. The pernicious remittent fever is simply a more intense attack; in the severe cases death may occur during the initial chill, before, therefore, any remission has occurred.

Remittent fever, when early recognized and properly treated, is not a a very formidable disease; under circumstances where it is

impossible to procure quinine in sufficient quantities, the disease is often fatal. Hence it has acquired a reputation for malignity in those regions where treatment is of necessity unsatisfactory, and is dreaded in various parts of the world under various names—African fever, jungle fever, Hungarian fever, and during our late war, Chickahominy fever.

Yellow Fever.

This dread disease has been known by numerous names at different times, and in different parts of the world; yet in the United States, which has acquired an unfortunately intimate acquaintance with the disease in the last two decades, the name, "yellow fever," is universally employed. It is a little remarkable that this name, derived from the yellowish tint of the skin during the disease, is by no means always applicable, since this tint is sometimes absent.

Yellow fever is a perfectly typical *malarial* disease. It occurs in certain limited districts where the following combination of circumstances prevail: First, continuous high temperature, about eighty degrees for one or two months; second, excessive moisture in the atmosphere; third, vicinity to the ocean or to a large river emptying into it; fourth, vegetable matter in a state of decomposition. This latter feature may be furnished by the offal of the cities, or by the upturning of the soil of the country. Yet many quarters of the globe, presenting just this combination of conditions, are never visited by yellow fever. Yellow fever prevails only during certain of the warmer months, and occurs as an epidemic at intervals of a few years; it is then evidently due to a *miasm*, as to the nature of which we have, as yet, no positive information, though from analogy we may be reasonably certain that this miasm, like that of certain other diseases, is a microscopic vegetable organism.

All the places which have ever been visited by yellow fever, within the history of medicine, are situated upon or near the Atlantic sea coast. The disease has never been known to visit the Pacific coast of either Asia or America; nor has it ever been seen in the interior towns of any continent, which were not situated upon large rivers emptying into the sea. It occurs as an epidemic most frequently upon those parts of the western coast of Africa and the eastern

coast of America, situated south of the thirtieth parallel of north latitude. The Guinea coast is almost constantly devastated by the disease; the West Indies, Central America, and the border of the Gulf of Mexico, are rarely entirely free from it. The most destructive epidemics of yellow fever have occurred in New Orleans, where it appears almost every year; in Shreveport, Louisiana, and in Memphis, Tennessee, in 1873, and again in Memphis in 1878.

Symptoms.—The onset of yellow fever is generally very abrupt, though in the majority of cases it may be preceded for a few days by a general indisposition, languor, wandering pains and occasional shiverings. The attack itself is ushered in by a chill of moderate violence, after which follows fever. Both the intensity and duration of this fever vary considerably; in many cases the heat of the skin seems but little raised, and the fever appears quite out of proportion to the severity of the general symptoms. During this fever thirst is extreme, the tongue is heavily coated, though perhaps moist; there is usually nausea and vomiting with great pain in the stomach on the second day and thereafter; there is also extreme pain in the head, especially over the eyes; pain in the small of the back, radiating down the thighs, and wandering pains in various parts of the body. This pain in the small of the back is so usual and so intense as to remind one of small-pox. The eyes are reddened and watery—a very constant mark of the disease. The bowels are usually constipated; there is commonly delirium in severe cases.

This fever with the accompanying symptoms continues for several hours, or even two or three days, at the end of which time there is a decided abatement in the severity of the symptoms, like the remission of remittent fever. All the symptoms subside, though there still remains considerable fever; this condition has been called "the state of calm." During this remission the yellowness of the skin becomes quite marked. In mild cases the severity of the symptoms may not recur; the patient improves slowly but surely, and ultimately recovers. In the majority of cases, however, there occurs the dreaded "state of collapse." During this period there is extreme prostration of the nervous system, and the greatest debility of the muscles; the pulse is rapid, irregular, almost imperceptible; the skin intensely yellow or bronze; the tongue brown and parched; delirium, convulsions or unconsciousness mark the impair-

ment of the mental functions. But the most characteristic feature — from which indeed the disease has obtained one of its numerous names — occurs during this stage of collapse, the *black vomit*. In the great majority of fatal cases, and in some of those which ultimately recover, the black vomit occurs. This matter consists merely of blood which has escaped into the stomach and has been changed from red to black by the action of the stomach juices. The matter ejected from the stomach is a thin reddish brown or blackish liquid with a sediment resembling coffee grounds; if the quantity of blood which has escaped into the stomach be very great, the vomit is usually red, because the blood has undergone but little change. The influence of the stomach juices in turning the blood black may be readily imitated outside of the body by adding a little acid, such as strong vinegar, to fresh blood.

This black vomit rarely occurs until the first stage of the disease is passed, and is most frequent during the period of collapse which succeeds. The discharges from the bowels also frequently present this same black appearance, resembling tar, due to the presence of blood in the intestine; sometimes red blood but little altered is also evacuated from the bowels. It is during this stage that the yellowness of the skin, from which the disease derives its usual name, is especially marked; the mucous membrane of the eye also exhibits this color, giving to the countenance a peculiar appearance. This yellowness is due to certain constituents of the bile, and occurs in the severer cases with especial frequency; in fact, it is somewhat rare in the cases that recover; in these latter it persists until the patient is almost well.

Blood may escape from other portions of the body also than the stomach and intestines; it frequently appears in the urine, causing the latter to assume a dark brown or smoky appearance. Blood may also issue from the mouth, nostrils, female genitals, sometimes even from the eyes, ears, and around the finger nails. A remarkable feature of the disease is the apparent lightness of the attack in cases which, nevertheless, prove suddenly fatal. Sometimes patients are not compelled to take to the bed, may even keep about their usual employments, until a few hours before the fatal result. Thus, one man shaved himself on the day of his death; another, a soldier, continued on duty until the black vomit occurred; still another wrote a letter a quarter of an hour before he died.

Perhaps these cases should be considered as examples of the delirium which not infrequently constitutes a feature of the disease.

The appearance of the face, too, is said by all observers to be quite characteristic. There is a deep red flush on the countenance, while the eyes are described as particularly brilliant, fiery, and glassy. The duration of this second stage is variable, according to the severity of the case; it may terminate in death in a few hours, or lead to convalescence in one or two days. Then follows the period of exhaustion, during which the majority of deaths occur. The duration of the disease is said to vary from three to nine days, averaging less than a week. A certain degree of immunity against subsequent attacks is said to be conferred by one attack of yellow fever; yet it is well known that the same individual frequently suffers from it two or more times.

It seems clearly established that yellow fever is not communicated by contagion from one individual to another, in which particular it resembles the malarial fevers generally. It is a familiar fact, for instance, that the ordinary intermittent fever, or "ague," while attacking most individuals living within certain districts, is not communicated by a sufferer from it to other persons. This fact has been proven by numerous personal tests. Medical men have submitted themselves to direct inoculation from yellow fever patients; have slept in beds in yellow fever hospitals, in which patients had just died with the disease. While, however, the disease is not spread by personal contagion, it is transferred by the atmosphere, presumably, because the virus of the disease is composed of material particles, which are swept abroad by currents of air. Much study has been devoted to ascertaining the conditions under which the disease becomes epidemic, as well as the agencies by which it is spread from one center of infection to another. The extensive and long-continued observations made in the southern part of our own land during the last forty years have furnished the following facts with regard to the origin and spread of the disease:

1. The yellow fever poison is usually diffused over very limited districts; it frequently happens that the area in which it appears is but the fraction of a square mile. Beyond these limits no cases of the disease appear spontaneously, and patients suffering from it when removed out of this area do not communicate the disease to others with whom they may come in contact.

2. The disease appears simultaneously at several points within such an infected district; there is an apparently spontaneous origin; that is, the first cases have not been exposed to contagion.

3. In the infected districts, scattered or *sporadic* cases occur almost every year, though they do not result in general extension of the disease; yet, at intervals of years, epidemics arise in these same localities. This is true, for instance, of New Orleans, which has experienced several severe epidemics in the last thirty years; yet scarcely a summer passes in which numerous cases do not occur along the wharves and in the shipping in the river.

4. The germs of the disease, while apparently not communicated by the clothing or the bedding of the patient, seem, nevertheless, capable of maintaining their infectious activity in a section of the infected atmosphere — so to speak, be transported; thus it is well established that the disease is transferred by ships, and several local epidemics in seaports on the Gulf of Mexico have been traced directly to the landing of vessels from the West Indies. Yet even in these instances, if the port thus infected be not habitually the home of yellow fever, the disease will spread but a short distance from the ship. It has been, also, abundantly established that such infected ships can be thoroughly disinfected, by cleansing and airing them.

5. It is evident that there is only a limited field for attempts to prevent the spread of yellow fever. For a large section of the country quarantine regulations are wholly unnecessary. The entire population of Memphis, for instance, might have been transported to Chicago without inducing a solitary case among the citizens of that place, for the atmospheric conditions and the temperature in Chicago are such as to render the development of the disease impossible. On the other hand, quarantine regulations are utterly impotent to prevent the appearance of the disease in New Orleans, or similar localities where the disorder is generated. It is only in one class of localities that quarantine can hope to accomplish much — namely, in those places where the fever has been in previous years spontaneously produced, but has not as yet made its appearance during the season in question. Such quarantine should be rigorously enforced as to vessels, but can derive no advantage from the detention of individuals.

6. It has been repeatedly demonstrated that the liability to an epidemic of yellow fever can be much diminished by sanitary

regulations. Thus the rigid military rule of General Butler in New Orleans, in 1862, prevented the usual extensive occurrence of the fever that year. It seems probable, too, that the strict police regulations in the same city, in 1873, prevented a disastrous epidemic similar to that which was at the same time prevailing at Shreveport and in Memphis.

Treatment.—Up to the present time no treatment has been devised by which the duration of an attack of yellow fever can be shortened or its course changed with certainty. There is, indeed, no course of treatment the results of which have commended themselves to medical men as worthy of general adoption. There is, of course, a vast number of remedies for which especial value in the treatment of this disease is claimed; but the very length of the list is ample proof that no one of them is reliable. The only rational course is, in every case, to meet, so far as possible, the symptoms as they arise, and not to adopt any set of rules for treating the disease in general.

It is a fortunate fact that a considerable majority of cases tend to recover spontaneously; yellow fever, like the other infectious diseases, is self-limited; and if the patient survive for a certain time, there is a strong probability that he will recover. Such is, indeed, the history of many cases. Then, on the other hand, there are instances which are inevitably fatal, the patient often dying in a few hours after the attack begins. The suggestions for treatment to be given here will, therefore, be indications for meeting the different symptoms according to the severity of the case.

In the milder cases no active measures are required for treatment. The patient must be kept quiet. His diet must be light and nutritious. And especial care should be directed to ventilation. During the height of the fever the usual remedies employed during febrile conditions may be used, such as cold applications to the head, frequent sponging of the skin with lukewarm water, cold and effervescing drinks, laxatives in case of constipation. Dr. Stone, of New Orleans, who has had much experience in the treatment of this disease, recommends "foot baths under the bed clothes and sponging the body with tepid water." Dr. Flint says that many cases of mild yellow fever in New Orleans are managed by Creole nurses without medical aid. This is doubtless true of the scattered cases, but scarcely during epidemics. Furthermore, some of the cases

which at first appear mild may develop malignant features subsequently. It is therefore desirable to observe and meet carefully every symptom of the disease. It is therefore of extreme importance that the patient should in every case take to his bed at the first indications of the disease. Both body and mind should be rested as completely as possible, and the most careful attention be bestowed even upon the slightest details.

In the more malignant cases the same general measures are indicated; that is, extreme care as to all the hygienic surroundings of the case. It is not advisable to follow the plan so much in vogue, that the measures shall be the more heroic according as the severity of the disease increases. It is doubtless possible to do much harm by the use of powerful medicine; this is particularly true of purgatives, since the intestinal canal is in a very debilitated condition. There is, perhaps, one indication for the use of sharp purgatives, namely, unconsciousness or stupor on the part of the patient. By causing the blood to flow to the alimentary canal we may succeed in reviving the congestion of the brain, upon which the unconsciousness depends. During the hot stage the remedies usually employed in other fevers may be used to advantage; such are sponging of the skin, the use of ice in the mouth, etc. If the patient be extremely restless and vigilant, opium will be found useful. Ten to fifteen drops of laudanum may be given, and repeated in three hours, if necessary.

The extreme danger comes usually during the stage of exhaustion. During this stage nothing may be left undone which can sustain and invigorate the patient. These measures consist, of course, first in the application of friction to the skin, which may be vigorously rubbed with brandy or other alcoholic fluid. The use of hot bottles or hot flat-irons to the feet and spine may impart strength, while the application of mustard plasters to the stomach and abdomen may be efficient in relieving the black vomit and discharge of blood from the bowels. In many of these cases of collapse advantage is asserted from the application of leeches to the back of the neck; but the great reliance must be, and is generally admitted to be, the internal use of alcoholic stimulants. If there be one fact established in the treatment of this disease, it is that lives have been saved by the use of whisky and brandy in quantities that would, under other circumstances, seem excessive. So far, therefore, as treatment

can be recommended in these cases of malignant yellow fever, it may be summarized as follows: During the hot stage sponging of the body, or hot baths; the use of ice, cold drinks or effervescing waters internally. During the collapse, stimulation by friction of the surface, application of hot bottles around the patient, and the use of whisky or brandy.

Cholera.

By this term is designated not the so-called cholera morbus which may occur at any time in almost every community, but the epidemic disease which we usually consider to be of Oriental origin, and designate by the name of *Asiatic cholera*. Volumes might be written upon the history of this disease and upon its relations to the political history of the world. It seems highly probable that this disease was one of the plagues known to the ancients, yet we are able to trace it definitely and exactly only about three hundred years back. Since this date it has at irregular intervals swept the entire civilized world, so that the very name inspires dread in the face of all that science has as yet accomplished. In 1817, 36,000 people were attacked by the disease in three months in Calcutta; in November of the same year an English army marching through India was decimated by it, 9,000 out of 90,000 men dying in twelve days. From India the cholera proceeded that year toward the west, and in the succeeding fifteen years had traversed nearly all of the known world. At the end of this time (in 1832) it arrived for the first time in America. In 1818 it raged again in India, spread thence into different parts of Asia with frightful results. In the following year 150,000 persons died of it in one district of India alone. In 1823 it had reached China; in 1831 it had spread to the north of Europe. During this year 100,000 Hungarians died of the disease. The Austrians surrounded their capital, Vienna, with a double military guard to protect themselves against their neighbors of Hungary, but in vain. In 1831 it had reached England, whence it spread through the British Isles. It first appeared on our continent, at Quebec, in June, 1832; within three months it had spread over twelve States. The following year the West Indies and Mexico were visited. In 1834 it returned to Southern Europe, where it remained with more

or less intensity for three years. In 1837 it had entirely disappeared from Europe and America, and was not seen again for ten years. In 1847 the cholera started again from India, which seems to harbor it constantly, toward the west, and reached the United States in 1849. During this epidemic there was noticed a phenomenon, at that time new in the history of cholera, though the same fact has been since repeatedly observed. The disease germs seemed to traverse the ocean without human agency, for the cholera appeared upon two emigrant ships a thousand miles apart, one of which had been at sea sixteen days and the other twenty-seven days, no cholera having occurred at the ports from which those vessels had sailed. From this time onward the disease seemed to linger in various parts of Europe and America for five years, when another severe epidemic occurred. In 1865 the disease appeared again in Arabia and Egypt, crossed to Constantinople in July, and reached England by the autumn. In the following year the disease broke out in America again. At the time of the writing of this book it has once more appeared in Eastern Europe, and may be expected again in our midst within a year or two.

Symptoms.—The disease is usually developed without serious premonitory symptoms. In the majority of cases there is no further warning than simple diarrhea, the stools being numerous and profuse, but not attended with pain. Vomiting may also occur, although this is not a constant symptom. Aside from these indispositions, which may of course be induced by other causes than cholera, there is nothing to indicate the onset of this dread disease. Unless the patient be already fearful of infection, it may be difficult to persuade him that the diarrhea can have any particular importance; but the discharges suddenly increase in quantity; or if there have been no previous diarrhea, the onset of the disease is marked by sudden and profuse discharges from the bowels. This is the beginning of the disease, and in many cases occurs during the night. From the first the stools possess the characteristic features by which the cholera is especially distinguished—they resemble rice water, and are ordinarily designated as "rice-water stools." The liquid will be found to contain numerous small white, solid particles, resembling grains of rice; it possesses little or none of the usual character of intestinal discharges, but emits a peculiar offensive odor. Not less characteristic than the discharge itself is the action

of the patient. He suffers none of the pain usually incident to diarrhea, but is simply impelled by a sense of distention to evacuate the bowels, a proceeding which gives him no pain nor uneasiness. If vomiting occur, as it usually does at some period of the disease, the matter ejected from the stomach is a watery fluid, somewhat similar to that constituting the stools. The vomiting is not usually accompanied with much nausea or pain, the act occurring in consequence of a sudden impulse, just as is the case in the evacuation of the bowels.

These symptoms mark the beginning of the disease; meanwhile there is a sense of profound exhaustion and debility. The pulse is usually rapid and weak, the skin cool, or covered with clammy perspiration, the face pinched, and the muscles may undergo the most painful cramps. If the attack be not severe, these symptoms begin to improve within a few hours; in fact the patient may be convalescent in half a day. In the majority of instances, however, the outcome is not so rapid nor so favorable; the patient passes into what is called the stage of collapse.

In this condition the pulse is extremely rapid and feeble, beating even 140 times per minute; it may be extremely difficult to distinguish the beat of the heart when the ear is applied to the chest. The failure of the circulation is indicated also by the stagnation of blood in the veins, in consequence of which the face and surface of the body generally become dark blue or livid; this condition is especially marked in the lips and at the roots of the nails. If the patient be bled from the arm, as was formerly often done, the blood oozes from the wound and does not flow in a continuous stream; leech bites, too, are not followed by the usual amount of bleeding; all these things indicate that the blood is materially changed from its natural condition.

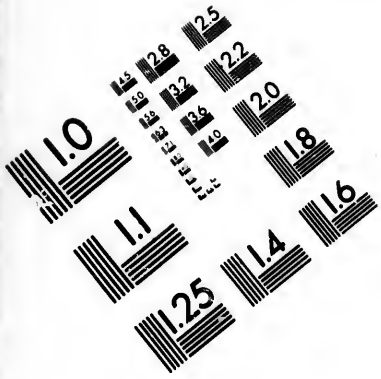
The breathing, too, presents certain characteristic features. The patient complains of want of air, and sometimes even gasps for breath; the respiration is irregular and sighing. The expired breath feels cold to the hand held before the mouth. The mind seems usually overwhelmed; the patient does not realize the situation, has no fears for the result, even though previous to the attack he may have harbored a profound dread of the disease. In some instances he lies quiet and content, at other times is very restless, though more from physical than from mental distress. The muscular cramps usually appear at some stage of the disease; they

affect especially the feet, calves and arms. To relieve himself the patient sometimes walks about even a few minutes before death.

As the disease approaches a fatal termination, the patient's body becomes intensely cold; he is usually unconscious, though if so he usually complains of a sense of heat, and insists upon being uncovered. The body temperature is sometimes decreased from ninety-nine—the standard of health—to ninety, or even eighty; the skin is wrinkled and shriveled; the face pinched. The general appearance is extremely characteristic; one derives the impression that the entire body has been diminished in size. The patient appears to have grown old in a few hours, and the countenance may be so changed as to be unrecognizable even by friends. Such, indeed, is the result of the excessive drainage of water from the body; for the constant discharges from intestines, stomach, and skin result in a very material decrease in the weight of the body. This loss of weight consists largely of the watery parts of the blood, whence results the shrivelled appearance of the skin and body generally. Death often occurs in the state of collapse, though there are instances in which a fatal result ensues before this stage of the disease is reached.

If the patient recovers from the stage of collapse, he does not as a rule begin convalescence at once, but passes into what is called the *stage of reaction*. In this period there is considerable fever; the diarrhea continues, but the discharges lose the rice-water appearance and become green. Vomiting is frequently a troublesome complication during this period, the vomited matter also being green. Death may also occur during this stage of reaction, the patient being exhausted by the long continued vomiting and diarrhea. Even if recovery ultimately ensue, the individual's powers are apt to be impaired for a considerable time.

Cause.—There is, undoubtedly, a specific cause, a *virus*, which is essential for the production of Asiatic cholera. This is evident from the history of the epidemics which have from time to time spread over the world. The fact that the disease is at home, so to speak, in certain parts of Asia, that only under peculiar conditions it invades other countries; but especially the fact that its spread is a continuous one from the original site of the disease — these all indicate that there is a particular infectious material, without which the disease does not exist. Quite otherwise is it, however, with



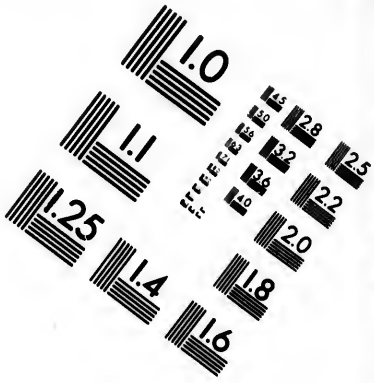
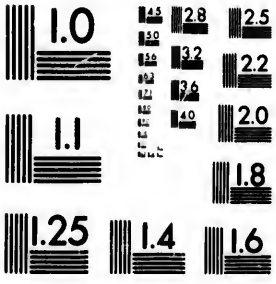
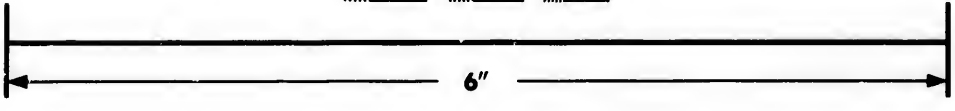


IMAGE EVALUATION
TEST TARGET (MT-3)





Photographic
Sciences
Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

2.8
2.5
3.2
2.2
3.6
2.0
1.8
1.1
1.0

the question whether cholera is communicated by personal *contagion*. Such method of communication is certainly not necessary; many instances such as that to which reference has been already made — the occurrence of the disease on vessels which had been at sea for several weeks — demonstrate that cholera can arise in a locality without any importation of individuals already suffering from the disease. Yet it might be also possible that cholera could be communicated by personal contact as well as by distribution through the atmosphere. Yet many facts, positive as well as negative, indicate that such transmission from person to person occurs either not at all or extremely seldom; for it seems that among those who are brought into contact with cholera patients, the disease is not more frequent than among those who are not thus exposed. In the report on cholera published by the French Government in 1831, it is affirmed that among 55,000 persons attacked by the disease, only 164 were individuals whose duties called them to associate with the sick. These 164 persons had been employed as physicians or nurses in the hospitals, where nearly 2,000 others, likewise employed, had escaped entirely. Among 58 persons employed in the hospital at St. Petersburg, only one contracted the disease. Similar observations have been made in great numbers, and show that if cholera be contagious, its contagion is far less active than that of other diseases, such as typhus fever. Then, again, cases of the disease have been repeatedly imported into cities without causing the multiplication of the disease in those localities; and, finally, efforts have been made to induce the disease in healthy persons by direct inoculation from cholera patients, but always without success.

From these facts we may make the important practical deduction that there is but little, if any, personal danger in the presence of a cholera patient; that nursing or attendance upon such a patient does not increase the danger of contracting the disease. This is, of course, quite contrary to the popular impression. We are accustomed to see and hear of people fleeing in dread from the vicinity of such patients; and it is even affirmed that physicians have been known to evade attendance upon such patients, out of fear of personal contagion. It is, of course, true that the locality in which cholera is epidemic is more dangerous than one out of the usual path of the disease; yet this danger arises, not from the presence of cholera patients, but from the atmospheric conditions (whatever they may be) which make cholera possible.

While we are thus ignorant of the essential origin of cholera, we are quite familiar with the circumstances which promote its spread and render personal liability to the disease greater. It is the universal experience that cholera appears first, is most destructive, and stays longest in those parts of a city in which sanitary regulations are poorest. The densest and filthiest cities, and parts of cities, have always been the home and breeding-place of epidemic cholera. Several apt illustrations of these facts were observed in London during the epidemic of 1849; in those districts of the city supplied with drinking water from the Thames above the entrance of the sewers the mortality was less than one-half of one per cent.; in those districts which were supplied from the river below the entrance of the sewers the mortality was from four to eight times as great. Evidently the best protection against cholera in a locality where the disease is epidemic consists in the greatest attention to sanitary regulations, the avoidance especially of decomposing animal matter. Defective sewerage, accumulations of filth, crowding of people in unventilated tenement houses — these are active causes in promoting the establishment of epidemic cholera.

Measures for individual protection rest upon the same general principles. There can be and need be no set of rules to be observed as personal protection against the disease, for every person living in a district infected by epidemic cholera is liable to the disease, his chances of escape being proportioned simply to the excellence of his general health and sanitary surroundings. The only salvation from danger is flight to a locality unaffected and not likely to be affected by the epidemic. Yet one measure of precaution may become necessary, and should never be neglected during the prevalence of a cholera epidemic; and that is prompt attention and treatment of even the slightest diarrhea, for it is the universal testimony that the attack of cholera is usually preceded by diarrhea, and that the attack rarely occurs if this diarrhea be promptly checked.

Every diarrhea, therefore, during the prevalence of cholera, should be promptly treated by an astringent. A good mixture for that purpose is the following:

Opium, - - - -	One-half grain.
Camphor, - - - -	Two grains.

A pill containing these ingredients may be taken every four hours; or half a teaspoonful of paregoric may be taken every two

hours during the day. No laxatives or cathartics should be administered.

Whether or not the access of country, or to a particular locality of that country, can be prevented in the least by quarantine regulations is still a debated question, though the evidence is overwhelmingly in the negative. Yet it may be advisable to obtain the benefit of the doubt and employ quarantine regulations, since even a small degree of success in checking this formidable disease would be a sufficient reward for the effort. It is scarcely necessary to correct certain popular practices and impressions in regard to the prevention of the disease. One of these is the idea that the adoption of a light diet, such as rice, and the avoidance of fruits and vegetables, diminishes the chances of infection, while others seem to believe that the frequent indulgence in alcoholic stimulants will accomplish the same result. Both these ideas are fallacies; the one object, as already indicated, consists merely in keeping the health at the best possible standard. For feeble persons are not only less able to resist an attack, but are also more susceptible to the disease, although no age in life exempts from danger. Yet the largest proportion of fatal cases is invariably among the aged, and the next largest in early infancy. Thus the statistics of Duchesne, collected from the Paris epidemic of 1849, show that the largest ratio of deaths occurred between the ages of sixty and eighty-five years, the next largest under five years. The actual mortality from cholera is ordinarily not so great as the popular impression supposes. During the epidemic of 1832 there occurred in London one death among 1,228 inhabitants; in Edinburgh one death to 2,033 inhabitants. In the United States the ratio was much larger. Thus, in New York there was one death to every one hundred persons, in Albany one to seventy-seven, and in Quebec one death to twelve.

Treatment.—In the treatment of cholera, nearly all the remedies known to medicine have been at various times employed, and a great number of these have received warm commendation from various observers. Yet the fact is, that medicine knows to-day no means which guarantee success, or even a probability of success, in saving life under the formidable attack of epidemic cholera. In this, as in most of the infectious diseases, the effort must be to support the patient until the disease has expended its fury; for cholera

is a self-limited affection, which leaves the patient in comparatively few days, if he but live so long. To outline a treatment, therefore, is merely to give the experience of one or more men, an experience which may be at variance with that of other physicians. All agree that there is nothing by which the duration of the disease can be shortened, nor its most dangerous symptoms controlled. Dr. Austin Flint, of New York, states his own practice, based upon a long and extensive experience, as follows: "The treatment is to be considered as applicable to the different stages before collapse, during the collapsed stage, and after the reaction. Prior to collapse the paramount object is the arrest of the intestinal discharge. This discharge into the intestine is the first appreciable link in the chain of unnatural events, and if promptly arrested before it has proceeded so far as to affect seriously the blood and circulation, the patient is usually safe. The remedy on which most dependence is to be placed in affecting this object is opium. Some form of opiate is to be given promptly, in doses sufficient to effect the object. The form of opiate is to be chosen with reference to promptness of action and the probability of its being retained. Laudanum is to be preferred. In the endeavor to effect the object of treatment in this stage, moments are precious, for there is always danger that if the object be not promptly effected, the patient will fall into the collapsed state. The opiate should, therefore, be given in a full dose. A grain of morphine (thirty or forty drops of laudanum) is rarely, if ever, too large a dose for an adult. If the first dose be quickly rejected by the stomach, a second should be instantly given. The doses are to be repeated at intervals of from half to three-quarters of an hour, until the discharges from the bowels cease. If, owing to the occurrence of vomiting, the administration of the drug by the mouth be ineffectual, it should be given by the rectum, and in cases in which the symptoms are urgent, both modes of administration should be resorted to. The system, even in this stage of the disease, is not readily affected by opiates thus given. If the administration be in the hands of the physician, and the effects of the doses watched with care, danger from this source (the opiate) may generally be avoided. The practical point is to employ the remedy freely and promptly, so as to effect the object, bearing in mind the fact that the delay of half an hour or an hour is often fatal. Relying upon the opiate, it is best not to add other remedies, lest by increasing the bulk of the doses they will be more

likely to be rejected. The patient in this stage should be restricted to a very small quantity of water, or to small pieces of ice. Perfect quiet is important. He should not be permitted to get up to go to stools, and he should be urged to resist as much as possible the desire to evacuate the bowels.

"I have repeatedly succeeded in arresting the disease by this plan of treatment, and when arrested before proceeding to the stage of collapse, the recovery is usually speedy. Regulated diet, rest, with perhaps a tonic remedy, suffice for the cure. I believe no other plan of treatment promises more than this, but it is not to be expected that it will always prove successful. It will fail, or rather is not available when, owing to the persistent vomiting and frequent purging, the remedy is not retained sufficiently long to exert its effect; and it is not available when the state of collapse occurs so quickly that there is not time enough to obtain a remedial effect. These difficulties are equally in the way of success from any remedies.

"In the stage of collapse the plan of treatment indicated prior to this stage may prove not only ineffectual but hurtful. It is still an object to arrest the discharge into the intestine if it continues; but to employ opiates very largely for this object may not be judicious in this stage. The symptoms in this stage of collapse are due mainly to the damage which the blood has sustained in the loss of its constituents from the discharges which have already taken place. Opiates should be given, but much care should be observed not to induce narcotism. Astringent remedies, if the stomach will retain them, may be added, such as tannic acid, etc. If, however, these or other remedies provoke vomiting, they will be likely to do more harm than good.

"In a large proportion of cases after collapse has taken place, little can be done with much hope of success. Even if the vomiting and purging cease, recovery may not follow. The blood may have been damaged irremediably. Under these circumstances it is plain that active treatment can effect nothing. Recovery, however, takes place in a certain proportion of cases, and under a great variety of treatment. It may take place when no treatment is pursued. My first case of cholera, in 1849, illustrated the fact just stated. The patient was brought into the hospital completely collapsed. I remained with him several hours, and resorted to various measures of treatment. At length all remedies were discontinued; he was allowed to drink abundantly of cold water, under the impression

that the case was utterly hopeless. Much to my surprise, after an absence of several hours, I found the vomiting referred to had ceased and reaction was coming on; he recovered rapidly. I had been led to doubt whether, in general, active treatment effects much for the advantage of the patient in the collapsed stage of cholera, and I cannot doubt that it is often prejudicial. The object of treatment in this stage, aside from the arrest of vomiting and purging, is to excite and aid the efforts of nature in restoring the circulation. The measures to be employed for this object are external heat, stimulating applications to the surface, stimulants, and food.

"The application of heat may be made by means of warm blankets or bottles of hot water placed near the body. Stimulants, in the form of spirits and water, should be given as freely as the stomach will bear, always recollecting the risk and the evils of inducing vomiting. They will be most apt to be retained if given in small quantities at a time, and often repeated, If vomiting be provoked, either by drinks, remedies, or food, more or less injury is done. Concentrated nourishment—essence of meat, chicken broth and milk—is to be given in small quantities at a time, provided the stomach will retain it. It is doubtless desirable to introduce liquid into the system as far as possible. The only objection to drinking water freely is the risk of promoting vomiting. Small lumps of ice should be freely allowed."

This description represents one of the chief lines of treatment pursued in America. Another, which has also many advocates in the medical profession, may be summarized as follows: During the premonitory stage, including the diarrhea, reliance must be placed upon rest, warmth, and mild but gently stimulating draughts, paregoric, aromatic spirits of ammonia, tincture of ginger, with a mustard plaster over the abdomen, and a hot mustard foot-bath if coldness of the body increase and vomiting begin.

During the second, or rice-water stage, aromatics should be given. A prescription much used and approved in India, is the following:

Oil of anise, - - - -	Half a teaspoonful.
Oil of cajeput, - - - -	"
Oil of juniper, - - - -	"
Ether, - - - - -	One teaspoonful.
Tincture of cinnamon, - -	Two ounces.

Mix, and give ten drops in a tablespoonful of water every fifteen minutes.

Another formula, much used in this country, is as follows:

Chloroform, - - -	A teaspoonful and a half.
Tincture of opium, -	" "
Spirits of camphor, -	" "
Aromatic spirit of ammonia,	" "
Creosote, - - -	Three drops.
Oil of cinnamon, - -	Eight drops.
Brandy, - - -	Two drachms.

Mix. Dissolve a teaspoonful of this in a wineglassful of ice-water, and give two teaspoonfuls out of this glass *every five minutes*, followed each time by a lump of ice.—*Hartshorn*.

Rheumatism.

Several distinct affections are popularly included under this term, rheumatism. First, an acute inflammatory affection of the joints, called in medicine *acute articular* rheumatism. Second, the disease, or perhaps series of diseases, called *chronic* rheumatism. And third, *muscular* rheumatism. Indeed this term is popularly applied with considerable license to almost any painful affection in which there are no local signs of disease.

Acute Articular Rheumatism.

This disease affects the joints, as the name implies. It is indeed an inflammation of a smooth membrane which lines the joints, called the *synovial* membrane. At the same time it may extend to other parts of the body containing this same membrane, especially the heart. So long as the disease is confined to the joints it is not immediately dangerous; the peril to life consists in the possibility that the inflammation may extend to the heart, in which case there often results serious difficulty, which may cause immediate death, or may result in permanent disease of the heart. Perhaps the majority of cases of so-called *organic* heart-disease originate in attacks of acute rheumatism.

Symptoms.—Acute rheumatism usually begins with a sudden attack, which may occur in the night. In some cases the manifestation of local difficulty—that is, pain in the joints—may be preceded for a few hours or days by more or less fever. In most instances, however, the fever and the local pain begin at about the same time; it may indeed happen that soreness in the joints is felt for some time before the fever begins.

The commencement of the disease consists in a painful swelling in one or more joints, the skin around which is red and tender, the intensity of the pain varies, but in most cases it is quite severe, and becomes agonizing upon movements of the inflamed joints. Perfect quiet is therefore requisite as one of the essentials for diminishing pain. Pressure, too, over the joints is extremely painful, so that even the weight of the bed clothes is at times unsupportable. Those joints which are not covered by the muscles—the knee, wrist, elbow and ankle for example—exhibit considerable swelling; while others, such as the shoulder and hip, may be equally affected and equally painful, but show only slight swelling. In some cases several joints become inflamed at the same time, or in rapid succession, in others the inflammation usually remains limited to one joint for some time before spreading to others; it rarely happens that the inflammation is permanently limited to a single joint, since several joints are successively attacked, and various ones may be suffering from the inflammation at the same time; in severe cases it seems as if nearly all the joints of the body were invaded by the disease during its course. It is a singular feature in the disease that the corresponding joints on the two sides of the body, both knees or both elbows for instance, are simultaneously affected. The relative liability of the different joints to the disease appears to be, first the knee, then the ankle, wrist, shoulder, elbow, hip and fingers.

Acute rheumatism is always associated with more or less fever, and is hence often called *rheumatic* fever. The appetite is impaired or lost, there is great thirst, the tongue is thickly coated, the bowels usually constipated. A special feature is the profuse sweating which occurs, especially at night; the perspiration evolves a sour odor. The mind is usually not impaired, unless the membranes of the brain become involved in the inflammation. The patient's strength is usually well preserved, his chief suffering consisting in the pain in the joints.

Although the local inflammation in the joints may result in some permanent stiffness or deformity, yet the chief danger from the disease occurs, as has been stated, from the possible complication in the heart, for the heart is lined by a membrane quite similar to that of the joints, and is covered over with another such membrane; either one or both of these may become the seat of the inflammatory process, a complication which may occur at any time in the course of the disease, though most frequently in its first half.

The various structures in the lungs and bronchial tubes seem also liable to the rheumatic inflammation, though these complications are somewhat rare. The brain, too, is enclosed in membranes similar to those of the joints, and these membranes may undergo the same inflammatory process. In such cases active delirium, convulsions, and, finally, stupor may occur, though delirium doubtless often occurs without there being any inflammation of the membranes in the brain.

The natural duration of the disease varies, within wide limit, from two weeks to two months, the average being perhaps about four weeks. Its course can be considerably shortened by various modes of treatment, and in the majority of cases can be stopped abruptly within two days by means to be presently described. If, however, the heart complications occur, the illness may be indefinitely prolonged. The joints, it is true, recover, but the patient convalesces very slowly.

Another unpleasant feature in the disease is its liability to recommence when apparently about concluded; that is to say, the patient will sometimes, after weeks of illness, become quite free from fever and pain, the joints are no longer swollen nor tender, and complete recovery seems to be at hand, when suddenly the disease begins again affecting perhaps the same joints as before, and manifesting the same intensity.

Cause.—The popular idea attributes rheumatism to exposure to cold. There may be, and doubtless is, some truth in the idea that such exposure promotes the development of the disease. Yet it is none the less certain that there is a certain predisposition to it; that the disease runs in certain families only as a rule. An individual in whose family rheumatism has not occurred may, it is true, in the course of time develop the disease; but the majority of instances occur in people who have a hereditary tendency to it. This is in-

dicated by the occurrence of rheumatism in childhood, and by the repetition of the disease in the same individual. Age, too, seems to have a decided effect upon the susceptibility to the disease; for it rarely occurs, even among those who have a constitutional tendency to it, under the age of fifteen years—the great majority of cases occurring between the ages of fifteen and thirty years. It is very rare to find an individual more than thirty years old who is suffering from the *first* attack of the disease. Hence, it appears, that the liability to acute rheumatism decreases after this age, and becomes very slight after fifty years of age.

Treatment.—Until a few years ago, the treatment of acute rheumatism was not entirely satisfactory, as was proven by the fact that many methods were in use. The best results had been obtained by the use of *alkalies*, with or without *colchicum*. A formula frequently used was the following:

Carbonate of potassium, Nitrate of potassium. } Each two and a-half drachms
Water, eight ounces.

Dissolve and take a tablespoonful three times a day.

Much value seemed to be obtained also from the use of lemon-juice in water, say a tablespoonful every three hours. Yet, since 1876, there has been but little resort to these measures, because means have been found by which the disease can be promptly and effectually checked. Under the use of the alkalies and lemon-juice, the patient was usually ill for two or three weeks at least, and ran the risk of complications in the heart, which might prolong the disease indefinitely. At present, however, we are enabled to cut short acute rheumatism usually within three days, sometimes within twenty-four hours; and not the least valuable feature of this treatment is the avoidance of the heart complications, which often prove the most serious feature of the entire illness. The measure employed for this purpose is the use of *salicylic* acid, or some of its compounds. The best form for general use will be the compound of the acid known as the *salicylate of sodium*, which is less disagreeable and more easily administered than the acid itself. Perhaps the best way to take it is in powder, ten grains of which may be taken every two hours until six doses have been swallowed. It may then be desirable to discontinue the drug for six hours. If, at the end of this time, the symptoms of the disease have not

materially subsided, the powder may be administered in the same way and quantity for another twelve hours. In the majority of instances the remedy works like a charm, especially if it be administered early in the disease, before complications have arisen in other structures than the joints. The fever subsides, the joints are less sore and not at all painful, the appetite returns, and not infrequently the patient who a day previously was writhing in agony upon the slightest movement, flushed and feverish, rises from his bed and walks without pain. It must be said that this result cannot always be depended upon. If the case has already lasted one or two weeks, the drug does not always act so promptly nor so efficiently, though even then it is usually the best treatment that can be employed. Then again, there are cases in which the disease is not very acute nor painful, in which the swelling of the joints is moderate and the fever slight. These cases are apt to be especially obstinate, and to resist the action of salicylic acid. It is impossible to say in advance which of the cases will yield, and which will resist this drug, although one may feel sure of the cases in which the fever is high, and be somewhat doubtful in regard to those in which the fever is very moderate. Yet in every case we should begin the treatment — and the earlier the better — with the salicylic acid. If this drug be efficient in controlling the case, the fact will be evident within three days, at the outside, in the rapid diminution of the pain, swelling and fever. If, at the end of three days, there be no evidence of improvement, it will be wise to resort to the alkalies, as in the formula above given, and the lemon juice.

Local treatment may also be used for the swollen joints; these may be enveloped in flannel or cotton wool, which may be surrounded with oiled silk. Or the swollen joints may be wrapped up in cloth saturated with chloroform liniment, as it is obtained in the drug store. Much benefit is derived in some cases by gentle friction of the joints with the dry hand or with chloroform liniment. The choice of measures may be left largely to the selection of the patient, since some individuals will prefer one and some another of these local applications. In employing the friction, the pressure must be at first, of course, extremely light, to avoid giving pain; though many times the force employed can be gradually increased with comfort to the patient until the attendant may use as much pressure as he can conveniently employ. A method which has been recently much employed consists in the application of fly blisters to

the affected joints, permitting them to remain until some blistering occurs. This plan doubtless relieves temporarily the pain in the particular joint which is blistered, but seems to have no effect upon the progress or course of the disease. On the whole, it is an undesirable measure, since the blisters may subsequently give trouble.

Chronic Rheumatism.

This name should, according to all medical usage, represent the continuation of an acute rheumatism in a less violent and painful form, and such cases are actually found under the name chronic rheumatism. Yet this name, as ordinarily employed, designates several affections, all of which are characterized by pains in the joints or in the muscles, which have a tendency to persist indefinitely. There is a form of chronic rheumatism which affects the patient like the acute disease, except that the symptoms are less marked; there may be no fever, the pain and soreness are less intense, the tenderness on pressure is comparatively slight, and the swelling of the joints may be scarcely noticeable. As in the acute variety, various joints are affected successively; the disease may finally become concentrated and remain fixed in a single joint. In this disease there is but little disturbance of the general health, insufficient, indeed, to disturb the patient's avocation. Yet there are instances in which movements of the affected part cause considerable pain, and patients may be even confined to the bed. After long continuance of the disease the affected joints may present irregular enlargements and stiffenings, while the muscles of these limbs become small from lack of use.

In many cases of acute rheumatism, the severity of the pain varies extremely with the weather; so that such individuals are usually able to foretell, by a few hours, the occurrence of cold and moist weather. There is a variety of rheumatism, so-called, in which the pain is felt chiefly along the leg bones, the "shins," and occurs especially at night. This affection is often due to a syphilitic taint, and will be discussed in speaking of syphilis.

Treatment.—One of the most important features of treatment of chronic rheumatism, is care in wearing flannel next to the skin throughout the year. The administration of drugs is by no means

certain to produce beneficial results. Some cases are materially benefited by the regular employment of the hot air, or hot vapor bath, the Turkish bath, etc. The fact is, that the treatment of each case of chronic rheumatism is largely an experiment which can be successfully accomplished after considerable time has been spent in trials of drugs and remedial measures. Among the medicines which are most frequently useful, are the iodide of potassium, guiac, and cod liver oil. The following formula may be given:

Iodide of potassium, - - -	Five drachms.
Tincture of guiac, - - -	Two ounces.
Water, - - - -	Two ounces.

Mix, and take a teaspoonful four times a day.

Other cases will be benefited by using colchicum with the alkalies. An example of such mixture is the following:

Wine of colchicum root, - -	One drachm.
Bicarbonate of potassium, - -	Three drachms.
Rochelle salts, - - -	Three drachms.
Peppermint water - - -	Four ounces.

Take a tablespoonful three times a day.

Some of the various mineral waters are reputed to be efficacious in the treatment of chronic rheumatism, though they generally seem to be valuable, if at all, merely as a subordinate element in the treatment.

Muscular Rheumatism.

Although this affection is designated rheumatism, there is every reason for believing that its cause is quite different from that of the disease just described. It seems to be of the same nature as neuralgia, and might properly be so described, though it is convenient to follow the usual designation as already given.

Symptoms.—The disease is usually developed gradually. A dull pain is felt in certain muscles, gradually increasing until it becomes quite severe. The pain is usually increased upon movement, sometimes becoming convulsive and cramp-like, causing the patient to groan, or even cry aloud. These movements, and the consequent

pain, may occur during sleep and awaken the patient. The muscles thus affected are somewhat tender upon pressure, but present no other signs of disease, such as swelling or redness. The constitutional condition is otherwise good, and no interference occurs in the bodily functions except such as are consequent upon the painful movements.

The duration of this disease may vary from a day to a week or may last, in less severe form, indefinitely. The muscles most apt to be affected are those of the forehead and of the temples. Another familiar example is in the neck, resulting in what is popularly termed "wry-neck." The pain may also be located in the muscles of the back and loins, constituting the affection known as *lumbago*. It occurs not infrequently in the muscles of the chest, where it may for days render deep breathing impossible without pain.

Wherever it may occur, the characteristic feature of muscular rheumatism is the occurrence of cramp-like pain, aggravated by the movement of the part. In this particular it is distinguished from neuralgia, which is a constant pain, affecting perhaps the same localities. This form of rheumatism is undoubtedly promoted by exposure to cold, and seems often to result from getting the feet wet. The treatment should consist in improving the general condition by such measures as will invigorate the health. In the acute cases benefit can also be derived from the use of liniments and of gentle friction.

Gout.

Gout is closely related to articular rheumatism; indeed, by some the two diseases are regarded as essentially identical. However, they are so distinct in their symptoms and course as to be generally recognized and described as distinct diseases. They may be regarded as allied, just as typhoid and typhus fever are allied. Gout occurs both as an acute and a chronic disease.

Symptoms.—In describing the symptoms, it becomes necessary to distinguish between the transient acute cases, and those of long duration, called chronic. The acute attack usually occurs suddenly, often during the night. In many cases the patient has

retired in his usual health, though in others there may be certain premonitory symptoms, such as pain in the region of the heart, belching of gas from the stomach, and mental depression or irritability. These symptoms so frequently precede an attack of gout that many, who have already experienced one attack, recognize in these symptoms the onset of another. The attack itself begins by extreme pain in one of the joints, usually that between the great toe and the foot. This pain is variously described by patients as like that of the gnawing of an animal, the dislocation of the bone, or like tearing the flesh with pincers. A feeling of throbbing accompanies the pain, and there is usually considerable fever, sometimes preceded by a chill. These features continue for several hours before subsiding; at the end of this time the patient is reasonably comfortable, and usually falls asleep.

This attack is usually followed on succeeding nights by repetitions of a similar nature; either during these repetitions, or perhaps during the first attack, the painful joint becomes swollen, reddened and exquisitely tender. The local affection may be limited to the joint originally affected, but often attacks also the corresponding joint of the other foot, or spreads to the instep and hollow of the foot. Indeed, in individuals who have repeatedly suffered from this disease, numerous joints in different parts of the body, even of the hands, may become similarly affected. In many cases the pain lasts but a few hours, and returns again on the following night. There are instances, however, in which the pain merely decreases in intensity during the day without entirely ceasing. Cramp may affect the muscles of the legs, the thigh, and even other parts of the body, though this is a somewhat unusual symptom. These attacks may return nightly for a week or for several weeks. The long continued attacks are usually less severe than the brief ones; the result may be entire recovery or continuation as the chronic form of the disease. Chronic gout may be the result of a series of acute attacks of gout, or may begin in a very mild manner. In either case the symptoms which characterize the acute affection are present in but slight degree. The disorder is rather a constitutional one, that is to say, the symptoms manifested in the foot are so slight that attention is directed to the constitutional derangement. There are usually disorders of indigestion — dyspepsia, pain in the stomach, derangement of the bowels. In many cases these derangements have caused serious impairment of the general health.

Sooner or later there occurs in the chronic cases of gout a condition quite characteristic of this affection: masses resembling chalk are formed in and around the small joints, and, indeed, some of the large ones; the joint of the great toe is especially apt to exhibit this appearance. As a result, the joints become deformed, stiffened and even incapable of any movement. Sometimes collections of this chalk-like matter can be felt just under the skin, and if opened this matter can be pressed out. Sometimes matter forms around these masses and makes its way through the skin, resulting in the formation of openings, called *fistulæ*. The result of all these changes is that both hands and feet become strangely deformed, presenting apprearances which have been likened to a bunch of parsnips. Similar formations of chalk-like matter have been known to occur in various parts of the skin, on the eyelids and in the ear.

There has long been an impression among medical men, which has become a popular belief among the people, that gout may be manifested, not merely in the joints, but also in the internal organs, such as the stomach, heart and brain. Disorders which affect these organs during an attack of gout are supposed to be due to the gouty influence; the gout has "struck in." This expression is particularly applicable to those attacks of gout during which the affection of the joints suddenly ceases, and symptoms indicating some derangement of some internal organ follow. There is, doubtless, some connection between the local attack and the affection of the internal organs. This is amply shown in the fact that remedies addressed to the gout relieve these symptoms.

Those who have long been subject to gout usually present certain disorders which constitute the dangers of the disease; for the local affection of the feet, or of the hands, however painful and unsightly, contains no element of danger to the patient. One of the most serious complications occurring in gouty patients is a disordered action of the heart. This disorder occasions not only palpitation, shortness of breath, sense of suffocation and pain in the region of the heart, but may even cause sudden death, in consequence of the sudden stoppage of the heart's action. Various affections of the lungs also are popularly, and doubtless properly, attributed to the gout. Among these are persistent cough, bronchitis and asthma. The explanation of many an intractable case of asthma has been found in the gouty condition of the patient, and relief from the asthma has followed remedies addressed to the gout.

So, too, various pains designated as neuralgia,—particularly neuralgia of the face and of the hip (sciatica)—periodical headache and even hysteria, seem to be promoted by the gouty condition of the patient.

Another most serious complication of the gout is a disease of the kidney, one form of the so-called "Bright's disease." This disease is so common among those affected with gout that the small, hard kidneys characteristic of this affection are called "gouty kidneys." This form of Bright's disease is not indicated by the symptoms characteristic of the ordinary acute Bright's disease; there is no dropsy, no fever, in fact none of the usual signs. The most characteristic feature, at least the one most readily recognized by the non-professional observer, is the fact that the patient passes an unusually large quantity of urine. These patients are almost always advanced in years.

Cause.—Gout, like rheumatism, is a disease occurring with especial frequency in certain families. It is, indeed, largely the result of a hereditary taint, which may be transmitted through several generations; yet it is not always so inherited, since it may be as readily acquired by errors in diet and the mode of life. Nor does it follow that the children of gouty parents will themselves necessarily suffer from gout. The tendency to the disease varies also with the age; it rarely occurs at an age under fifteen years, and then only in the children of gouty parents. It affects most frequently middle life, thirty to fifty years. Sex, too, exerts a marked influence over the disease, since women are very rarely affected with gout. But the most direct and powerful influences leading to the acquirement of gout seem to be the habitual use of over-stimulating food, and of wine or malt liquor. The disease is proverbially frequent among the wealthier classes of society, who are addicted to luxurious habits of life, so that gout is regarded generally as one of the penalties of wealth. It is impossible to ascribe accurately and definitely the exact influence exerted by each one of the factors which enter into a luxurious life; it is, however, certain that over-indulgence in the pleasures of the table, even without the use of liquors, promotes the production of this disease. As a matter of fact, gout is by no means a monopoly of the wealthy, since it is quite common among the London laborers who drink porter and stout to excess.

Treatment.—One of the most important measures in the treatment of gout consists in the regulation of the diet; the avoidance of excesses at the table and in the use of liquors is an evident necessity. Among the remedies used during the attack, reliance is chiefly placed upon *colchicum* and *alkalies*. Instead of the latter, various mineral waters have been highly recommended by different authors; perhaps the most noted and universally used of these is the so-called "Lithia Water," which may be obtained at the druggist's. This is, in reality, not a natural mineral water, but an artificial solution made by dissolving the citrate of lithia. If this be not procurable, a solution of magnesia and colchicum may be employed as follows:

Wine of colchicum root, - - -	One drachm.
Magnesia, - - - - - -	One drachm.
Peppermint water, - - - -	Four ounces.

Mix; take a tablespoonful three times a day.

It may be necessary also to protect the inflamed joint; this may be accomplished by the means prescribed in treating of rheumatism—by enveloping the joint in cotton, or by wrapping it with cloths which have been saturated with the tincture of belladonna or with the tincture of aconite. The chloroform liniment will also be found advantageous for local use in this affection. During the paroxysms it may be necessary to relieve pain by the use of opiates; for this purpose twenty drops of laudanum, or ten grains of Dover's powder may be employed. If the opiate cause unpleasant effects, such as nausea and headache, we may substitute ten drops of the tincture of belladonna, which may be repeated in two or three hours. In the intervals between the attacks the diet must also be restricted—should embrace no wines or malt liquors, and but little, if any, meat; a simple, unstimulating diet of milk, eggs, fish and vegetables will materially assist in preventing the return of the attack. So, too, the remedies useful in treating the paroxysm—especially the colchicum—may be continued during the intervals between the attacks. If the indications, such as dyspeptic symptoms, render the patient suspicious of an approaching attack, it will be well to employ the colchicum and the alkalies in advance. For there is reason to believe that impending attacks can be in this way warded off.

The local affections of the joints may sometimes require attention after the severity of the paroxysm has subsided, for, as already

said, the joints are often rendered permanently stiff and deformed by the deposit in and around them of chalk-like masses. This stiffness can be sometimes partially relieved by systematic gentle friction, and by the arrangement of the shoes so as to afford the parts ample room. The swelling can be sometimes diminished before the deposit of chalk is apparent, by the use of repeated blisters, not allowed to remain long enough to produce excessive blistering. After this chalk-like matter has been deposited in abundance no measures can be successfully applied for its removal.

With reference to the use of mineral waters, Dr. Garrod, the most eminent authority on this subject, says: "They should be altogether prohibited when there is considerable structural disease in any important organs, especially in the heart or kidneys; and even when the organic mischief is slight, the greatest caution is necessary in their use. They should be avoided when an acute attack is either present or threatening.

"The waters should be selected according to the nature of the case. When the patient is robust and of a full habit, the alkaline-saline springs; when torpidity of the bowels predominates, the purgative waters; when there is a want of vascular action, the saline water; when the skin is inactive, the sulphur springs; lastly, when debility prevails, then the more simple warm waters should be chosen. In all cases the use of the waters should be cautiously commenced, and care taken not to oppress the stomach by giving too much liquid, nor to induce debility or any other injurious effects by allowing a too long sojourn in the bath."

Rheumatic Gout.

This term is much used to denote a combination of the two diseases, rheumatism and gout; a use which is rarely proper, since the two diseases seldom occur in the same individual. The proper use of the term is to designate an affection which is neither rheumatism nor gout, but presents some of the characteristics of one or the other, or both, of these diseases. To prevent this misunderstanding, it has been proposed to call the disease in question *rheumato diarthritis*. This disease is either acute or chronic, usually the latter. In the acute form, if the larger joints are affected, it

resembles acute rheumatism, though the fever is less marked, and the joints more swollen than in rheumatism; moreover, there is not the same tendency to spread from one joint to another, nor is there danger of inflammation in and around the heart. The chronic form is distinguished, also, from rheumatism by the amount of liquid in the affected joints, and by the tendency to destroy the ends of the bones constituting the joints. One of the most characteristic features is a tendency to a peculiar distortion of the fingers, which are directed toward the outer side of the hand, and cannot be retained in their proper position. Rheumatic gout occurs at all periods of life, most commonly in people suffering from feeble health. It is said to be especially apt to affect the children of consumptive parents, and the offspring of gouty or rheumatic persons. "It fixes upon the girl just arriving at puberty, in whom the uterine functions are not well performed; it invades the stiffening joints of the woman who has arrived at that time of life which is marked by the cessation of the monthly periods; it shows itself during the state of debility which follows in a miscarriage or a difficult and protracted labor, more especially when accompanied by flooding; it is a frequent attendant upon kidney disease, and upon the ill health produced by syphilis, or gonorrhœa; it is a common sequel of prolonged suffering, of excessive venery, of severe and long-continued mental exercise, and of mental distress and bodily exhaustion."—*Fuller.*

Treatment.—Since this disease rarely occurs, so long as the health is kept at par, it may be laid down as a general principle, that the first object of treatment is almost invariably the improvement of the individual's general condition. For this purpose, hygienic measures—food, air, exercise—should be carefully regulated; and, in addition, it may be advisable to take some of the usual tonics containing iron. There may be, of course, in every case special circumstances which require particular attention.

The swollen joints require especial attention, not simply to relieve the painful symptoms, but also with the hope of checking the inflammation, so as to prevent the destructive results which often occur in the joints. It is absolutely necessary that the joints be kept perfectly quiet; they should be enveloped in hot cloths enclosed in oiled silk. Sometimes advantage may be derived from the application of the tincture of iodine to the skin; this may be painted on

with a camel's hair brush or with a piece of soft rag, or small fly blisters may be applied to the swollen joints, first on one side and then upon the other, so as to keep up a certain amount of irritation for several days. These measures (the iodine and the blisters) are beneficial after the acuteness of the pain has subsided. So long as the symptoms are violent, it will be better to keep the joints wrapped in flannels wrung out of hot water. A considerable degree of stiffening often persists for a considerable time, and may be relieved by passive motion of the limbs; that is, having them gently bent by the attendant, and by gentle friction with some liniment, such as the chloroform liniment.

Scurvy.

This is a disease long known, which formerly proved exceedingly destructive, both in cities and among armies, and it was the bane of ocean voyages, particularly the long ones which were inevitable before the application of steam to navigation. This disease caused enormous loss of life in the English and French armies during the war of the Crimea; and the United States forces were materially weakened by it during the war with Mexico. At present the disease is quite controllable, and has lost the terrors which it formerly inspired. It now occurs only as the result of ignorance or neglect to comply with known rules of health.

Symptoms.—The characteristic features which mark the onset of the disease are usually preceded for several weeks by general languor and weakness; the patient is listless and indisposed to exertion, mental or physical; he loses flesh, becomes pallid, the appetite fails, and digestion is impaired. The first symptoms are swelling of the gums, which become quite spongy in texture and bleed upon the slightest pressure, or even spontaneously; the gums are especially swollen and spongy around the teeth, and these become loose and fall out, or may remain sticking in the food. Meanwhile blood may escape also from other mucous membranes, from the nostrils, the chest and the bowels; slight hemorrhages, too, occur in the skin, forming reddish spots of varying size, which subsequently undergo the usual changes of color observed in "black and blue" spots; these

spots are produced spontaneously, and are formed whenever even the slightest bruise is inflicted upon the skin.

In a short time the body becomes somewhat swollen, especially the feet, ankles and face. The patient complains of pain, chiefly in the lower limbs, but also in the small of the back and loins. The muscles of the legs become hard and swollen. The depressions in the skin of the thigh, which indicate the hollows between the muscles, are often streaked with blood; slight pressure over the lower limbs usually causes considerable pain. The blood, which has escaped into the spaces between the muscles, sometimes interferes seriously with the movements of the patient, who is therefore compelled to seek comfort in the recumbent posture. In fact, after a few days the patient's strength is so much reduced that he can walk with difficulty, if at all. He is short of breath and exhausted by the slightest exertion. In extreme cases, indeed, the attempt to rise or to walk induces fainting, or even serious collapse. The eyesight becomes impaired, so that the patient may be practically blind. The mental faculties usually remain natural, though delirium may finally occur. The lips become almost as blanched as the skin, and the eyes sometimes present a curious and startling appearance, because the part that is naturally white is thickly streaked with red, while the red membrane of the lid has become quite white.

Scurvy is to-day a comparatively unimportant, because easily controlled, disease, and the cases are rare in which the patient cannot be restored to health by proper treatment, however exhausted and pallid he may be. Under certain conditions, where it is impossible to obtain the necessary remedies, however, scurvy is still a fatal disease. Even during the late civil war in America, very many soldiers became victims to it.

Treatment.—The treatment of scurvy consists in the adoption of those measures which, if earlier used, prevent the disease entirely. It is now pretty generally known that the disease results from lack of vegetable food, or perhaps it would better to say, of *fresh* food. It is only in the absence of such supplies that the disease occurs; a fact which accounts for its especial prevalance on military and naval expeditions, upon long sea voyages, etc. If the patient be not yet extremely exhausted, no other treatment is necessary than a reasonably abundant supply of fruits and vegetables. Flesh is, of course, not injurious, and may be taken in

proper quantities in order to promote the strength. During seasons when it is impossible to obtain fresh vegetables, an excellent substitute will be found in lemon juice, which may be taken in such quantities as the stomach can endure, say at least three ounces daily. If lemon juice also be unobtainable, good can be derived from an abundant supply of *fresh* meat, though the patient's improvement under this treatment will be by no means so rapid.

If the patient be much exhausted when treatment is commenced, caution must be exercised in permitting him fruits and vegetables, since the stomach will be unable to retain as much as he will desire to eat. In such cases small quantities of fruits and vegetables may be permitted at short intervals, the amount being increased as rapidly as the patient's digestive powers will permit. Such cases of extreme exhaustion will be benefited by alcoholic stimulants, especially wines. The condition of the gums can be improved by gently rinsing the mouth with a solution of tannic acid in glycerine and water (one drachm of the acid to two ounces each of glycerine and water); or alum may be dissolved in brandy and water.

Since the origin of scurvy is thus known, it is desirable to adopt such precautions as will prevent the disease, rather than to wait for a chance of curing it. It is now generally understood that any expedition which will be deprived of opportunities for obtaining fresh food, should be amply supplied with the best possible substitutes for it. Experience has shown that the best possible substitute is potatoes eaten raw; onions, tomatoes, turnips, cabbage, corn, apples, sauer kraut, are all valuable. Yet for long voyages, the most convenient of the reliable preparations is, of course, lemon juice. A daily allowance of one to two ounces of fresh lemon juice has been amply proven by the experience of naval expeditions to prevent the outbreak of scurvy.

Purpura Hemorrhagica.

This term refers simply to the existence of purple spots in the skin, resulting from the escape of blood. It is always easy to distinguish between a spot due simply to inflammation and one due to the escape of blood into the meshes of the skin. In the former

case (as in the rash of scarlatina or measles) there is no rupture of blood vessels; hence, if we press the finger upon one of these spots for an instant, and then remove it, the spot has disappeared and the skin is momentarily white. When, on the other hand, the redness of the spot is due to the presence of blood in the meshes of the skin as a result of the rupture of blood vessels, such pressure of the finger does not cause the disappearance of the color; these latter spots are characteristic of the disease in question.

Such spots may, it is true, occur in the course of several diseases, such as typhus and typhoid fevers, and cerebro-spinal meningitis; and, as just remarked, they are present usually in large numbers in scurvy. Yet there is recognized in medicine a condition characterized by many of the appearances of scurvy, among them these extensive ruptures of blood vessels in the skin, whence the disease has received the name purpura hemorrhagica. The disease is distinguished from scurvy by the fact that there is less swelling of the gums, which may, indeed, remain entirely unaffected. There is rarely so much swelling and stiffness of the muscles; and the disease does not seem definitely traceable to the lack of vegetable food. Furthermore, the treatment which is so effectual in relieving scurvy (the use of fresh food and vegetables), is by no means so certain to effect relief in purpura as in scurvy. Purpura seems to occur in consequence of reckless violation of the laws of health, or of privation and suffering. The danger from it, like that from scurvy, consists in the general exhaustion consequent upon this condition, and also in the possibility that such large amounts of blood may be lost during the hemorrhages from mouth, nose, throat, and intestines, as to seriously endanger the patient's recovery.

The object of the treatment is the restoration of the natural condition of the blood, increase in the vital powers generally, and the arrest of hemorrhage. To accomplish these ends medicines are of little avail without the use of food in proper quantity and quality, and the avoidance of any unnecessary demands upon the patient's health or strength. The treatment, therefore, should consist of generous diet, re-enforced by wine; while vegetables should, of course, constitute a part of the diet, they are not so essential to success as is the case in the treatment of scurvy.

It sometimes becomes necessary to administer remedies which shall check the escape of blood. For this purpose half a teaspoonful of the tincture of ergot may be given every four hours until six doses have been taken. Some have recommended the oil of turpentine, a tablespoonful of which has been given in half a glassful of milk. The skin may be sponged with whisky and water or with a solution of alum (one ounce), in brandy (six ounces).

Tonic remedies are useful; two grains of quinine should be taken three times a day, either in powder or in the following prescription:

Quinine, - - - - - - - -	One drachm.
Dilute sulphuric acid, - - - -	Four drachms.
Water, - - - - - - - -	To make four ounces.

Take a teaspoonful in water before meals.

DISEASES OF THE THROAT AND CHEST.

AFFECTIONS OF THE LARYNX.

Catarrh of the Larynx.

In treating of the diseases affecting the organs of breathing one naturally begins with the organ situated at the beginning of the windpipe, and making the projection at the front of the throat, popularly termed "Adam's apple." This organ, the larynx, is composed of pieces of cartilage, and is one of the continuations of the back part of the mouth, or *pharynx*. Stretched across its cavity, and lying in the tube through which the air passes, are two elastic bands — the vocal cords — which are so essential in articulate speech. The inside of the larynx, like that of the trachea and lungs, is lined with moist membrane, which covers also these elastic bands or vocal cords. This, like all other mucous membranes, is liable to a condition called *catarrh*. For the popular impression that catarrh means an affection of the nose or head, is not in accordance with the technical use of that term; for any mucous membrane, whether of the nose or throat, or intestine or bladder, may be, and often is, the subject of catarrh.

By catarrh, we understand an *inflammation;* the blood vessels of the part increase in size, there is an increased flow of liquid, and sooner or later a casting off of some part of the membrane itself, causing a thick, ropy discharge. This is the history of a catarrh, no matter where it appears — that is, no matter what mucous membrane be affected. The liability to catarrh varies extremely among different persons; a slight exposure to cold, or rapid transition from one temperature to another, is quite sufficient to excite a catarrhal inflammation somewhere in many individuals, while other persons exposed to the same influences suffer from no

such inconvenience. Then, too, among those who are liable to catarrh there is considerable diversity as to the part most easily affected; in some, exposure to cold is followed by discharge from the nose; in others bronchitis and cough occur; while still others are apt to suffer from inflammation of the lungs or of the kidneys. All these things may result from "taking cold," though the catarrh inflammation more frequently affects the mucous membranes situated nearest the surface, among them that of the larynx. We may say in general, that poorly-nourished people are more prone to a catarrh as a result of exposure to cold, than healthy and robust individuals; and those who are constantly exposed to the weather in the performance of their usual avocations are less easily affected than those whose pursuits are sedentary. Another factor is important in determining the liability to catarrh; namely, that after repeated attacks a mucous membrane becomes more readily affected; it is a weak spot, and yields most readily to any influences tending to derange the individual's health.

Among the exciting causes of catarrh of the larynx are the breathing of very cold air, or dust; excessive efforts at singing, shouting, screaming, and violent coughing. But, in addition, agents which do not affect the larynx directly, may also cause a catarrh of this organ; thus, chilling of the skin, especially that of the feet, is frequently the direct cause of the catarrh. Then, again, a catarrhal inflammation may spread through the larynx from adjacent organs; thus it not infrequently occurs that an inflammation of the throat, such as *diphtheria*, will, in the course of a few days, spread through the larynx. Another familiar example is the catarrh of the larynx, almost invariably found in habitual drinkers, in whom the disease usually begins first in the pharynx, and subsequently extends to the larynx.

Beside these various causes which may induce a catarrh of the larynx in any individual, there are certain other factors which frequently induce the disease. Some very obstinate cases of catarrh of the larynx are due to constitutional taints, such as syphilis; and finally there are numerous instances of the disease in which the cause is to be found in the growth of a tumor in the larynx.

Symptoms.—Acute catarrh of the larynx does not usually cause serious constitutional symptoms; though in some instances slight shiverings mark the onset, and some fever accompanies the

disease. The patient complains of a sensation in the throat, which he describes usually as tickling, or, in more severe cases, as burning or soreness; this sensation is aggravated by coughing or speaking. At the same time, the voice is changed in character, grows deeper, hoarse, perhaps cracked, and, finally, may be lost altogether. This change in the voice indicates that the mucous membrane covering the vocal cords is in a state of inflammation or *catarrh*. Another constant symptom is a violent cough, due to the irritation in the inflamed mucous membrane. There may be also a spasm of the muscles of the larynx, whereby the passage for the air is so much diminished in size as to cause a wheezing sound during the breathing.

If the catarrh affect the larynx only, — a somewhat rare occurrence — there is but little matter expectorated. The cough is hard, dry, ringing. It often happens that a child who has coughed somewhat during the day, and has been rather hoarse though not ill, wakes up suddenly in the night with great difficulty in breathing. The little patient seems suffocated; gasps for breath, and throws himself about in the bed in terror, perhaps clutching anxiously at his throat. The cough is loud and hoarse—"barking." These are the cases commonly called *croup* by mothers, and are really merely attacks of slight catarrh of the larynx. So soon as the child has cleared his throat of the mucus which has collected there during his sleep, the breathing becomes again easier, the cough subsides, and the patient falls asleep.

Acute catarrh of the larynx usually terminates, if uncomplicated, within a week; though if neglected, or if the patient be in poor health, it may last for several weeks.

Chronic catarrh of the larynx is marked by hoarseness, obstinate cough, and finally permanent change in the character of the voice. This difficulty may result from an acute attack, but more commonly appears only after frequent catarrhs.

Treatment.— Since the acute attack usually subsides spontaneously within a week, treatment with medicines is usually unnecessary. It will suffice to direct the patient to remain so far as possible in a uniform temperature, and not expose himself to sudden changes of atmosphere; he should avoid the effort to talk, so far as possible, and should especially resist the inclination to cough. He will of course say that he can't help it, but he *must*

help it. The irritation of the larynx, and hence the tendency to cough, can be much diminished by one of the following prescriptions:

Hydrocyanic acid (dilute) - - -	Half a drachm.
Sulphate of morphia - - -	Half a grain.
Syrup of tolu - - - -	One ounce.
Water - - - - -	One ounce.

Mix and take a teaspoonful every two hours.

Or relief may be obtained from the following:

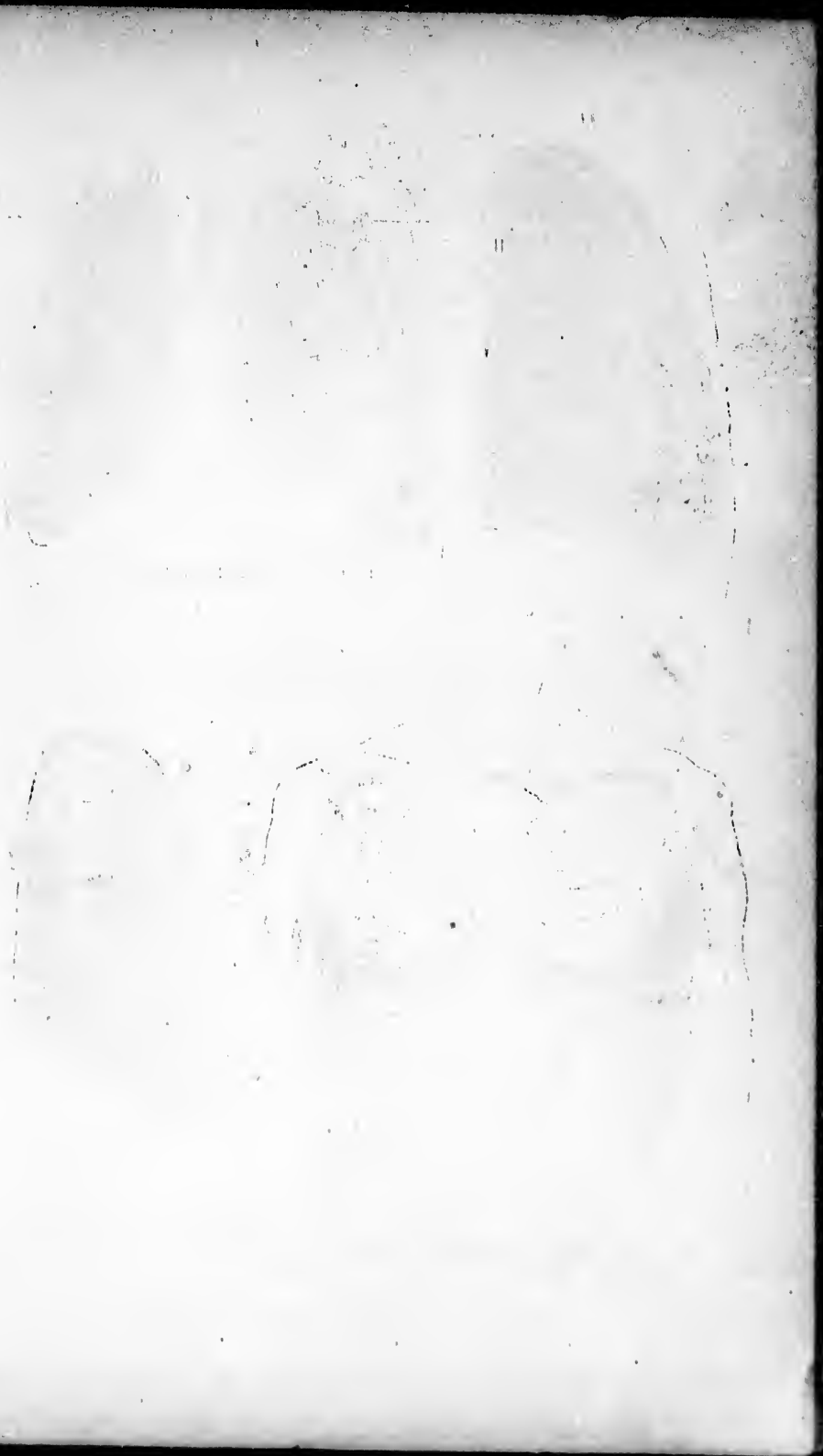
Syrup of wild cherry - - - -	One ounce.
Syrup of squills - - - -	One ounce.
Camphor water - - - - -	One ounce.

Mix and take a teaspoonful every two hours.

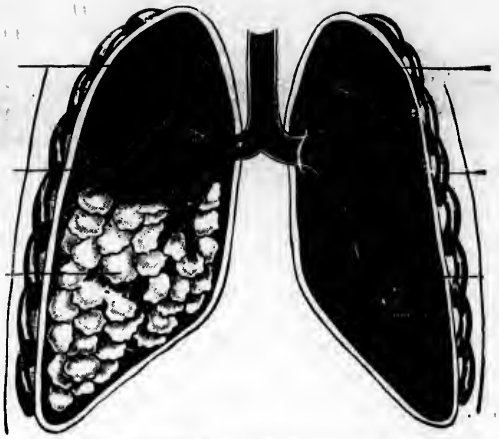
At the very first indication of "taking cold," whether the mucous membrane affected be that of the larynx, or elsewhere, it is often possible to cut the matter short by promoting free perspiration. This can be easily accomplished by soaking the feet in hot water for fifteen minutes, the patient being meanwhile enveloped in a quilt or blanket; at the expiration of this time the feet should be well dried, the patient tucked snugly in bed, and ten grains of "Dover's powder" may be administered. The throat may be wrapped in flannel, though it is not necessary to apply petroleum or hog's fat, or any of the other popular domestic remedies. If the individual be constipated, a saline laxative may be administered with advantage.

The treatment of chronic catarrh of the larynx must consist of local applications, which are best made by means of a brush. This requires especial manual skill, and must, therefore, be entrusted only to professional hands. It sometimes happens that a long-continued catarrh results in the formation of ulcers in the larynx, even in those who are not afflicted with any constitutional taint, such as syphilis or tuberculosis. Such a complication — the formation of an ulcer — is not always indicated by additional symptoms; perhaps the most characteristic feature is pain upon swallowing; in such cases, too, the matter expectorated is often streaked with blood.

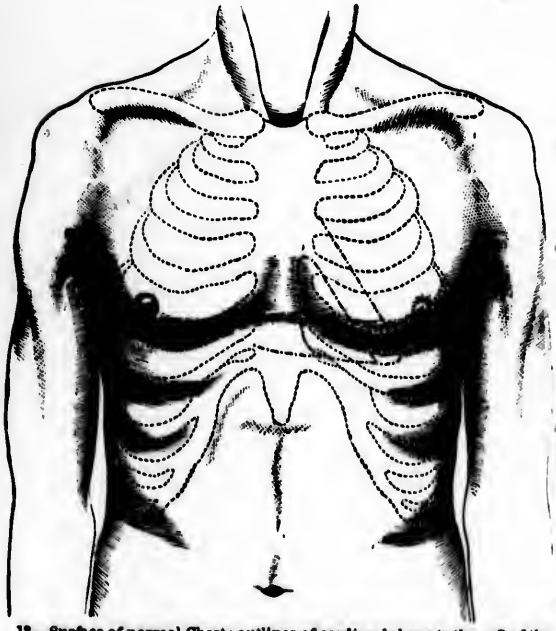
The ulcers of the larynx consequent upon a syphilitic or tubercular taint, will be described in connection with these diseases respectively.



11.—Pleuro-Pneumonia.



12.—Chronic Phthisis; intervesicular changes.



13.—Surface of normal Chest; outlines of cardiac dulness to the left of the Sternum. The spaces inclosed in dotted lines represent the interspaces.

14.—Croupos of Vesicular Pneumonia. Stage of consolidation.

LUNGS.

Tumors of the Larynx.

The tumors most usually found in the larynx are of a fibrous nature, and may be as large as a bean. Besides these, there occur, also, thickenings of the mucous membrane, called *polyps* and *cancers*.

Symptoms.—The presence of a growth in the larynx may be accompanied by a variety of symptoms, none of which are perfectly characteristic of the disease; among these are difficulty it breathing, without apparent cause, and, in some cases, sudden and violent choking fits. There is, also, usually a chronic catarrh of the larynx, causing hoarseness, cough, and some pain. Yet, a positive opinion can be reached only by the use of an instrument called the *laryngoscope*, or throat-mirror, whereby the physician can look directly into the throat, and detect, with the eye, the presence of any foreign body.

Treatment.—If the tumor be of such a nature that its presence causes only mechanical difficulty, its removal is justifiable. These operations are so successful as to have become a recognized surgical procedure.

AFFECTIONS OF THE LUNGS.

Pleurisy.

By pleurisy we understand an inflammation of the membrane which covers the lungs and lines the chest. For it will be remembered that the chest is a cavity, or rather a pair of cavities, in each of which is contained a lung; that during the movements of the chest in breathing, the lung is rubbed against the inner surface of the ribs, and that to render this friction as light and easy as possible, a very smooth membrane—the pleura—is so arranged as to cover the lung and to line the inside of the chest wall. In this way the delicate structures of the lung are protected from actual contact with the chest wall; the friction necessary during the movements is borne by the smooth and tough membrane called the pleura.

Whenever inflammation occurs anywhere except on a mucous surface, there occurs what is called an *exudation*. This is familiar to us in the examples of inflammation which take place at or near the surface of the body; a boil, for example, is a circumscribed inflammation, and we are well aware of the fact that a considerable amount of material is deposited in the inflamed spot, making a swelling. So, too, in acute rheumatism, a large amount of liquid or *exudation* takes place into the joint, resulting again in swelling. When the membrane covering the lungs becomes inflamed, a similar exudation of liquid takes place into the space between the ribs and the lung. The amount of this exudation varies considerably, amounting sometimes to several pailfuls. The result of the presence of this liquid in the chest is, of course, to compress the lung and interfere seriously with breathing.

Symptoms.—There is usually no premonitory stage preceding an attack of pleurisy. An individual exposes himself to cold, gets his feet wet, or is caught in a heavy shower; after an interval which may vary from a few hours to several days, the patient experiences a shivering sensation, which may sometimes develop into a pronounced chill. About the same time he begins to feel considerable pain in one side of his chest. This pain is usually sharp and cutting in character, increases during the act of breathing, to such an extent that the individual unconsciously arrests the motion of his chest on that side. Any violent motion, particularly coughing and sneezing, is accompanied by exquisite pain; and even the ordinary movements of the body occasion considerable uneasiness. The pain is usually referred to the middle and lower part of the chest, especially in front and under the arm; it may not be limited to any particular spot, but may seem to spread over the entire side.

Meanwhile, the chill has been followed by fever, which is not, however, extreme. The usual evidences of constitutional indisposition — thirst, wandering pains, headache, restlessness and debility —are usually present; yet it is not seldom to observe a case in which most of these symptoms are wanting — the patient complaining almost exclusively of the sharp sticking pain in his side upon breathing.

Such are the symptoms during the stage of inflammation which precedes the exudation — that is the escape of liquid into the cavity of the chest. When this exudation has occurred, the

symptoms change materially; the pain is much diminished, presumably because the inflamed surfaces which had been previously rubbing against each other during every act of breathing, are now separated and bathed by the liquid exudation. The acts of coughing become less frequent and less painful; the fever subsides somewhat, and may even cease; the patient feels more comfortable, acquires a little appetite, and may even rise from his bed and walk about. If the amount of exudation which has been thrown out into the cavity of the chest be so considerable—say several pints—as to compress the lung on the same side of the chest, the breathing will be hurried, since the individual now has the use of but one lung; if the amount be excessive, the respiration is extremely rapid; the skin may be blue, indicating that the patient gets an insufficient quantity of air; he is often compelled to sit upright, in which position he is enabled to breathe easier. Yet there is considerable diversity in the symptoms, even when one side of the chest is distended with fluid. Cases are sometimes seen in which, even under these conditions, the patient is perfectly comfortable, and seems to suffer from no lack of air.

Another sign that the exudation has occurred, is more apparent, perhaps, to the non-professional eye than those just discussed; it consists in the change of position of the patient, for during the first stage, before the water has been poured out into the chest, that is, while the inflamed surfaces are rubbing against each other, the patient cannot bear to lie upon the affected side; he reclines, always, either upon the back or upon the healthy side. So soon as the exudation has occurred, on the other hand, he finds most comfort when lying upon the affected side, for now this gives him no pain, but permits him to use the healthy side for breathing.

The further course of the disease consists, in the majority of cases, in the removal of this liquid again from the chest cavity, leaving the chest in almost the same condition as before the disease began. This, however, is a gradual and often a long process. Weeks may elapse, even after the patient is apparently convalescent, before all the liquid has been taken from the chest. On the other hand, it sometimes happens that the liquid is not promptly removed from the chest, that a considerable quantity of it may remain for months, retarding the patient's recovery, and perhaps requiring ultimately artificial means for its removal. A still worse sequel to the disease consists in the gradual formation of matter—*suppura-*

tion — in the cavity, so that the liquid becomes gradually transformed from water into *pus*. This constitutes the affection known as *empyema*, which may entail the most serious consequences, and will be later discussed.

In the majority of cases the liquid is sooner or later entirely removed from the chest cavity. In the most favorable cases the compressed lung regains its former size and use so soon as the compressing liquid is removed, and the patient may recover the entire use of the lungs and chest, so that even a careful medical examination can detect no trace of the disease. In a considerable number of cases there remain, however, certain reminders of the affection, in the shape of deformity of the chest. This results from the fact that there have been formed during the inflammation certain bands which unite the lung and the chest wall, preventing free movement of the chest in breathing. In such cases the ribs may be sunken, instead of bulging in the natural way; the entire side is smaller, and the back bone may be curved toward the opposite side, causing the shoulder of the diseased side to be lower than the other one. Some cases of serious curvature of the spine originate in the facts of pleurisy during childhood or youth.

Acute pleurisy, when occurring spontaneously or as the result of taking cold, usually affects the entire side. It may, however, occur as a sequel and result of some other inflammation, such as pneumonia and consumption. As will be remarked later, pleurisy is responsible for many of the pains which occur during the course of consumption. It may also be produced in consequence of a wound which penetrates the chest, or of the fracture of ribs, even without any wound to the skin; it may also be developed as a sequel of scarlet fever, measles, and of the infectious diseases generally.

The disease may occur at any time of life, although it is extremely rare in infancy and in old age; it affects males far oftener than females.

Treatment.—Pleurisy itself is not ordinarily a grave disease, though some of its possible sequels may be serious. The disease usually subsides even without treatment; yet the patient's comfort can be materially enhanced by certain measures.

During the first stage the object is to arrest, if possible, the course of the inflammation, or at least diminish its intensity, with

the hope of restricting the amount of exudation which is to follow. We know of no means which can be relied upon for arresting the disease. In former years blood-letting, opium and mercurials were largely employed for this purpose, but have all been abandoned. It will usually be found that some form of opium will be necessary for subduing the pain; for this purpose we may employ an eighth of a grain of morphine. But a better measure will be ten grains of Dover's powder, in which we obtain not only the soothing effects of opium, but also secure free action of the skin. If the temperature be high, the patient should be either freely sponged or may take a hot bath. Much relief will be afforded by applying to the chest, over the painful part, either cotton wool covered with oiled silk, or a light poultice of flaxseed. Regular evacuations of the bowels should be secured by the use of saline laxatives, if any medicines be necessary.

When the escape of the liquid into the chest cavity—the exudation—has occurred, measures are usually adopted for the hastening of the removal of the liquid again. For this purpose the chest is usually painted with the tincture of iodine, or several blisters are applied in succession, and permitted to remain until the skin is fairly raised. In obstinate cases there can be no doubt that these measures, the iodine and the blisters, may accomplish the desired object. Yet, until there is some evidence that the case is proceeding less rapidly than usual, it is doubtful whether any such measures should be used. Another plan, which may be combined with the local application to the chest, consists in the administration of saline cathartics to such an extent as to cause several evacuations of the bowels every day; or, the following prescription may be given:

Powder of squills - - -	One drachm.
Powdered digitalis - - -	sixteen grains.

Mix and divide into sixteen pills; take one three times a day.

The object of this is, of course, to remove the liquid from the chest, causing it to be taken into the blood and pass out with the evacuation from the bowels. It must be said, however, that this plan is not so successful in the removal of water from the chest, as in the removal of water from the legs or from the abdomen, that is "dropsy." It often becomes necessary to employ mechanical means for this purpose, to make an operation which is known as *aspiration* of the chest. This consists in introducing a fine needle

into the cavity of the chest, between two adjacent ribs, and in attaching a syringe so that the fluid can be withdrawn without permitting any air to enter. In this way the chest cavity can be easily emptied, without causing the patient any more pain than the prick of the needle. Yet it is a fact that the liquid usually returns in this cavity, and has to be removed again. However, the result sought can be finally secured in the great majority of cases.

During convalescence the patient's strength must be of course invigorated by the usual strengthening diet, and by the use of tonic remedies, especially iron. If the lung be bound to the chest wall by bands, as above described, much may be done by persistent and systematic efforts to dilate the lung by deep inspirations. This practice should be continued for months, perhaps even years; it is certainly sometimes possible to restore the natural form and functions to a chest which seems permanently damaged.

It sometimes happens that both sides of the chest will be inflamed at the same time; that there is in fact a double pleurisy; this of course increase the gravity of the case, since all of the ill effects are doubled. It may also happen that while the patient is convalescent from a pleurisy on one side, he is attacked by the same inflammation on the other side of the chest. Yet these cases not infrequently recover, however serious they may appear for a time.

Empyema.

This affection consists in the formation of matter in the chest cavity, and is one of the ways in which pleurisy may terminate. It may be suspected, if during the apparent convalescence of the patient, he suddenly become feverish, and again complain of severe pain in the side. The quantity of liquid usually increases, and before long the patient will have a series of chills at irregular intervals. Sometimes the liquid in the chest cavity seems to contain pus almost from the beginning, in this case the symptoms of constitutional disturbances are much greater than usually occur in the disease. The fever is more intense, the chills are more marked, and the patient shows in every way the effects of severe disease.

Whether the pus be formed in the cavity of the chest as a complication during the convalescence, or whether it be present from the first, the condition of the patient is one to excite grave apprehension. It is easy to remove the pus from the chest cavity, but this will rarely have any effect in arresting the disease, since more pus will be promptly formed. Debility, emaciation and continuous fever gradually break down the patient's strength, and death is the result in the majority of cases. There is but one means which affords any hope of success, and by means of this many cases of empyema have been cured. This consists in making an opening into the chest wall, permitting the escape of the pus and giving an opportunity for washing out the cavity of the chest with carbolic acid solution or other disinfectant. In the majority of instances it will be found necessary to make two openings, several inches apart, in order to permit the escape of the pus as rapidly as it is formed. This must, of course, be left to the skill of the surgeon.

Pneumonia.

Under this term is understood an *inflammation of the lung* itself, as distinguished from pleurisy, which is an inflammation of the membrane covering the lung. As in other inflammations, there occurs in this disease an *exudation* of material from the blood vessels. In the case of pleurisy the exudation escapes into the cavity of the chest, between the lung and the chest wall; in pneumonia it escapes into the substance of the lung itself. Now, the lung, as is well known, is merely a framework enclosing numerous openings, which may be likened perhaps to a honey-comb. These spaces are during the natural condition filled with air, just as the honey-comb is filled with honey. In pneumonia, however, the exudation escapes into these air cells, filling them up and preventing the access of air. One of the results is then, evidently, that the individual has less lung space for breathing purposes than when in his natural condition.

Symptoms.—In the large majority of cases pneumonia begins with a pronounced chill; this attack is usually abrupt, without any premonitory symptoms, and often occurs during the night. At the

same time, there occurs a sharp pain, which is usually referred to a point near the nipple of the affected side; this is one of the early signs distinguishing pneumonia from pleurisy. This pain may be very severe, causing the patient to "catch his breath" at every attempt to inspire; on the other hand, cases occur in which the pain is comparatively trifling.

Immediately following the chill, there occurs a fever, usually of great intensity, all the usual symptoms — thirst, intense heat of the skin, constipation, pain in the head and in the limbs — indicating severe constitutional disturbance, are noted. The face is flushed, though not usually uniformly so, for there is apt to be an intense circumscribed redness of one or both cheeks, while the surrounding skin may be of rather dusky appearance.

An early feature of the disease is a cough, which occasions the patient much pain and annoyance, since every act of coughing is accompanied by great pain. The matter expectorated is at first scanty and transparent, but later becomes more profuse and acquires a reddish brown tint, like that of iron rust. This tint is due to the admixture of a small amount of blood from the lungs. At times this amount may be much increased, so as to give the expectorated matter bright red color. Cases occur, however, in which there is no expectoration until late in the disease. The breathing is usually hurried and labored, and the patient frequently complains of extreme pain in every breath.

Such are the symptoms when the inflammation is limited to a portion of one lung, as is usually the case. If a greater amount of the lung tissue be involved, the symptoms are correspondingly more severe. At times the entire lung on one side becomes inflamed, or what is more frequently the case, a portion of each lung is subject to the disease. In this case, the embarrassment of breathing becomes greater, the blueness of the skin is more marked, the fever is higher, and the patient's prostration is much greater. Then again, it may happen that but a part of the lung is involved at first in the inflammation, and that during the patient's convalescence the disease spreads to the rest of the same lung. This complication is indicated by the occurrence of another chill, or by a sudden and rapid increase in the intensity of the fever.

After the symptoms of the disease have remained at their height for several days, signs of improvement appear; the fever diminishes, the cough and expectoration are decreased; the breathing becomes

easier and less frequent; in short, the patient is evidently convalescing. For several days the patient remains extremely weak and prostrated; there is a marked difference in this respect between the profound exhaustion following pneumonia, and the comparatively slight debility after pleurisy. If the disease progress without complication, the patient's restoration to health is usually completed in two or three weeks. There are, however, several unfortunate terminations, which may either protract the disease indefinitely, or may finally exhaust the patient's strength; one of these terminations is the so-called *abscess of the lung*. In this case the lung does not gradually resume its natural condition, but a certain amount of it becomes converted into pus, so that an abscess is produced. Then again, it happens that the patient's convalescence stops at a certain point, he does not recover his health entirely, remains weak, pale and feeble; begins to have a little fever in the afternoon, perhaps profuse perspiration at night; suffers from an occasional shivering sensation at night, and is found upon examination to be suffering from "galloping consumption."

Pneumonia occurs frequently as a complication of other diseases, such as typhoid fever and measles. Yet the majority of cases occur spontaneously. Many times the disease seems to be induced by exposure to cold, and there can be no doubt that such exposure does at least promote the development of this affection. It seems however probable that there is some especial cause behind, without which the exposure to cold is not sufficient to induce this disease. Pneumonia may occur at any period of life, and is more common among males than among females. It occurs over the entire United States, oftener in the Southern and Middle, than in the Northern States; it is more frequently met with during the winter and spring months than at other times in the year.

The patient's chances for life depend largely upon the amount of lung-tissue involved in the inflammation. If the patient be in fair health, and but a portion of one lung become inflamed, recovery is the rule, to which there are but very few exceptions. If, however, the extent of diseased lung be much greater, or other complications occur, the disease is followed by a considerable percentage of mortality. The treatment must be regulated by the condition of the patient, since it must ever be borne in mind that the object is to support the patient through the disease. The great danger in this disease occurs from the failure of the heart's

action, although we might suppose, from the blueness of the patient's skin, that there is danger of gradual suffocation; yet the difficulty is to be remedied not by any efforts addressed to the lungs, but by supporting the heart, so as to keep the blood circulated through the lung. If the patient be in robust health, there is but little danger that his heart will flag, unless, indeed, an excessive amount of the lung be inflamed. If but a portion of one lung be diseased, it will not be necessary to employ very active measures of treatment, since recovery is practically assured. For these favorable cases it suffices to diminish the pain and to reduce the intensity of the fever. The pain will be best controlled by a large, soft linseed poultice, made to cover the affected side, bound tightly on and covered with oiled silk. This poultice should be changed at least every three hours. Opium, in some form (best, perhaps, as ten grains of Dover's powder), will also diminish the pain and the tendency to a distressing cough. The temperature of the body may be reduced by frequent sponging with lukewarm water, or by the hot bath, or the wet pack. These measures are, however, rarely necessary, except in the complicated cases. Free evacuations of the bowels should be secured, for which, perhaps, the best means are twenty grains of the cream of tartar or the citrate of magnesia.

If, however, the previous health of the patient have been unsatisfactory; if he have been weak and debilitated, and from the onset of the disease shows plainly its depressing effects, an entirely different line of treatment is required. These are the cases in which the power of the heart must be stimulated to prevent a fatal result. For this purpose whisky or brandy must be freely used, preferably in the shape of milk punch. Quinine, too, is required in these cases — two grains every four hours in a tablespoonful of brandy. It is rarely beneficial to give any medicines for the relief of the cough, since with opium we diminish the tendency to cough and accomplish the desired object. The greatest attention should be paid to the diet, since food is of course an absolute necessity in sustaining the patient's strength — milk, broths, eggs, all liberally supplied with alcoholic stimulants.

The supporting measures are usually called for also in the cases marked by delirium, since this symptom is usually an indication of debility. After convalescence from an attack of pneumonia, the lung will be for some time unusually susceptible to changes of tem-

perature. It is, therefore, important to take especial pains not to "take cold." Flannel should be worn next to the skin for a considerable time after convalescence.

Bronchitis.

This is an inflammation affecting the lining membrane of the bronchial tubes — that is the tubes which form the continuation of the windpipe. These tubes are lined with mucous membrane, which is the continuation of the membrane in the windpipe, larynx, and the mouth above and of the lungs below. It is evident, then, that this membrane may become inflamed as a continuation of an inflammation from the larynx and windpipe above or from the lungs below; bronchitis, therefore, may occur by the spreading of the laryngitis or of a pneumonia. It also occurs as a primary affection, that is one in which the bronchial tubes become inflamed without the existence of a previous inflammation elsewhere in the air passages. Under these circumstances, bronchitis seems to be the result of exposure to cold, and is popularly termed a "cold on the chest." Then, again, the disease sometimes occurs as an epidemic, when it seems to be associated with some special influence of soil or atmosphere.

Bronchitis also often occurs during the course of other diseases, such as scarlet fever, measles and typhoid fever. It may also be induced by the local effect of irritating gases taken into the lungs with the breath. It is more apt to attack individuals who spend their time in close and warm rooms, than in those constantly exposed to the weather.

Symptoms.—Acute inflammation of the bronchial tube usually begins with a cold in the head; that is, a catarrh of the nose. Thence it extends down the throat and larynx to the bronchial tubes. Thus a variable period, from a few hours to two or three days, may elapse from the beginning of the catarrh in the nasal passages to the establishment of the bronchitis. The inflammation in the bronchial tubes begins with a sense of tightness across the chest, accompanied with a feeling of rawness or soreness. These sensations are aggravated by every act of coughing; there is at the same time a certain amount of fever, usually slight. The con-

stitutional disturbance may be so considerable as to prevent the patient from attending to his usual vocation, or may be almost imperceptible. The cough is at first dry, but very little mucus being expectorated. During, and especially at the end of, each act of coughing a painful sensation is felt under the breast bone; this is also the case upon breathing cold air, or upon drawing a long breath.

After some days the cough becomes "looser;" the expectoration becomes easier, more profuse and less painful; the matter expectorated being frothy, viscid, and often streaked with blood. After three or four days it becomes thick and yellow, or green. By this time most of the disagreeable symptoms have subsided; the patient is troubled by no other symptoms than the necessity for frequent, sometimes violent, coughing. The usual duration of the attack is twelve to fourteen days, though this period is often prolonged by carelessness or neglect on the part of the patient.

The disease contains no element of danger except to the feeble, whether old or young. In infants, it is always a serious affection, since they are often physically unable to remove, by expectoration, the secretion in the bronchial tubes; hence, death not infrequently occurs from suffocation. In aged people, too, the disease may also be serious, and for the same reason. In feeble individuals a serious degree of exhaustion, also, may follow long and protracted efforts at clearing the bronchial tubes by the act of coughing.

Treatment.—It is often possible to cut short a "cold on the chest" within twenty-four hours, by taking, at bed-time, a hot foot-bath, a glass of hot toddy or lemonade, and ten grains of Dover's powder. This attempt will, however, be unsuccessful unless made after the first indication that the individual has taken cold — that is, before the sense of tightness in the chest occurs. If this measure be omitted, a brisk saline cathartic, such as the citrate of magnesia, should be given. The pain and soreness in the chest will be relieved by a light mustard-plaster over the breast-bone; the cough may be "loosened" by taking a half-teaspoonful of the compound syrup of squills every two hours. If this remedy provoke nausea, it may be replaced by the following:

Tartar emetic, - - -	Two grains.
Syrup of wild cherry, - -	
Water, - - - -	Each three ounces.

Mix; take a teaspoonful every two hours.

So soon as expectoration becomes easier, the removal of the mucus from the bronchial tubes may be promoted by giving a quarter of a teaspoonful of the syrup of ipecac every hour; or, if the cough be somewhat violent, the following prescription:

Nitrate of potash, - -	Two drachms.
Syrup of squills, - -	Two ounces.
Tincture of digitalis, - -	Half a drachm.
Sugar, - - - -	
Gum arabic, - - -	Each two drachms.

Water enough to make six ounces. A teaspoonful of this may be put in a wineglassful of water and sipped every ten or fifteen minutes.

Acute Bronchitis in Young Children requires especial notice, because of the peculiar danger of the disease at this time of life. In consequence of the infant's inability to expectorate the mucus which collects in its bronchial tubes, this matter may accumulate so as to prevent the access of air to the lungs. This accident may be suspected if the child's breathing becomes especially frequent and accompanied by decided movements of the nostrils, and especially if the skin become livid.

The most efficient means of relieving this difficulty in children is the use of mild emetics, such as the syrup of ipecac. The act of vomiting often promotes the escape of mucus from the bronchial tubes, which could not otherwise be effected.

Chronic Bronchitis.

This affection is usually a sequel of acute bronchitis; the latter disease loses its characteristic acute features, but there remains a persistent cough, with considerable expectoration. This disease affects especially the aged.

Symptoms.—There is rarely any pain, or, at most, an occasional uneasy sensation under the breast bone. If the cough be violent and frequent, there may be also some soreness at the lower part of the chest, on both sides. The general health is not usually affected, so long as the disease remains limited to the bronchial mucous membrane. The expectoration varies considerably in different cases. It is often profuse, whitish, and viscid; at other

times thick yellow, while in still other cases it may be almost solid greenish, and streaked with blood. At times a considerable quantity of matter escapes in the expectoration. In many instances this disease of the bronchial tubes is associated also with catarrh of the nasal passages; it also results from organic disease of the heart. In many cases it seems to be the direct effect, like the catarrh in the head, of sudden and rapid changes of a variable climate. It does not contain any element of danger to life, unless, indeed, in the aged; but it may result in the development of other lung troubles, such as asthma, all of which together may materially shorten the patient's life by the constant annoyance to which he is subjected.

Treatment.—The treatment of chronic bronchitis must consist of attention to general health, as much as in remedies addressed directly to the lungs; indeed, there are cases in which the only hope of cure, or, indeed relief, lies in a change of climate. The locality to be sought, in the hope of relieving chronic bronchitis, must be warm, dry, and free from sudden and violent changes of temperature. All other measures which contribute to the improvement of the general health will also materially hasten relief from this disease. If it be impossible to avoid extremes of temperature, the greatest care should be observed that the body be warmly clothed throughout the year. In a cold climate, woolen or silk garments may be worn next to the skin; and it is advised to wear over these, during cold weather, a garment of chamois leather or buckskin. At any rate, it will be found judicious at least to wear flannel next to the skin throughout the year.

Measures addressed directly to the chest may consist, first, of local applications, and second, of cough remedies. Benefit may often be derived from the application of various remedies directly to the skin; thus, three drops of croton oil, mixed with the same quantity of olive oil, may be applied to the chest every night by means of a camel's hair brush; or tincture of iodine may be applied in the same way, for the same purpose. The medicines that may be administered have for their object the loosening of the mucus and the restoration of the membrane to its natural condition. It is impossible to give any one prescription which shall be applicable to all cases of chronic bronchitis, because the condition of the patient, as well as the condition of the bronchial tubes, varies extremely in different cases. It may be said, in general terms, that

if there is but little expectoration, if the patient is troubled with a dry, hacking cough, much benefit may be derived from some medicine which will allay the irritation. For this purpose the following prescription may be used:

Dilute hydrocyanic acid, - - -	Half a drachm.
Sulphate of morphia, - - -	Half a grain.
Syrup of tolu, - - - - -	Two ounces.

Of this, a teaspoonful may be taken every three hours. If the mixture cause any feeling of nausea the amount of syrup can be diminished to one ounce, the other ounce being filled up with water. If there be much secretion, with considerable difficulty in expectoration, the following may be given:

Chloride of ammonium, - - -	Four drachms.
Paregoric, - - - - - -	Two ounces.
Syrup of squills, - - - -	Two ounces.

Mix; take a teaspoonful every two hours.

Most patients suffering from chronic bronchitis experience great relief during the warm weather, and suffer again during the fall and winter. Such individuals are, of course, benefited by residence in a warm climate during the winter. Chronic bronchitis itself is not so injurious or dangerous as to compel the patient to employ extraordinary measures for its relief; hence, such patients are usually content to suffer the annoyance year after year, until they become quite habituated to it. Yet, such persons should remember that a chronic bronchitis often brings in its train a series of other evils, which cannot be indifferently endured and neglected. Not the least of these ills to which chronic bronchitis often serves as an introduction, is consumption. In view of these facts, it behooves the individual to take the matter early, even before it seems absolutely necessary, for if he wait, it is often impossible to repair the damage done.

Emphysema.

The human lung may be compared, as already stated, in its general structure, to a honey-comb; it consists of elastic structures hollowed out so as to enclose numerous small cavities separated from one another by thin partitions, just as are the open-

ings in the honey-comb. These little compartments in the lungs are called *air cells*. These openings are very minute and open out from the small bronchical tubes; hence the bronchical tube and the air cells opening from it resemble a bunch of grapes, the tube corresponding to the stem of the bunch. Now it happens under various circumstances that these air cells, which are merely little bags of elastic rubber-like tissues, become greatly stretched and finally enlarged; if the cause which produced this stretching continue to act, it often happens that the walls of these little bags give way, so that two or more adjacent cells become converted into one cavity. If this happens in many places throughout the lung, the result is that the breathing becomes impaired. For since the partition walls between these cells are gone, it follows that that there is less surface exposed to the air entering the lungs than was formerly the case; the effect of breaking down these partitions is the same as would result if a portion of the lung were removed.

This condition may result evidently from any cause which interferes seriously with the exit of air from the air cells; for with every act of breathing, these air cells are distended with air during inspiration, and collapse or fall together during expiration. Hence any impediments in the exit of air interfere with this falling together of the cells, and may, if sufficiently long continued, result in permanent distension, or *emphysema*. A familiar example occurs in musicians who habitually perform upon brass wind instruments. For these individuals drive the air from the lungs with considerable force against the obstacle, and frequently suffer from emphysema in consequence.

Symptoms.—Emphysema may, doubtless, exist to a considerable extent without attracting the patient's attention to the fact that something is wrong in the lung; but after a time it is indicated by labored breathing and shortness of breath, especially upon active exercise. The difficulty in breathing is quite characteristic, in that the *expiration* is long and labored. In fact, the natural proportion between drawing the air in and breathing it out—inspiration and expiration—is reversed. For in the natural condition of the lungs the act of inspiration is three or four times as long in duration as the following act of expiration; in cases of emphysema, however, the act of expiration becomes much longer than that of inspiration.

Emphysema occurs from a variety of causes, among them chronic bronchitis and asthma. Indeed, it is somewhat rare to find a case of spontaneous emphysema, or one which is not associated with some other disease of the lungs. Many of the symptoms which are usually considered to be caused by emphysema, are really due to the bronchitis or asthma, or both, which are so often associated with this disease. Thus, there is usually cough and expectoration, the cough being violent, and being characterized by prolonged convulsive efforts at expiration, so that it resembles somewhat whooping cough. The matter expectorated varies considerably, just as it does in bronchitis.

This disease is obstinate and long continued; though it causes directly no other ill effects than the annoyance due to the difficulty of breathing, yet it is apt to occasion derangement in the circulation of the blood. For all the blood in the body must pass through the lungs in order to give off carbonic acid gas and take up oxygen; now, when the lungs are thus partially disabled, the blood does not pass so readily, and hence the work of the heart is much increased. The blood is not completely purified, and hence emerges from the lungs not red, as it should, but still somewhat blue. The result is, that the skin of the individual is apt to exhibit a bluish tinge; the veins of the face and neck are often distended, giving the countenance an expression of distress. All these symptoms are increased by exercise, whether in walking, working, or speaking. Most of these individuals suffer at times from paroxysms of labored breathing, which are usually caused by the accompanying asthma, and not by the emphysema itself.

This disease may be developed at any time of life, and, indeed, seems to commence in many cases during infancy or childhood, though it rarely becomes troublesome, or, indeed, is noticed at all until middle life is attained. The disease appears to be hereditary.

In well-marked cases of emphysema the form of the chest is so characteristic that the experienced physician recognizes the disease at a glance; the upper part of the chest is barrel-shaped, not flattened from side to side, as is the natural condition; during inspiration, too, the chest sinks in at the lower part and above the breast bone, while the ribs and breast bone together rise as if they constituted one piece.

Treatment.—The treatment of emphysema must consist usually in the effort to cure the bronchitis, with which it is com-

monly associated; for when the latter difficulty is relieved, the patient exhibits but little annoyance from the emphysema, although the latter be continued undiminished. The measures already indicated as useful in bronchitis may, therefore, be employed in the treatment of this affection also.

Asthma.

This term has been applied to difficulty in breathing, from a variety of causes. The condition to which physicians apply this name is a spasmodic contraction of the smaller bronchial tubes, as a result of which less air than natural is admitted to the lungs, and the individual consequently suffers from deficiency of breath.

Symptoms.—Asthma occurs in paroxysms, at irregular intervals. The paroxysm seems to be brought on both by certain conditions of the patient himself and by certain conditions of the atmosphere. The attack may begin without warning, though those individuals who have long suffered from the disease can usually predict some hours in advance the approach of the paroxysm. The attack may come on slowly, requiring, that is, two or three hours for its development; or it may attain its full intensity in a few minutes. The paroxysm usually occurs at night, or early in the morning.

The patient is awakened with a feeling of suffocation; he is unable to lie down, but finds relief in sitting with his elbows on the knees, the head thrown back, the mouth open. Even in this position the patient usually gasps for breath, and often feels compelled to open the window in the hope of securing more air. The breath is drawn in with considerable effort, while the expulsion of the air from the lungs is a long, laborious process accompanied with a wheezing sound. The patient's utterance is difficult, the words being spoken in a jerky, interrupted way. The face is pale and has often a bluish tinge; perspiration is profuse. The skin is cool; the countenance exhibits anxiety and distress; the nostrils are often dilated at each attempt to breathe.

A patient suffering from a severe attack of asthma presents a most distressing and even alarming appearance; the bystanders unfamiliar with the disease, regard the patient as dying. The most

distressing symptoms endure, however, as a rule, but a short time, usually not more than fifteen minutes to an hour; they may, however, last for several hours or even days. At the conclusion of the paroxysm the patient ordinarily enjoys profound and refreshing sleep; there is considerable cough with the expectoration of mucus, varying in quantity and quality according to the amount of the accompanying bronchitis. This expectoration may continue for several days after the paroxysm has subsided.

Attacks of asthma affect individuals at certain seasons of the year, or during certain kinds of weather. In this particular, there is no constant law, though, generally speaking, the disease is more frequent during damp and chilly weather than at other times. Many persons suffer repeatedly and severely from asthma during the winter and spring, but remain quite free from the disease during the summer months. Then, again, the presence of an unusual quantity of dust in the atmosphere, provokes an attack in those predisposed to asthma. Individuals exhibit also personal peculiarities; thus, one individual has asthma whenever he has an attack of indigestion; another, whenever he sleeps upon a feather bed; and women not infrequently suffer at the menstrual period. Mental emotions, too, may contribute to the development of the attack. It is also well known that in some localities the liability to asthma is much greater than in others. The disease occurs more frequently in males than in females, and is apt to occur at any period of life, though more frequent in advanced years. A paroxysm of asthma, however serious and dangerous it may appear, does not imperil the patient's life; since no instance is on record in which an individual died from an attack of asthma. Indeed, it seems well ascertained that individuals subject to asthma are often long lived. Yet this longevity is enjoyed not because of, but in spite of, the disease.

Treatment.—The treatment of asthma consists of two parts: the management of the patient during the paroxysms, and the treatment during the intervals. During the paroxysms, numerous measures have been tried and found to give more or less relief. But before resorting to the use of medicine, it must be remembered that the attacks in many cases seem to be brought on by influences which can be removed. It has been found, for example, that asthmatic attacks are favored in some individuals by constipation,

or by excesses at table. In such cases a cathartic, or an emetic, may be not only beneficial, but quite essential for relief. After the surroundings of the patient have been properly regulated, after he has been placed in a large airy room, some of the more usual remedies may be employed. Among the quickest to afford relief —in those cases in which it possesses any influence—is stramonium, taken in the shape of cigarettes, or the leaves may be burned and the smoke inhaled. If no stramonium leaves can be obtained, the same effect may be produced by tobacco leaves or cigars, though this means is far less reliable. Next to stramonium in efficacy is the nitrate of potassium or *niter*. Pieces of paper which have been soaked in a solution of niter may be burned, and the smoke inhaled; or, if preferred, they may be made into cigarettes and smoked. If all these measures prove unsuccessful, relief can be obtained at once by the inhalation of chloroform, or ether, a few drops of which may be sprinkled upon a handkerchief and held to the face. A still more efficient remedy is the nitrite of amyl, two or three drops of which may be inhaled from a handkerchief in a like manner. It must be said in reference to these three agents, chloroform, ether, and the nitrite of amyl, that they should not be administered except in cases of emergency by any one except a physician, since, unless judiciously employed, they are capable of inducing serious effects. This is particularly true of the nitrite of amyl; the writer has known most alarming symptoms of fainting and collapse follow the inhalation of a few drops from the handkerchief. Another disadvantage in the use of these remedies lies in the fact that relief is afforded only during the inhalation, for a few minutes after the vapor has been dissipated, the paroxysm is apt to return undiminished. A remedy which may be easily procured and always used without danger, is the following:

Tincture of lobelia, two ounces.

Wine of ipecac, two ounces.

Mix; take half a teaspoonful every half hour until expectoration or nausea is induced.

If this does not answer, half a teaspoonful of "Hoffman's anodyne" may be taken every hour.

Benefit may be derived from the application of mustard plasters to the feet, or from the use of chloroform liniment upon the back.

The treatment during the intervals consists usually in measures addressed to the relief of the accompanying bronchitis. It is

always well to try the effect of iodide of potassium in these cases, as well as in those where there is little or no accompanying bronchitis. This may be given by dissolving five drachms of the iodide of potassium in four ounces of water, of which a teaspoonful may be taken every four hours. A remedy which has recently been extensively employed, though not with the success which was anticipated, is the fluid extract of *grindelia robusta*, which may be given in half teaspoonful doses every four hours. It must be stated in general terms, that up to the present time no remedy is known which will certainly benefit all cases of asthma; it is usually necessary to try several of the remedies named, in order to ascertain which of them, if any, can be relied upon to benefit the case in hand. If all measures prove unsuccessful, the patient can often obtain relief by change of climate.

Consumption.

Consumption of the lungs, also called in medicine *pulmonary tuberculosis*, and popularly known as the *decline*, is the most formidable enemy of the human family in the United States, as well as in other parts of the world. Small-pox, yellow fever and cholera devastate whole cities, and carry off thousands; their approach carries dismay and terror into entire communities. But neither yellow fever nor cholera, nor both of them combined, can exhibit a death roll comparable to that of consumption; for this insidious disease, to whose presence we are so accustomed that its ravages awaken no remark nor attention, carries off *one-seventh* of the entire civilized world. From this disease there is no exemption of sex nor age, of social condition nor personal hygiene; the infant in arms as well as the gray-haired grandfather fall alike victims to the disease. Each year three million human beings succumb to consumption.

Tuberculosis is not always nor necessarily a disease of the lungs; since it may invade many other organs of the body and cause fatal results. The intestines and the brain are especially liable to be attacked by it; in fact, most of its victims under the age of puberty die of "consumption of the bowels," or of the brain. The term consumption, however, is usually limited to the

disease as it occurs in the lungs, the word tuberculosis being employed to designate it when it attacks other organs of the body. The disease is, however, one and the same process, wherever it may occur, though the details vary, of course, according as one organ of the body or another is affected. Without entering into particulars, we may say in general, that pulmonary consumption consists in the deposit of scrofulous matter in the substance of the lungs. This scrofulous matter — technically called *tubercle* — is the result of a long continued inflammation; it follows that consumption is essentially a slow or chronic inflammation of the lungs. This explains to us the familiar fact that consumptive patients have usually suffered for a considerable time from a chronic bronchitis or from repeated attacks of pneumonia before the symptoms of consumption became apparent. In fact, even the physician often finds difficulty in deciding whether a patient who has long suffered from chronic bronchitis has already begun to have consumption. So, too, individuals who have repeatedly suffered from pneumonia are apt to become finally consumptive, because the inflammation of the lungs becomes permanently established — the repeated pneumonias, in other words, develop into consumption.

The deposit of scrofulous matter, or *tubercle*, varies considerably as to its rapidity and location in the lungs. There are, accordingly, different types of consumption, some of which run a rapid course to a fatal termination, while others drag along slowly, and may even terminate in recovery, if the individual be given a good opportunity to throw off this scrofulous deposit. Then, again, the formation of the tuberculous deposit does not proceed uniformly; a considerable amount will be formed in a short time, after which the patient, in consequence of a change of residence or other cause, improves in health. For a considerable time the disease may make no progress, and may occasion the patient far less annoyance than formerly; in consequence of which the individual and his friends may be sanguine of ultimate recovery. But, sooner or later, there comes a relapse; the patient takes cold, or sojourns in a damp climate, as a result of which the tuberculous deposit is increased and the old symptoms return with renewed vigor. This matter is usually deposited at the upper part of the lungs, just under or near the collar-bone; and the observation of a large number of cases seems to indicate that the left lung is somewhat more frequently affected than the right. After the amount of mat-

ter deposited has attained a certain size, it undergoes a process of softening, becomes liquid, and is expelled in part, at least, from the lungs by the act of coughing. If the tuberculous deposit only were thus affected, the disease would doubtless end in recovery, since the lung would heal up after this matter had been expectorated. Such is, indeed, the actual history of some cases of pulmonary consumption. Individuals who have given all the evidence of consumption, and in whose chests the deposit has been recognized upon medical examination, ultimately recover entirely, and an examination of the lungs shows that the deposit has been entirely removed. These are the favorable cases, and, unfortunately, the rare ones; for, in the large majority of instances, the softening of the deposit is accompanied by a destruction, a "breaking down," of the lung tissue itself surrounding the deposit. This broken-down lung tissue is cast out by expectoration with the softening tubercular deposit, giving to the expectorated matter and to the breath of the patient that peculiarly offensive putrid odor so often observed in consumptive patients. In course of time, a considerable portion of the lung substance may be thus expectorated, so that there remain large cavities in the lung. It is, in part at least, from the walls of such cavities, where the lung tissue is constantly breaking down, that the hemorrhages occur which constitute one of the formidable symptoms of this disease.

Symptoms.— Pulmonary consumption is usually very slow and gradual in its development; indeed, it is often impossible, as already remarked, to fix definitely the exact date of its commencement. In many cases, the symptoms indicating lung difficulty are preceded for weeks or months by general ill health, loss of strength and of weight; yet, since these symptoms may be caused by other affections, it is impossible to ascribe them definitely to incipient consumption. In a larger number of cases, the symptoms of lung trouble, particularly the cough and expectoration, are present for a considerable time before any evidences of general debility are observed; yet these early symptoms may be indistinguishable from those of chronic bronchitis.

Usually, one of the earliest symptoms noticed is cough; and, after the patient's attention is called to it, he will often remember that at first he used to cough chiefly in the morning, upon rising, being comparatively free from this troublesome symptom during

the day. The cough is usually slight, dry and hacking at first; the matter expectorated is slight in quantity, white and glairy. The patient's attention is rarely directed to this symptom, unless one of two things should happen — either spitting of blood, or marked loss of flesh and strength. The expectoration of blood, while a more usual symptom at an advanced stage, may nevertheless occur at an early period of the affection; the blood raised is usually small in quantity, of a bright red color, and occurs as streaks in the mucus. This is sure to attract notice, and to alarm the patient. It is usually only after the appearance of this blood that he seeks medical advice, having treated his previous cough as insignificant.

Pain in the chest is not a necessary symptom of pulmonary consumption, since it is not caused by the disease itself, for the lung tissue—the part affected in consumption—seems to have but little susceptibility to pain. The individual suffers from pain in his chest only when the membrane covering the lungs—the *pleura*—is involved in the inflammation, for this pleura is exquisitely sensitive to pain. Sometimes, however, the pleura becomes involved early in the disease, in which case pain is an early and prominent symptom of the disease. This pain is sharp, and is described by the patient as stitches in the chest, commonly referred to the upper part of the lung, just under the collar bone, often shooting through to the back. This pain is by no means constant, even in the same case, being sometimes so severe as to keep the patient within the house, at other times so slight as to pass unnoticed. These pains have considerable significance for the physician, though they are usually considered by the patient to be rheumatic or neuralgic.

The breathing is usually somewhat increased in frequency, though this increase rarely attracts the patient's attention, unless he be engaged in some occupation requiring considerable physical activity; in this case he is apt to observe that his breath is shorter than formerly, and may be indeed compelled to give up the most severe part of his labor because of this shortness of breath.

Another early symptom, often noticed by the patient himself, or by his friends, is increased heat and dryness of the skin. As the disease advances, this heat amounts to positive fever, which usually increases toward evening, when there is apt to be a decided flush on the cheeks. At this time, too, the patient often has ill-defined, chilly sensations, or shiverings; or well marked chills, fol-

lowed by fever and perspiration, may occur with such regularity that the difficulty is supposed to be ague. Another symptom often present with these is the occurrence of "night sweats."

As the strength and weight of the patient decrease, there is usually some impairment of the appetite and digestion, amounting at times to a decided aversion for food; the patient usually has a special dislike for fatty articles. Emaciation is the rule in consumption, but at times there is but little apparent loss of flesh, though the patient becomes very pale. The strength is usually impaired, even though the bulk of the body be not materially diminished.

During the early part of the disease diarrhea is an occasional but by no means constant symptom; in the more advanced stages it is usually pronounced and troublesome, and then often indicates that the disease is affecting the bowels as well as the lungs. In some instances obstinate and frequent recurring diarrhea, and a persistent cough are the first indications of pulmonary consumption. In females there is always, usually at an early period of the disease, an interference with the menstrual function; as a rule, the discharge becomes gradually less in quantity, the periods irregular and finally suppressed. A popular idea is inclined to ascribe the disease in some way to a suppression of the menses, but the fact is that this suppression is not the cause but the result of the disease, or rather of the impairment of health and loss of flesh incident to the consumption.

The mind usually remains perfectly clear and unaffected until within a few days of the fatal termination; and what is far more remarkable, the patient is usually cheerful and confident of ultimate recovery. This delusion amounts sometimes to actual infatuation, causing the individual to disregard the grave symptoms of his case and to conceal them from the physician; and if informed of the actual state of the case, he is apt to take offense or to undervalue the professional ability of the medical adviser.

The disease advances to what is termed the *second stage*, by which is meant the period during which the tuberculous deposit is becoming softened and expectorated. During this stage the previous symptoms continue in somewhat exaggerated form; the cough becomes a prominent and troublesome symptom, for though less irritating to the patient, it is more frequent, and usually followed by expectoration. During the transition from the first to the second stage, expectoration is apt to be difficult, the patient being

compelled to cough long and painfully before he succeeds in raising any material from the lung. But as the breaking down of the lung tissue proceeds, the cough becomes easier, since the matter is more readily loosened and brought up. This expectorated matter now consists, in addition to the white and frothy material of the first stage, of thick yellow masses, sometimes streaked with blood. The amount of material expectorated varies considerably, depending largely upon the rapidity with which the softening process proceeds in the lung; it may amount even to a half pint or a pint daily. Sometimes the patient will suddenly expectorate a considerable amount of matter during a few acts of coughing, owing to the sudden loosening and discharge of larger masses of softened tuberculous matter. As the patient becomes weaker, the act of coughing becomes a severe task upon his strength, and in the later stages expectoration is often but imperfectly performed.

Hemorrhage occurs less frequently perhaps after the formation of cavities than in the earlier stages of the disease; yet when they do occur, such hemorrhages are far more alarming. For not only is the amount of blood lost greater than formerly, but the effect upon the patient is more decided, since the loss of a given amount of blood now affects his diminished strength more than was previously the case. It occasionally happens that a blood vessel of considerable size gives way in the lung, and the patient dies in a few minutes, either from loss of blood or from suffocation in consequence of the presence of the blood in the air passages. During this stage another symptom, which is often present in the first stage of the disease, or may even be one of the earliest signs, becomes prominent. This symptom is huskiness of the voice, which often increases to hoarseness, or may proceed to complete loss of voice, so that the patient is unable to speak above a whisper. This results from the spread of the disease to the larynx, usually involving the vocal cords, and often causing ulceration upon them and in their vicinity. The pains in the chest are apt to be continued from time to time in the second stage, and occasionally become constant symptoms. The appetite is now decidedly impaired, diarrhea is frequent and persistent. At times, indeed, this looseness of the bowels becomes a serious matter, exhausting the strength of the patient in spite of all efforts to control it.

A symptom upon which considerable stress is laid by medical men is the appearance of the finger ends, which become quite club

shaped, the nails being curved downward toward the end and toward the root, while the middle makes the summit of the curve. This appearance is by no means constant, though quite characteristic when present. During this stage, too, the feet and ankles are usually swollen, especially if the patient walk or sit erect. This symptom merely indicates the general failure of the patient's strength, and possesses no other significance.

The course of pulmonary consumption is apt to be hastened by complications which arise in other organs; among these the most frequent, perhaps, is consumption of the bowels, indicated by profuse and obstinate diarrhea—the spread of the disease to the abdominal cavity, and to the organs contained in it. In some cases the disease occurs also in the membranes covering the brain, causing interference in the mental functions—a complication more frequent in young persons than in adults. The disease may also affect the urinary and the genital organs, causing difficulty in urination; not infrequently there occurs an entire loss of the power to propagate in the male, as a result of this disease, and this loss may occur before the symptoms of lung difficulty arouse suspicion as to the nature of the disease.

Cause.—Consumption, or, speaking more generally, *tuberculosis*, whether it occurs in the lungs or brain, or other organ of the body, is due to a specific and particular cause. The researches of the last two years, conducted in all parts of the civilized world, have demonstrated what is now universally admitted—that the body of every consumptive individual, as well as of every tuberculous animal, harbors immense numbers of minute vegetable parasites. These organisms, belonging to the general class of plants known as *fungi*, of which the mould on jelly is a familiar example, invade the body of the individual, and seem to act as a source of irritation which results in the tuberculous inflammation. These parasites ordinarily gain access to the body in the air which is inspired; and hence the disease is usually first manifested in the lungs. Yet they may secure access to the blood, and thence be carried all over the body, affecting any or all of the organs. So far as we know, consumption never occurs without the presence of these parasites; yet it is equally evident that certain other circumstances must contribute in order that this disease may be established, for these parasites do not gain a foothold so long as the indi-

vidual enjoys perfect health. It is only when the system has been prepared in advance for the reception of these organisms — when, in other words, there occurs some departure from the usual state of health — that the individual becomes liable to consumption. This departure from the natural standard of health — or *predisposition* to consumption, as it is technically termed — may be either inherited or acquired. Long observation has rendered the fact familiar to all, that the children of consumptive parents are especially liable to the disease in question. There appears to be a peculiarity of constitution which renders the individual especially favorable, or *predisposed*, to the development of consumption ; and this peculiarity of constitution is transmitted from parent to child, just as peculiarities of feature or of mind are likewise transmitted. While this hereditary tendency is perhaps often overestimated, yet that there is such a tendency cannot be, and is not, denied. It by no means follows that the children of consumptive parents must necessarily become tuberculous; nor that those of non-consumptive parents are safe from the disease. Indeed, the vast majority of cases occur in individuals whose family history contains no record of consumption. Most cases of consumption, in other words, are *acquired* — that is, the individual, though not burdened with any known hereditary taint, lapses into such a condition of health as to make him liable to the invasion of the disease.

Among the causes which predispose to the development of consumption, is a cold, moist, variable climate; and it seems to be the variability, rather than the coldness of the climate, which is to be held responsible for the influences favoring the disease, for certain parts of the world, even of our own country, are cold and moist, and yet afford such protection against consumption as to have become a refuge for consumptive patients; while, on the other hand, certain localities located so near the tropics as to be quite warm the year round, are also unfavorable to the development of the disease. Consumption seems to prevail more on the seacoast than in the interior at the same latitude, perhaps because of the sudden and rapid changes to which the former localities are especially susceptible. It has also been shown that in the State of Massachusetts, cases of consumption occur more frequently along the borders of streams and marshes than in other localities. The most favorable climate seems to be warm and dry, and free from the rapid changes which characterize a considerable part of our own

land. Another influence which predisposes to the development of tuberculosis is the frequent or repeated occurrence of other inflammations in the air passages, such as bronchitis and pneumonia. Possibly these repeated inflammations are to be regarded as an evidence of the inherent weakness of this part of the individual; at any rate, it is an unquestioned fact of observation, that consumption is often preceded by a long and obstinate bronchitis, or by repeated attacks of pneumonia.

Still another influence, or rather set of influences, are the conditions inseparable from sedentary pursuits. It is well established that consumption is especially prevalent among those whose occupations confine them to close, ill-ventilated rooms, where they are not only deprived of exercise, but are compelled also to breathe impure, vitiated air for many hours a day. These influences explain, too, to a certain extent, the extreme prevalence of the disease among the poorer classes of society living in crowded and not over-clean quarters, and subsisting upon inadequate or improper food. An interesting observation in this connection is the universally recognized fact that wild animals in confinement are apt to suffer and die from this disease; for consumption is not a monopoly of the human family, but attacks a large number of the lower animals, wild as well as domestic, and it is well ascertained that domestic animals kept in close confinement are far more liable to the disease than animals of the same species permitted to enjoy abundant air and exercise. "The stabled cow, the penned sheep, the tame rabbit, the monkey, the caged lion, tiger or elephant, are almost invariably cut off by tuberculous affections."—*Aitken*. There is reason for believing also that an improper diet, one which does not furnish the different substances required for the system, is often an important factor in inducing the disease. Such diet may be improper, not because it is deficient in quantity, but because it is not judiciously selected and regulated. The liability to consumption varies also with age, the most susceptible period of life being from twenty to thirty years, the next most susceptible time between ten and twenty years of age; yet no period of life affords exemption from consumption, since the disease may affect even the child in the womb.

Observation indicates that certain other diseases exert an influence in favoring or opposing tuberculosis. The disease seems to occur somewhat frequently after typhoid fever, measles, and

scarlet fever. On the other hand, consumption is rarely found in individuals suffering from organic heart disease, or from emphysema of the lungs. It has been asserted, too, that during pregnancy a woman is but slightly susceptible to consumption, even though she may become so after delivery; yet, more careful observation indicates that this idea is not founded on fact. Indeed, certain observations would indicate that pregnancy and lactation rather favor the development of consumption; for Pollock found that of one hundred and fifty-five cases of consumption occurring in women recently confined, the disease began in forty-eight of them during pregnancy, and in fifty-one about the time of confinement.

Intimately associated with the subject of consumption are the other manifestations of tuberculosis in the various organs of the body; but the only one that will be mentioned here is the enlargement of the glands in the neck. It is a common observation that children exhibiting the so-called "scrofulous habit," that is, those with thin, white skins, watery eyes, and inclination to a sandy complexion, are subject to enlargement of glands in the neck, even from early childhood. These enlarged glands may remain for a long time in the same condition, without giving rise to much pain or annoyance; but, sooner or later, they are apt to become larger and somewhat tender, the skin over them is reddened, and finally is perforated, giving exit to a quantity of matter. The openings made in this way are apt to be very slow and obstinate in healing, and may resist all ordinary efforts and treatment for months; and, when finally healed, there remain ragged, irregular, and unsightly scars. Such children seem especially prone to the development of tuberculosis in various internal organs, though it has not been observed that when they reach adult age they are especially liable to consumption. It seems unquestionable that this enlargement of the glands, accompanying the general debility and feebleness of health, is one of the many manifestations of tuberculosis.

The duration of pulmonary consumption varies extremely, according to the original condition and subsequent surroundings of the patient; yet, it cannot be too emphatically stated that consumption is not always fatal. It is a prevalent belief that the individual who has become tuberculous, has practically received his death warrant. Now, while it must be admitted that a large majority of cases terminate fatally, yet, it is equally true that a small minority recover entirely from the disease. In many cases the

progress of pulmonary consumption is extremely slow, because it seems to be for a long time a doubtful battle between the disease and the individual; and it is just these cases in which the scale can be turned in favor of the patient by judicious treatment in the way of sanitary surroundings as well as medicines. In all cases it is, of course, of supreme importance that the actual facts in the case should be ascertained as early as possible; for, if anything is to be done in the way of cure, it must be done early. Every individual, then, who has any well-grounded suspicions that he is already attacked, or is especially liable to be attacked by consumption, should at once ascertain the truth by consulting a competent physician. If he be the child of consumptive parents, and have an obstinate, even though slight, cough; if he lose flesh rapidly, even without sufficient cough to attract attention; if he be troubled with pains in the chest, with an obstinate and long-continued diarrhea, or with other symptoms which do not yield readily to the treatment employed, it is the wisest policy to submit himself to a thorough examination, in order that the existence or non-existence of tubercular disease should be ascertained. And, even if there be no record of consumption in the family, it should be borne in mind that this fact does not give positive assurance of safety from the disease; since, as has been stated, the majority of cases occur in individuals who have no suspicion of the true nature of the disease, feeling assured of their immunity from consumption by the fact that it has not afflicted other members of their family. These are the persons who neglect, year after year, a persistent, hacking cough, which troubles them, at first, only in winter, and leaves them comparatively free in the summer; and, even if their attention is directed to the possibility of consumption by their friends, they are inclined to ignore the warning, or, at least, postpone it. Many such are first seriously awakened to the danger by a hemorrhage more or less severe.

In those cases in which recovery occurs the tuberculous matter is either softened and expelled from the lungs by expectoration, or they become hardened by the deposit in them of lime and similar salts, after which the tuberculous masses cease to cause breaking down of the lung tissues, and the disease is arrested. Sometimes these little balls of lime which have been formed in and around the tuberculous masses are finally loosened and expectorated, when they are called *lung stones*. These favorable terminations usually

occur as the result of careful managing and treatment, yet instances are recorded in which the patient recovered from undoubted pulmonary consumption without any other treatment than simple cough medicines, yet such cases of spontaneous recovery from consumption are so rare as to be curiosities, and can not unfortunately be expected in any but the rarest instances.

There are many cases in which it seeems for a time that such spontaneous recovery is going to occur; the patient and his friends observe that all the symptoms decrease as spring and summer approach, and are deceived by this lull in the disease into a belief that recovery will occur. Such belief has doubtless prevented many a patient from resorting to the measures necessary to save his life. For it should be known that consumptive patients are always better in warm weather, whether the disease affects the lungs, the bowels, or the bladder; but they are just as certainly worse again during the following winter, and although another improvement may occur during the second summer, yet the patient has lost ground very decidedly. There is one symptom, however, which is rarely neglected, the hemorrhage from the lungs; this warning truly alarms the patient, and if repeated will surely lead him to do his uttermost to check the disease. It is very satisfactory to know that these cases in which repeated hemorrhages occur to terrify the patient and his friends, are usually the most favorable.

Treatment.—The first item in considering the treatment of consumption is naturally the possibility of preventing or *escaping* it. Unquestionably the best protection against consumption, as against so many other diseases, consists in maintaining the highest possible standard of health; diet, air, exercise and clothing should all be carefully attended to, not only in a general way, but also in detail. The food of patients inclined to consumption should be nutritious, easily digestible, and generous in quantity and quality. It is a mistake to prescribe definite rules for the guidance of the appetite in such cases. Many people make a hobby of insisting upon just so many ounces of bread and meat per day. The only valuable rule consists in permitting and encouraging the patient to eat such food and in such quantity as he desires; his own experience will teach him to avoid such articles as he cannot readily digest. In some cases, it is true, it will be especially desirable that

the diet should include meats and milk; in nearly all, care should be taken that butter, cream and other fatty matters should be included in the diet. The object is always to secure the best possible nutrition; it will rarely, if ever, happen that the patient incurs harm by over-eating.

Another most important item is fresh air, especially if taken out doors. It is perhaps impossible to overestimate the benefit to be derived from out-door exercise. Dr. Flint, of New York, some years ago, reported the history of sixty-two cases which had fallen under his own observation, in which the disease was arrested. After discussing these cases in detail, he remarks: "In twenty of these cases the arrest took place under hygienic measures, without medicinal treatment. In these cases the most important point related to change of habit as regards exercise and out-door life. In many cases the change consisted in relinquishing sedentary callings for other pursuits, in order to carry out more effectually the desired reformation. I am well satisfied that here is the foundation for the successful management of pulmonary tuberculosis. I would rank exercise and out-door life far above any known remedies for the cure of the disease. There are grounds for believing that the advantage of a change of climate mainly consists in its being a change of habits as regards exercise and out-door life." It is scarcely necessary to remark that exercise is rarely beneficial if taken merely as exercise, and without the charm of amusement or interest to engage the attention. The same remark applies to the different plans recommended for inflating the chest. Thus we are told that much benefit is to be derived from the habit of slowly expanding the chest, and as slowly permitting the air to escape, this exercise being repeated morning and evening. Doubtless much might be done by such measures, were they persevered in; yet, because performed merely as a hygienic measure, they will be rarely followed out faithfully. In most instances the best plan is to give up the usual employment entirely, and to devote the time to the restoration of health by engaging solely in such out-door occupations as secure amusement and entertainment as well as physical exercise.

A most important point for such patients as seem predisposed to the disease is the care *to avoid taking cold;* that is, to avoid wetting the feet, draughts of air, and sudden changes of temperature. This does not, of course, mean that the patient should be confined

to the house; for, when properly protected by warm clothing, he is much better in the open air than in the house. Indeed, many patients have gone to California and the Sierras, into localities where the temperature was uniform, though not too warm, and have here spent months in the open air, sleeping at night with no other protection than that of a tent. In many parts of our country, however, where the climate is subject to sudden changes, it is advisable for the patient to be within the reach of shelter at all times. In such places especially it is desirable that warm clothing should be worn throughout the year; either woolen or silk goods may be worn next the skin, reinforced in colder weather by a garment of buckskin or chamois leather. Such clothing should be worn not simply around the chest, but over the entire body, from neck to ankles. Another measure, which is often useful in hardening the individual, is cold bathing, a sponge bath being taken night and morning. This should not, however, be insisted upon if it be manifestly a severe test of the patient's endurance.

So soon as it becomes apparent that the individual is acquiring consumption, no means should be neglected which can possibly contribute to the arrest of the disease. One of the most important of these means is unquestionably residence in a climate which is not subject to sudden changes of temperature. It is doubtless true that a change of residence contributes in many ways to the improvement of the individual's health, since, under the circumstances, he is very apt to devote himself to the care of his physical condition, and to employ his time in out-door amusements and exercise. Yet, making due allowance for the value of these measures, there remains considerable importance to be attached to the climate itself. Much attention has been devoted to this subject, and the relative worth of numerous localities and of various climates has been the subject of close observation and study. Several popular errors in regard to this subject have been corrected; among these was the idea, which is even to-day quite prevalent, that a warm climate was absolutely essential for improving the consumptive's condition. Upon this subject Aitken says: "It was long a prevalent belief that consumption was limited by latitude, and that it never appeared in warm countries—for instance, south of the Mediterranean. But this is proved not to be the case, for the returns of the army, prepared by the above writer, have shown that consumption is more frequent in the West Indies than even in England

— a statement first made by Sir James Clark in his work on climate, in illustration of the injurious effects of that climate on consumptive patients sent there from this country.

"According, also, to the opinion of this author, great heat appears to have a powerful effect in predisposing to tuberculous diseases, probably by diminishing the exercise in the open air. That it is not the climate of the place which alone produces this result in the West Indies, is shown by the fact that officers were attacked in infinitely smaller proportions than private soldiers; and it is more than probable that crowded barrack rooms, a restriction to salt diet and drinking spirits may have produced the result.

"It would appear that England and Wales, the Cape of Good Hope, Canada and Malta are more exempt from consumption than many countries which, from their higher temperature, have hitherto been supposed to enjoy a remarkable exemption from this complaint."

The feature which has been supposed to exercise much influence upon the progress of consumption is the *moisture* of the climate; it has been found that not only particular localities, but even particular districts, and even individual houses in the same district, vary much as to the prevalence of consumption, according to the moisture of the soil. It seems, indeed, well established that those localities particularly favorable to the development of the disease are usually marked by an unusual degree of moisture. Yet it is equally true that moisture alone does not constitute a necessary barrier to the improvement of a consumptive's health, since some of our noted resorts have a more or less moist climate. When it becomes evident that the patient is suffering, or is about to suffer, from consumption, the question arises, where shall he go? The answer must depend largely upon the condition and history of the patient; for let it be understood that there is no charm, no specific curative influence in any climate; the object is merely to place the patient under the best possible conditions for preserving his strength and for removing him from those influences which seem most injurious. There is, therefore, no one rule which applies to all cases, and no one climate which is suitable for all consumptives. One feature is absolutely necessary, namely, a reasonable uniformity of temperature through the season; that is, the absence of those sudden and excessive changes which are so characteristic of our Atlantic seacoast, for example. Dryness is best adapted to a considerable

number of cases, though not to all; warmth is favorable for most consumptives; though some cases improve more rapidly in colder localities. This last fact has been well brought out by observation on the effects of residence in the northern part of the United States.

Instances are known in which consumptive patients who had scarcely been able to hold their own in Florida or other warmer places, have rapidly improved in Minnesota, Dakota and other localities in the same latitude; and this improvement has continued even during the winter, which is in these regions extremely severe. Such cases are doubtless in the minority, since the greater number seem benefited by the warmer climate of Southern California, Colorado and even Florida; but the fact indicates that there is a diversity in the requirements of different cases. Probably the best way for conjecturing the most suitable climate is to be derived from the feelings of the patient at different seasons. If his condition be better during the hot summer months at home than during the cooler spring and fall, he will probably be better suited by sojourn in a warm climate; while if he feel oppressed and enfeebled by the summer heat when at home, he might try to advantage the more Northern resorts already named.

"With reference to the particular situation to be selected," says Dr. Flint, "it should contain resources for occupation and mental interest. There must be inducements for out-door life. I have known patients who had been accustomed to active habits, suffer intolerably from ennui, in going to places where the supposed excellence of climate was the only attraction. It is frequently better to move about from one place to another, than to remain stationary. As soon as the place becomes tiresome, it is best to leave it. Traveling in foreign countries, without any special regard for climate, is often the best plan, the advantage consisting in the interest and inducements to exercise derived from a succession of new scenes. A sea voyage is generally useful, and if patients are fond of the sea, a long voyage, if practicable, may be advised. Places which are especially the resort of patients are to be avoided; the moral effect of seeing daily examples of the different stages of the disease is unfavorable. A change is often useful when there is no superiority on the score of climate, because it is in this way only in certain cases that relief from the cares and anxieties of business can be secured.

"The habits and taste of the patient are to be considered. Persons who are dependent on the associations and comforts of home and friends for their happiness will not be likely to be benefited by being sent away, especially if alone and among strangers. The stage of the disease and the rapidity of its progress are points of great importance. It is truly a cruel act to send to a distance patients who are in a condition admitting of but little prospect of improvement, and who would probably not live to return. The amount of damage which the lungs have sustained, as determined by physical signs as well as the symptoms, are to be taken into account, before entertaining the question relative to change of climate. And finally, if a change be made and prove effectual, it becomes an important question whether, if practical, the change should not be permanent. An arrest of the disease does not extinguish the predisposition to it, and the safest course, undoubtedly, is to take up a residence in the climate in which the disposition to consumption is less liable to be reproduced than in the climate in which it has been already once developed."

The following extracts, from a table prepared by Dr. Mattocks, indicate the relative frequency of consumption in different parts of the Union. As is shown in this table, the disease is far more frequent in the older, more thickly settled portions of the country, being most prevalent in New England, and least frequent in the Western and Southern States. In 860, there was in Massachusetts one death from consumption for every 250 inhabitants:

Maine	1 in 280
New Hampshire	1 in 280
Rhode Island	1 in 300
Connecticut	1 in 360
Vermont	1 in 400
New York	1 in 470
New Jersey	1 in 490
Delaware	1 in 550
Maryland	1 in 570
Pennsylvania	1 in 580
Michigan	1 in 630
Kentucky	1 in 660
Ohio	1 in 670
California	1 in 720
Virginia	1 in 750

Indiana	1 in 760
Tennessee	1 in 770
Louisiana	1 in 840
Wisconsin	1 in 850
Illinois	1 in 880
Missouri	1 in 900
Iowa	1 in 902
Kansas	1 in 910
Minnesota	1 in 1,139
North Carolina	1 in 1,300
Arkansas	1 in 1,322
Mississippi	1 in 1,420
Texas	1 in 1,430
Florida	1 in 1,440
Alabama	1 in 1,618
South Carolina	1 in 1,720
Georgia	1 in 2,150

The treatment of consumption must consist chiefly in attention to the general health, and in such measures as shall increase the patient's strength and vigor; and these measures consist largely in the regulation of diet, air and exercise, and a change of climate, as already described. Yet something can be done by the use of medicines, which indeed become absolutely essential in the later stages of the disease, when the only hope and object of treatment is to palliate the sufferings of the patient. Chief among these remedies are *alcohol* and *cod liver oil*, neither of which has any special curative effect in opposing the disease; each of them acts apparently merely by furnishing rich and easily digestible nourishment in concentrated form. While all admit the value of alcohol late in the disease, when the patient's strength is exhausted and his body emaciated, yet comparatively few, perhaps, realize how beneficial it may be at an earlier stage. Indeed, when the first symptoms of the disease become pronounced, the amount that may be prescribed with benefit is much in excess of the quantity ordinarily given; patients have been known to improve materially, even apparently to recover, by taking a pint or more of whisky daily. In these cases there is rarely observed any evidence of the intoxicating effects of the drug which are so common under ordinary circumstances; a weak, emaciated patient may swallow eight ounces

of whisky daily without showing any unusual impairment of the mental faculty. Yet it must be admitted that some cases do not bear whisky so well; that even in larger quantities it does not seem to cause marked improvement. Such cases may often be benefited by the substitution of wine or malt liquors for the whisky. The amount of liquor that may be prescribed with benefit is to be regulated by the feelings of the patient; if it be not followed by a sense of lassitude, headache and other signs of intoxication, the quantity is not excessive.

Cod liver oil, too, is to be regarded as a food, and not as a specific cure for the disease. It is found beneficial not only in the advanced, but also in the early stages of consumption. An adult may take with advantage one or two tablespoonfuls three times a day, preferably after meals. The nauseous taste of the oil is in many cases a serious impediment to its use, some individuals being utterly unable to take it. For such cases, some one of the many compounds prepared expressly to disguise the taste of the oil — emulsions, combinations with malt, etc., can be used; if these also be objectionable to any fastidious palate, the oil can be taken inclosed in capsules. It sometimes happens that even when thus taken, so that the taste is disguised, the oil materially impairs the appetite or digestion, or both; in such cases the unpleasant effects may often be avoided by diminishing the quantity of the oil; in any case it is advisable to begin the use of this agent by giving small quantities, say a teaspoonful or less, and gradually increasing to one or two tablespoonfuls.

Certain symptoms of the disease may also require treatment, among them the cough, diarrhea, and night sweats. The cough is inevitable, so soon at least as the softening and breaking down of the lung tissue begins; hence the only object in treating the cough is to diminish the irritation and consequent exhaustion of the patient. Hence such remedies as squills and ipecac are out of place, and may even do harm; but some sedative mixture may be of service, such as the following:

Dilute hydrocyanic acid, - -	Half a drachm.
Sulphate of morphia, - - -	Half a grain.
Syrup of tolu, water, - - -	Each one ounce.

Mix, and take half a teaspoonful every hour.

Or, instead of this, the following mixture may be given:

Paregoric, - - - - -

Syrup of wild cherry, - - - Each one ounce.

Mix, and take half a teaspoonful every hour or two.

The night sweats of consumption may be quite profuse and exhausting, even before the later stages of the disease are reached. They are best and soonest relieved by improving the patient's strength and vigor, since the night sweats are merely indications of the general debility and exhaustion induced by the disease. It may be possible, also, to materially reduce this perspiration and its ill effects, either by using some astringent wash externally, or a preparation of belladonna as a medicine. For the former purpose, alum may be dissolved in alcohol, and the patient lightly sponged with this, before retiring; at the same time minute quantities of atropia — one one-hundredth of a grain — may be given as a pill, at night. Or the following mixture may be given:

Aromatic sulphuric acid, - - - Three drachms.

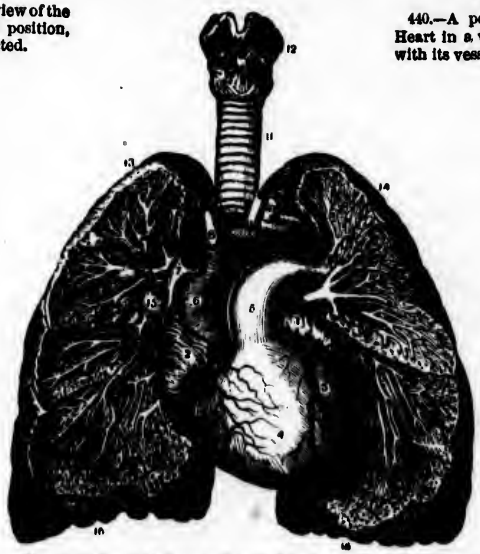
Sulphate of quinine, - - - - Fifteen grains.

Water to make two ounces. Mix, and give a teaspoonful in water at night.

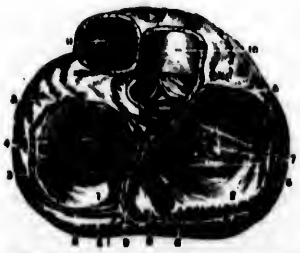
The pains in the chest are often so troublesome as to disturb the patient's rest extremely. These can usually be relieved by the use of belladonna plaster applied to the painful spot, or friction with chloroform liniment or a light mustard plaster may also prove beneficial.

439.—An anterior view of the Heart, in a vertical position, with its vessels injected.

440.—A posterior view of the Heart in a vertical position, and with its vessels injected.



430.—A view of the Bronchia and Blood-vessels of the Lungs, as shown by dissection, as well as the relative position of the Lungs to the Heart.



446.—A vertical view of the Auriculo-Ventricular and Arterial Valves of the Heart.

444.—A three-quarter view of the Left Ventricle after the removal of its Anterior Parietes.

HEART.

Explanation of "Heart" Plate.

FIGURE No. 439.

1. External or muscular integument of the right auricle.
2. Same integument of the left auricle.
3. Same integument of right ventricle.
4. Same integument of the left ventricle.
5. Superior vena cava, or channel conveying the blood from the upper part of the body to the heart.
6. Inferior vena cava, conveying the blood from the lower part of the body to the heart.
7. Pulmonary artery.
8. Aorta.
9, 10. Coronary arteries.
11. Division between the right and left ventricles.
12. Series of nutrient channels of the external layers of the heart.
13. Position of the valves of the heart.

FIGURE No. 440.

1. Posterior part of the right auricle.
2. Posterior part of the left auricle.
3. Posterior part of the right ventricle.
4. Posterior part of the left ventricle.
5. Opening of the superior vena cava.
6. Aorta.
7. Pulmonary artery.
8. Inferior vena cava.

9, 10. Nutrient vessels of the walls of the heart.

11. Position of the valves of the heart.

FIGURE No. 430.

1, 2, 3, 4, 5, 6, 7, 8, 9, 10. Different parts and channels of the heart already shown in figures Nos. 439 and 440.

11. Trachea.
12. Cartilages and base of the vocal chords.
13, 14. Superior part or apex of the lungs.
15. Ramifications in the lungs of the major blood vessels.
16, 16. Base of the lungs, showing the exterior surface.

FIGURE No. 446.

1. Auricular cavity.
2. Ventricular cavity.
3, 3, 3, 3 Muscular layers.
4. Tricuspid valve.
5. Pulmonary artery.

6, 6, 6. Interior mucous membrane of the heart.

7. Mitral valves.
8. Auriculo-ventricular orifice.
9. Division between both auricles.
10. Aorta.
11. Vena cava.

FIGURE No. 444.

1, 2, 3. Pericardium.
4. Muscles of the wall of the heart.
5. Folds of the wall of the heart.
6. Chordæ tendineæ.
7. Columnæ carneæ.
8. Base of the valves.
9. Opening of the auricle.
10. Walls surrounding the mitral valve.
11. Mitral valve.
12. Semilunar valves.

DISEASES OF THE ORGANS OF CIRCULATION.

DISEASES OF THE HEART.

Pericarditis.

By this term is meant an inflammation of the membrane which surrounds the heart, the pericardium. For the heart, like the lung, is enveloped in a smooth membrane, so arranged that the heart itself is not exposed to friction during the movement which accompanies its natural action. This membrane covers the heart, and is then reflected so as to make a closed sac. In this sac there is during life a small amount, perhaps half a teaspoonful of watery liquid, which lubricates the two surfaces of the membrane lying in contact. If this membrane becomes inflamed, the same general process occurs which has been described in the discussion of *pleurisy*—that is, the inflammation of the membrane surrounding the lung. Without entering into a repetition of details, it will suffice to say, in general, that there occurs an *exudation* into the pericardium, consisting at first of liquid perhaps, and subsequently containing a considerable amount of solid matter called *lymph*. If the case termin. 'e in recovery, this liquid is taken back again into the blood, —that is *absorbed*—leaving the solid material in the sac. This material then forms bands, which unite the two surfaces of the pericardium, so that there is sometimes interference with the freedom of the heart's movements. In other cases, the liquid is not absorbed at the usual time, and may even become filled with matter that is purulent. Such cases involve the patient in considerable danger, and often result fatally.

Symptoms.—The symptoms of pericarditis are apt to be associated with those of other affections existing at the same time, because pericarditis rarely occurs as a primary affection, but

usually as a complication of acute rheumatism or of kidney disease. If a patient be suffering from one of these affections, it is the duty of the physician to watch for the development of pain in the region of the heart. This pain is usually sharp and cutting in character, like that of pleurisy; moreover, it is increased during deep breathing, so that this disease has been often mistaken for pleurisy. There may be also a dry, hacking cough. In fact, the symptoms generally direct the attention to the breathing apparatus, rather than to the heart itself. The action of the heart is however much disturbed, as may be discovered by the pulse, or by placing the hand over the point of the heart between the fifth and sixth ribs. So soon as the exudation begins, the system changes somewhat; the pain and soreness become less acute, and if the amount of liquid be considerable, there may be some protrusion between the ribs in the region of the heart. But other and more serious results follow the presence of the liquid in the pericardium, because the heart is compressed by this liquid, and its movements are impeded. The result of any impediment to the heart's movement is, of course, an interference in the circulation of the blood, and this interference is manifested by blueness of the face and hands, by a feeling of suffocation, perhaps even delirium and convulsions. Indeed, it sometimes happens that the inflammation in the heart itself is overlooked, because the other symptoms, such as derangement of the mind, are so prominent.

The severity of the affection is measured by the amount of exudation; if this be slight, the symptoms are not severe and the danger is not great. but if a large amount of liquid escape into the pericardium, the disease is extremely dangerous and often fatal.

Cause.—Acute inflammation of the pericardium may be produced by an injury such as a stab, or by a blow upon the chest, especially if a rib be fractured, in the neighborhood of the heart. Several curious accidents are reported in which pericarditis proceeded from unusual causes; thus, Walsh mentions an instance in which, during the juggler's trick of swallowing a sword, the instrument passed from the œsophagus into the pericardium, which lies adjacent, and caused a fatal inflammation. Flint also mentions a case in which a set of false teeth were swallowed while the owner was profoundly intoxicated; the teeth lodged in the lower part of

œsophagus, and ultimately worked their way through into the pericardium, inducing a fatal inflammation; after death the teeth were found in the pericardium. Pericarditis, when it does not result from injuries, is almost always a complication of some other disease, especially acute rheumatism. Until the use of salicylic acid became general for the treatment of rheumatism, pericarditis was a quite frequent occurrence, it being estimated that it occurred in one out of every six cases of rheumatism. It is also a frequent complication of inflammation of the kidneys, of erysipelas, typhoid and typhus fever, and of many of the infectious diseases.

The height of the disease is usually reached within a week or ten days, though it does not follow that recovery will begin at the expiration of that period. For in many cases the patient remains in a dangerous condition for two or three weeks, and even when the liquid has become absorbed the patient is by no means out of danger; for the heart remains weak for a considerable time, and the patient should not be permitted to make any severe exertion. Flint reports a case in which a patient suffering from pericarditis died instantly upon getting out of bed.

Treatment.—In most cases pericarditis is, as has been already remarked, a complication of other diseases; hence the treatment consists, in most cases, of measures adapted for the relief of these other diseases. The treatment for the pericarditis itself consists in the relief of pain by opium, and in local applications over the region of the heart. Before the exudation has occurred, a light mustard poultice may be applied over the heart; and so soon as there is evidence of the presence of liquid in the pericardium, the skin may be painted with the tincture of iodine once every day. It is desirable to avoid blistering the skin in this region.

If the amount of liquid become so great as to threaten life by impeding the movement of the heart, there is still a resort which has in skillful hands repeatedly saved the lives of patients suffering from pericarditis; this measure consists in what is termed *aspiration*. This means that a very fine needle is inserted through the skin into the pericardium, and the liquid is drawn off by means of a syringe. In this way the pressure on the heart is removed, and the immediate danger is averted.

During convalescence extreme care should be taken to protect the patient against severe physical effort of any sort, since the

heart is so weak that a degree of exertion which is not noticed during health, may be sufficient to make the heart stop beating entirely.

Endocarditis—Heart Disease.

By this term is designated what is popularly known as "heart disease." It consists in an inflammation of the membrane which lines the inside of the heart, the endocardium, for the heart is hollow, and its cavities are, during life, always full of blood; the surface over which the blood moves is covered with a smooth membrane, quite similar to that which covers the heart, the *pericardium*, and to that which covers the lung, the *pleura*. The endocardium, like either of the other membranes named, is subject to inflammation, during which a certain amount of material is formed on its surface, called the *exudation*. This exudation may occur anywhere within the cavity of the heart, but is found with especial frequency at those parts of the lining membrane which project so as to form the *valves* of the heart. These valves, it will be remembered, are folds of the lining membrane of the heart, so arranged as to prevent the blood from flowing backward. So long as these valves retain their natural condition they are smooth and fit tightly into one another, so as to prevent the blood stream from passing through them. When, however, they become inflamed, and the exudation already described takes place on their surface, they become rough and uneven, and are no longer capable of fitting so closely against each other as to prevent the return of blood; the valves are, in other words, no longer *blood tight*. In the most favorable cases this exudation may be absorbed, and the valves become smooth and even again; yet, in the majority of instances, this exudation is never entirely removed, but remains in and around the valves, keeping them rough and preventing them from shutting tightly. The result is that the blood does not circulate so well as before, and this is the origin of the so-called *heart disease*; that is, of what physicians call *organic disease* of the heart.

It is, of course, impossible to detect by any ordinary means the presence of this exudation on the surface of the valves and of the endocardium, but the properly trained physician can readily dis-

cover such a condition by applying the ear to the chest, for the beating of the healthy heart is accompanied by certain sounds, which may readily be distinguished by listening over the chest between the fourth and sixth ribs, a little to the left of the breast bone; and although there are certain variations in different individuals, yet the sound caused by the circulation of the blood through the heart is essentially the same in all healthy persons. But so soon as this circulation of the blood through the heart is disturbed by disease of the valves, so soon as the blood fails to flow always through the organ in the proper direction, and begins to flow backward through these diseased valves, the sounds heard by placing the ear over the heart are quite different from those of the normal chest. In this way, therefore, it becomes easy, after acquiring proper experience, to detect disease of the heart valves.

By post mortem examination it is found that the exudation which takes place on these valves is often arranged in the shape of little masses or bunches looking like warts or pimples; sometimes these masses attain considerable size, becoming as large as a bean, or even a hazel nut. As will be mentioned later, these little masses constitute a constant source of peril to the patient's health, or even life; for they are constantly washed by the stream of blood passing with great force through the heart; and it not infrequently happens that small pieces will be torn off and carried along in the current of blood, just as trees on the bank of a stream may be undermined and swept away by the current. So long as these little masses circulate in the blood there is no particular danger; but they are apt to become lodged in the arteries in various parts of the body, blocking up the blood vessel, and thus cutting off the supply of blood from some of the organs. The result of this must be a suspension, partial or complete, of the functions of that organ thus deprived of blood. This is the explanation of many cases of so-called apoplexy; in these cases the individual drops suddenly to the floor, paralyzed in some of his limbs, or perhaps falls unconscious, and dies in a short time. The explanation is simply that some fragments of this exudation have been washed off from the heart valves, and have lodged in some of the blood vessels going to the brain, cutting off the supply of blood to this organ, and thus causing paralysis.

Symptoms.— Inflammation of the lining membrane of the heart occurs, in the vast majority of cases, as an incident in the course of other diseases, especially of acute rheumatism. As has been already remarked in discussing rheumatism, the chief danger from this disease lies in the possibility that inflammation of the heart may occur. Before the use of salicylic acid, it was estimated that endocarditis occurred in one-third to one-half of all the cases of acute articular rheumatism

Whenever, then, the patient has a protracted attack of acute rheumatism, the possibility, in fact probability, must be borne in mind that an inflammation may occur in the heart. This will usually be indicated by a dull, heavy pain in the region of the heart. In other cases the sensation does not amount to pain, but is rather a feeling of distress. There is usually, at the same time, very rapid and irregular action of the heart, indicated by palpitation. But the only positive means for recognizing the affection consists in applying the ear (either directly or indirectly, through the *stethoscope*) to the chest, whereby the sounds of the heart, indicating disease, may be detected. In many cases, endocarditis is associated with pericarditis, and the recognition of both diseases requires considerable skill and experience on the part of the physician, since many of the symptoms are common to both diseases.

Treatment.— The treatment of endocarditis is merely that of the disease with which it is associated, generally acute rheumatism; in fact, the inflammation in the heart may be regarded as a part of the disease.

Organic Disease of the Heart.

The inflammation of the lining membrane — endocarditis — lasts but a few weeks; but the results of this inflammation frequently constitute a permanent affection, which interferes more or less seriously with the patient's health, and may ultimately cause his death. The source of this difficulty lies, as has been already stated, in the imperfect closure of the valves in the heart, resulting from the exudation in and upon them. It has been already related that sudden paralysis or even death may result from the loosening of such particles, which may then be swept into various blood

vessels in various parts of the body. But even if this do not happen, there results almost certainly a gradual interference with the circulation of blood. We can readily understand that if the valves of a pump or syringe do not close properly, water cannot be projected by the instrument with the same force nor to the same distance as before; and it is just so with regard to the heart, which is merely a living pump for throwing the blood through the vessels into different parts of the body. When the valves of this pump become so damaged by disease as to close but imperfectly, the blood will not be pumped throughout the body with the same force as before; and the results of this imperfect circulation of the blood will be manifested in different organs of the body according to the degree of impairment in the heart's action.

Though the symptoms vary in detail according to the valves affected, yet certain general symptoms are generally found in all cases; among the first of these is shortness of breath. The patient first observes that he cannot take exercise with the same freedom of breathing as before; and he usually observes that he cannot even walk up stairs without a feeling of oppression in the chest or even of suffocation. Such effort, too, is accompanied by a somewhat violent action of the heart, which the patient probably describes as "palpitation." If persisted in, such exercise causes a feeling of faintness. After a time this shortness of breath, which was at first felt only upon exercise, becomes habitual; so that the ordinary duties of life occasion extreme inconvenience. This difficulty in breathing is usually accompanied by a cough and some little expectoration; at times this expectoration is streaked with blood. There is not usually any considerable pain, but simply a feeling of distress in the chest, often accompanied by a state of mental anxiety and depression quite out of proportion to the apparent physical derangement. The sleep, too, is often disturbed by unpleasant dreams, in which the patient fancies himself exposed to danger and death.

There is apt to be a blueness of the skin, indicating impaired circulation of the blood. All these symptoms become exaggerated with the lapse of time, until the heart meets the increased demand upon its strength by an increase in size. For just as a man's arm becomes thicker and stronger after long continued use of a sledge hammer, so the heart increases in size, in order to accomplish the severer task imposed upon it by the failure of the valves. Hence

it happens that the subjects of organic disease of the heart usually exhibit, sooner or later, an *enlargement of the heart*. This enlargement is not to be regarded as a disease in itself, but is merely the result of the previous disease of the valves. The enlargement is in fact a beneficial change, as is indicated by the improvement which takes place in the patient's symptoms. It is not uncommon to find individuals with organic heart disease who enjoy, nevertheless, excellent health, because the heart is sufficiently powerful to circulate the blood properly, notwithstanding the impediment in the valves.

But sooner or later the heart becomes unequal to the ever-increasing resistance, and the original symptoms return with even greater intensity. There now occurs, if it has not previously taken place, swelling of the body, usually beginning in the feet and legs, and spreading over the entire trunk. At the very beginning, this dropsy is noticed in the feet only toward the close of the day, and has disappeared when the patient rises in the morning. But it finally becomes persistent, and occasions the patient a great deal of annoyance. The face becomes swollen and livid, there is often so much liquid in the chest cavities as to seriously impair the breathing; the abdomen, too, becomes distended with fluid, and the feet and legs acquire such a size that the skin seems to be on the point of bursting. When the disease has progressed so far as this, the patient is often unable to maintain the recumbent posture with comfort; he is compelled to sleep in a chair or bolstered up in bed. The sluggishness of the circulation impairs also the functions of most of the organs; the stomach and intestines fail to perform their work in the usual way; the appetite and digestion become impaired, and there is often obstinate diarrhea. The patient is also often frequently troubled with piles.

Organic disease of the heart may remain for a long time harmless; indeed, examiners for life insurance companies not infrequently find such diseases in individuals who had never been led to suspect the existence of serious disease of the heart or elsewhere. Indeed after the disease has been discovered, and the patient is even suffering from the lighter symptoms, many years may elapse without the occurrence of serious interference with the health; many individuals afflicted in this way live to a good old age, and ultimately die of affections in no way attributable to the heart disease. So soon, however, as enlargement begins, it is to be expected that

sooner or later — in the course of many years perhaps — the severe symptoms will follow; and there is always a possibility that a fatal result may occur suddenly, either from apoplexy in the way already described, or from paralysis of the heart.

Treatment.—Until the symptoms indicate an impairment of function of various organs, — shortness of breath, etc. — organic disease of the heart frequently requires no treatment. Indeed, in many cases, it is advisable that the fact of the disease should be concealed from the patient if possible, as is often the case when the discovery be made accidently by a physician; for an individual conscious that he is suffering from "heart disease," is apt to regard himself as an invalid and to adopt a mode of life which will render his general health delicate, and will thus favor the development of tne disease in the heart. Such an individual should place himself under the best possible conditions for the maintenance of health, including a fair amount of exercise in the open air; and it is just this latter point from which he will shrink if he be aware of the existence of heart disease. Yet it is advisable that such patients should avoid those influences which can exert a sudden strain upon the heart and thus tend to increase the difficulty; he should, therefore, abstain from very violent physical exertion, from excessive mental emotion, and from the use of alcoholic stimulants. Yet if he bear this general principle in mind, it is far better that he do not attempt to regulate his life by any set of rules, but merely observe the general facts of hygiene, by keeping himself well fed, well clothed and in good exercise.

After the symptoms begin to indicate that the heart is no longer equal to the demand made upon it, that the circulation is becoming feeble, much can be done to retard the progress of the disease and to restore the patient to a fair degree of health by the use of *digitalis*. The effect of this drug is to stimulate and strengthen the heart's action; under its use the breathing becomes easier, the skin loses its bluish tinge, and the patient feels much improved. Ten drops of the tincture of digitalis may be administered every four hours, in water.

When the disease has advanced to such a stage that general dropsy and the accompanying symptoms are present, but little can be done to materially prolong the patient's life. The dropsy can be, perhaps, diminished by the use of saline laxatives, though the

exhaustion consequent upon their use is apt to weaken the patient materially. All the symptoms must be treated as they arise.

Death ordinarily occurs after a long period of suffering, though it may happen from sudden distension of the heart, caused by unusual physical effort or mental excitement; in these cases there is either a paralysis of the heart or a rupture of its walls.

Enlargement of the heart, technically called *hypertrophy*, may result from several other causes than the one just mentioned In the majority of cases it is doubtless due to a previous inflammation of the endocardium, as described above; but there are instances in which there have been no endocarditis, and no impairment of the valves. These causes may be located in various parts of the body quite removed from the heart, for since the function of the heart is to propel the blood through the body, any obstacle to the passage of the blood through the vessels will increase the work of the heart, and hence cause it to enlarge. Several of these causes will be discussed under the appropriate headings, such as aneurism and disease of the kidneys. But one disease will be described in which enlargement of the heart is a prominent symptom; this is

Exophthalmic Goitre.

This affection, which is also known as *Graves' disease*, is, perhaps, not primarily a disorder of the heart. The most prominent characteristics are protrusion of the eyes, enlargement of the neck and violent action of the heart. This disease is somewhat rare, though since attention has been especially directed to it, a comparatively large number of cases have been observed.

The most prominent feature of the disease is protrusion of the eyes. This change of position begins gradually, but may attain an extreme degree. The eyeballs are more prominent than before, and hence escape to a certain extent from between the lids, so that the eyes can oftentimes not be closed completely. In these cases the whites of the eyes are visible above and below as well as at the sides of the pupil, so that the patient has a peculiar staring and even fierce expression. The sight is not usually impaired. Indeed, the only unnatural feature about the eyes is their prominence. At times their may be a dull aching pain in the orbits, though this is not a necessary feature.

The neck is usually enlarged, more especially upon the right side. This swelling is not necessarily painful, but often leads to embarrassment in breathing and in speaking, from pressure upon the windpipe and upon the nerves of the larynx. The swelling often pulsates quite markedly. The action of the heart is unusually violent, giving the patient the sensation of constant palpitation. At times the heart's beat becomes much increased in force and frequency, constituting paroxysms which are quite distressing to the patient. The individual is usually in poor health, and is apt to be quite pale. In the course of the disease various symptoms of mental and physical disturbance occur, such as despondency and irritability, hysteria, inability to sleep; in women, derangements of menstruation, loss of appetite and impairment of digestion. The disease is chronic, lasting for months or years. It does not seem to destroy life directly, yet most of the patients die of other affections, which seem to be hurried on by this disease.

The disease is especially apt to occur in young women, and it has been supposed that it could be traced to excessive sexual excitement—a supposition as yet not proven. Some cases have been known to recover ultimately.

The best results from treatment have been thus far obtained from the continuous electric current, and from the administration of digitalis and the iodide of potassium. Much can be accomplished by surrounding the patient with such influences as shall secure amusement, exercise and the avoidance of mental anxiety.

Palpitation of the Heart.

Palpitation of the heart is the popular term for designating certain irritable conditions of the heart, which manifest themselves to the patient by disordered and violent action. The individual has a painful sensation of depression in the region of the heart; the organ seems frequently to move about within the chest, and even to rise in the throat. At the same time there is great mental disturbance and nervous anxiety; at such times the pulse is apt to be irregular. These paroxysms of irregular action occur only at intervals, and vary much in severity, sometimes quite prostrating the patient. Although the palpitation usually lasts but a few hours or less, it may persist for days or weeks.

One of the most common symptoms during such an attack is the patient's dread of impending death, due partly to the unpleasant sensations which he experiences, and in part, doubtless, to his conviction that he has heart disease. It may be said, once for all, that palpitation of the heart, however distressing and unpleasant it may seem, is usually quite independent of organic disease of the heart, and, in such cases, contains no element of danger.

The causes of this palpitation are several. Slight attacks often occur in those especially addicted to the pleasures of the table, particularly if they take but little exercise. It is often doubtless the result of excessive indulgence in liquor, venery and tobacco; and it is highly probable that addiction to strong tea and coffee may be followed by the same disorder of the heart. So, too, in some individuals it occurs from exhaustion, whether from physical effort or from mental strain or anxiety. In girls it is a not infrequent accompaniment of the green sickness, chlorosis, and of hysteria.

The first point in the consideration of palpitation of the heart, is to determine whether it be due to one of these causes, which we may distinguish as *nervous*, or whether it be actually associated with organic disease of the heart. It may be said in general terms, that the latter condition is a comparatively rare one as a cause of palpitation; that the great majority of cases of so-called palpitation are purely nervous, and not dependent upon any actual disease of the heart. The truth can be ascertained at once by a careful examination of the heart with the stethoscope; and it is very desirable for the sake of the patient, to learn whether any such disease of the heart actually exist. Yet, even without such an examination by a physician, it will be usually found that a distinction can be made in this way: *Nervous* palpitation is apt to occur especially at night soon after the patient retires, while palpitation from *organic* disease occurs most frequently after physical exertion. *Nervous* palpitation is usually accompanied by other symptoms of nervousness, increasing whenever the patient's mind is disturbed, and rather diminishing when his attention is engrossed by actual physical exercise; *organic* palpitation is not associated with mental so much as with physical causes.

" It is extremely desirable, in view of the comfort and welfare of the patient, to determine with positiveness, in cases of func-

tional disorder, that structural disease does not exist. If, on a careful examination of the chest, the heart be not found to be enlarged, if there be no murmur present, and the heart sounds be normal, the affection may be confidently pronounced functional (nervous); without the negative proof afforded by examination of the chest, the mind of the practitioner must be in doubt as to the diagnosis. If he give a decided opinion, it is a guess which may prove to be either right or wrong. If he avoid giving a decided opinion, the inference which the patient usually draws is that organic disease exists, and that the physician is reluctant to tell him the truth. I could cite from the cases which have come under my observation, not a few in which patients were for many years rendered unhappy and deterred from engaging in the active duties of life, by either an erroneous medical opinion that they had organic disease of the heart, or by a fixed belief that such was the fact, based on the indecision of their physicians."

After it has been decided that the disease is really not located in the heart, but that the palpitation is merely an evidence of a nervous disorder, the treatment will of course consist in discovering and removing the cause of the nervousness. In most cases it will be found necessary to regulate the amount of food, and to carefully avoid excesses of all kinds, including tea, coffee and tobacco; provision should also be made for a proper amount of out-door exercise and for mental recreation. Not the least important item in the treatment consists in the positive assurance to the patient that he is free from "heart disease," properly so-called. He should also be assured that there is no danger of a genuine heart disease arising from repeated attacks of nervous palpitation.

Many cases will doubtless resist treatment for a long time, especially if they have existed for many years. Perhaps the most promising cases are those in which the disease is evidently a result of impoverishment of the blood,—anæmia—as is so often the case in girls and women; for in these instances the anæmia can usually be relieved and the palpitation stopped.

During the paroxysm of palpitation relief can often be obtained by the use of stimulating liniments, such as the chloroform liniment over the chest, and by the inhalation of hartshorn and similar agents.

Angina Pectoris.

This is a symptom rather than a disease, since it means merely a severe pain in the chest; but it is a symptom, usually, of some disease of the organs of circulation, especially of the heart and the aorta, and may be therefore properly discussed in this connection. The pain comes on in paroxysms, the first ones of which are usually slight and attract but little attention; but in course of time these paroxysms recur with greater force as well as frequency. When well developed the paroxysm is marked by sharp pain beginning in the region of the heart or under the breast bone, and radiating from this point in different directions—around the chest on both sides into the back, but especially up to the left shoulder, often extending down the left arm and fore-arm; less often invading the face and head. The pain is often of a burning or tearing character, sometimes so intense as to render the patient almost delirious; there may also be a feeling of tightness in the chest.

The paroxysm usually begins suddenly, compelling the patient to remain perfectly quiet, and inspiring him with a feeling of indescribable dread, so that he seems often afraid to move or even to breathe deeply. The surface is usually cold and frequently bathed with clammy perspiration. The heart's action is usually tumultuous and disordered, adding to the patient's distress.

Angina pectoris is, as has been said, usually an incident in organic disease of the heart or of the aorta; and in the majority of cases the evidence of such disease is apparent upon close examination; the angina is in fact merely a severe neuralgia accompanying the heart disease. Angina is a dangerous affection, or to speak more correctly, the cases of heart disease in which this severe form of neuralgia occurs usually terminate fatally. Death often occurs suddenly, frequently during a paroxysm of pain. On the other hand there are some cases of this rare disease in which there is no evidence of serious affection of the heart, and which may recur for years without imperiling the life of the individual. Generally speaking, we may say that the danger is proportional to the disease of the heart and not to the intensity of the pain.

Beside the genuine angina pectoris there may occur neuralgic pains in the chest and near the heart, which do not depend at all upon nor originate in the heart, and which should therefore be distinguished from the latter variety. These slight neuralgic attacks

may be confined to the chest wall, or may originate in distention of the stomach with gas; an examination of the heart by a competent physician will usually detect the true nature of the complaint. The real angina affects women but rarely, and is not frequent before the age of 30 years.

The treatment consists of measures for the relief of the paroxysm; and this relief can be best afforded by the use of opium in some form. The most effectual way is the hypodermic injection of morphia, one-eighth to one-fourth of a grain, according to the intensity of the pain. If no physician can be secured, it will be better to administer the same quantity of the drug by the stomach; or if that is not procurable, twenty drops of laudanum may be given at once, and repeated in half an hour if the pain still be severe. A light mustard plaster or chloroform liniment may be applied over the chest. It is also desirable to avoid such influences as can provoke a paroxysm — excess in food or drink, mental strain and physical effort.

Aneurism of the Aorta.

By aneurism is meant a dilated condition of an artery — an increase in size which may be induced by various causes that it is not necessary to discuss here. Many different arteries in the body are subject to such dilatation, and some can be cured or removed by various surgical procedures. When the dilatation affects the aorta, however, the case is different; since the aorta — the large artery leading directly from the heart, through which all the blood of the body passes — cannot be meddled with nor treated. A dilatation, or aneurism of the aorta, therefore, is not susceptible to cure and must run its course; in most cases this course leads to a fatal termination, while in the favorable exceptions the affection is sometimes cured spontaneously. Yet, notwithstanding our inability to remove this condition, it is important to recognize the existence of an aneurism in the chest, since this knowledge gives us the clue to many symptoms which cannot be otherwise understood, and enables us to at least retard the progress of the disease and to avert for a time the fatal results.

Symptoms.— The symptoms caused by aneurism of the aorta vary considerably, according to the part of the vessel which is

affected. The aorta extends upward from the base of the heart, behind the upper part of the breast bone, and then curves backward and to the left, so as to reach the spinal column, along which it proceeds into the abdomen. The artery may be dilated at any point in its course, but is especially apt to undergo this change in the immediate vicinity of the heart. If the dilatation occur at that part of the vessel which lies behind the breast bone, there is often a swelling or tumor in the upper part of the chest, sometimes pressing one or two ribs a little forward, at other times merely filling out the spaces between the ribs. This tumor is apt to be tender upon pressure and painful. It usually gives a feeling of throbbing, corresponding in time to the beats of the heart. When situated in this location the tumor sometimes causes some numbness and loss of power in one or both arms. The circulation of the arms may be very feeble, causing one limb to be cooler than the other. This feebleness of the circulation may be also indicated by the absence of pulse at the wrist of the same arm. Sometimes, too, there is decided interference with the return of blood from the head, causing the face to be somewhat puffed, and to exhibit a dusky or livid color.

If the dilatation take place a little further toward the left, the dilated vessel may press upon the windpipe or one of its branches, causing an obstruction to breathing; if this be considerable, the effect is indicated by a loud, hoarse noise, which may be heard at some distance during the act of breathing. If the obstruction be considerable, the patient may show signs of a lack of breath by blueness of the skin. There may also occur a spasm of the larynx in consequence of this pressure upon one of its nerves; in this case the patient suffers extremely in his efforts to breathe, and may seem to be suffocating. These symptoms may be so prominent as to mislead the physician into the belief that there is an obstruction in the larynx itself, and instances are known in which an operation has been performed for opening the windpipe, under the impression that the breathing would be thereby relieved.

The tumor may press also upon the œsophagus, whereby the passage of food into the stomach is impeded. Sometimes the most prominent symptoms are associated with the digestive organs, the patient being afflicted with obstinate vomiting. At other times pressure on certain nerves may cause partial or complete paralysis of a considerable part of the body. As has been already

remarked, the pressure of the tumor frequently causes extreme pain in the chest and arm, these neuralgic attacks being designated *angina pectoris.*

It is evident, from what has been already said, that the detection of an aneurism of the aorta is a by no means easy matter; indeed, the physician himself, though suspecting the existence of this difficulty, may long remain in doubt before he can satisfy himself as to the nature of the difficulty. The symptoms are so variable in different cases that a non-professional person cannot be trusted to ascertain the presence or absence of aneurism.

Aneurism of the aorta almost invariably results in death. The chief question after the diagnosis has been settled, is, how long can the patient survive? There are, it is true, instances in which recovery has occurred, either spontaneously or under treatment; in these cases the dilated part of the vessel becomes filled up with coagulated blood. But in the great majority of cases death results either from bursting of the aorta, so that the patient bleeds to death in a few minutes, or from the long continued pressure of the dilated vessel upon different organs, causing fatal disease. A patient suffering from aneurism of the aorta is not sure of life from one hour to another, since death may result even before the symptoms from pressure have occasioned serious inconvenience. Indeed, instances are known in which sudden death has occurred in previously healthy individuals, who had never exhibited marked symptoms of any disease, in which *post-mortem* examination has shown the cause of death to be the bursting of an unsuspected aneurism.

No treatment is known whereby an aneurism of the aorta can be cured, or the dilatation of the vessel even arrested. The treatment must, therefore, be directed simply to the relief of suffering and the prolongation of life. Everything which increases the force of the circulation, or stimulates the heart to unusually strong action, must be avoided; since, by increasing the strain upon the dilated vessel such influences increase the danger of rupture. Hence, all active physical exertion and all extreme excitement should be avoided. The general condition of the patient should be as good as possible, though it is not desirable that he should become excessively stout. The pain must be relieved by opiates or other narcotics, the quantity of which depends upon the intensity of the pain.

Aneurisms sometimes occur in other parts of the body. That is, it is in other arteries than the aorta. Among the most frequent locations is the back of the knee; the large artery which passes from the thigh to the leg runs across the back of the knee-joint, and in this situation is sometimes enlarged. This affection can be readily recognized by the size and shape of the tumor, as well as by its pulsations.

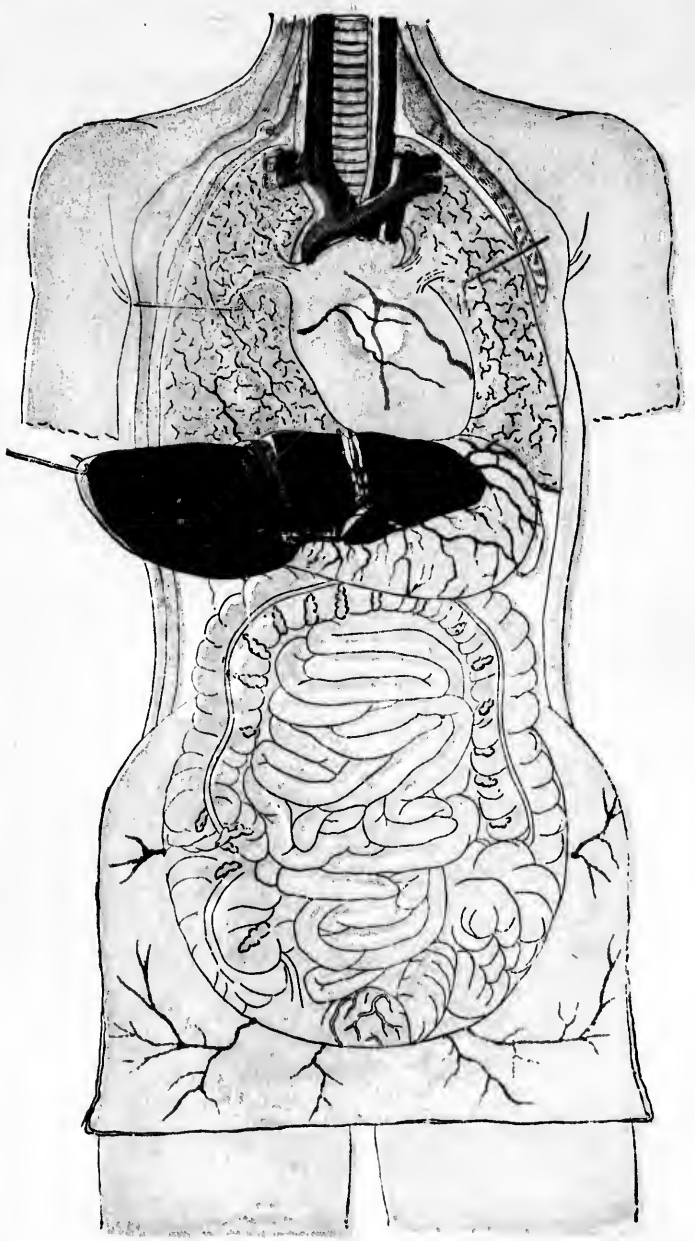
The treatment of an aneurism at the back of the knee is a surgical procedure which should not be attempted by inexperienced hands.

Aneurisms are also liable to occur in the arteries of internal organs, especially of the brain. In these cases it becomes impossible to recognize the nature of the condition, since the symptoms are merely those of interference with the functions of the various organs. The bursting of an anuerism of the brain is a frequent cause of apoplexy.

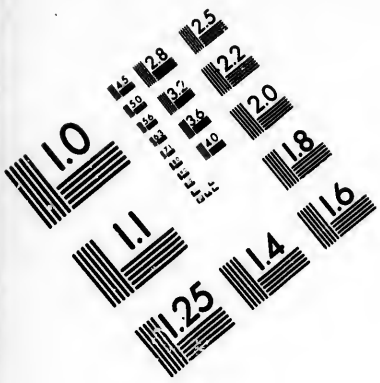
ody. That
st frequent
hich passes
knee-joint,
tion can be
well as by

knee is a
xperienced

of internal
comes im-
the symp-
ons of the
brain is a



DISEAS[illegible]VE ORGANS.



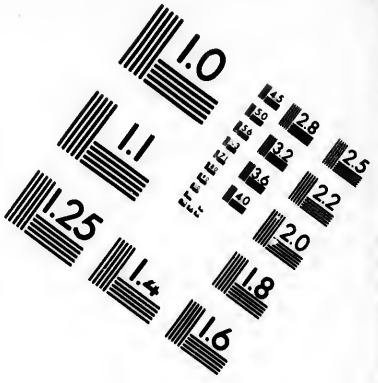
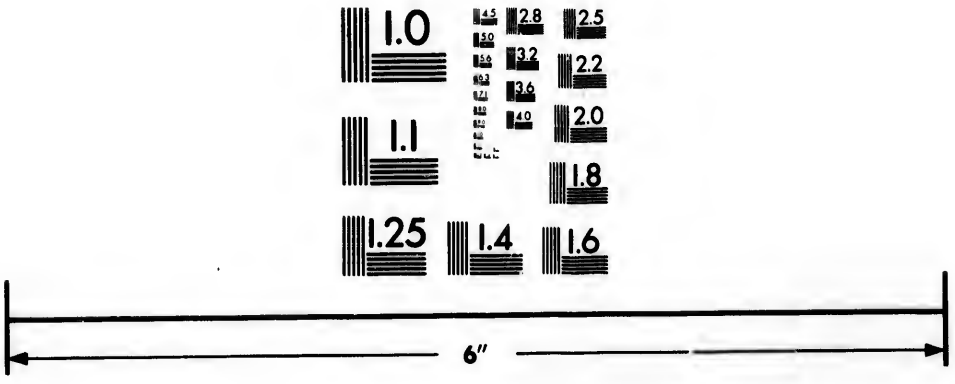
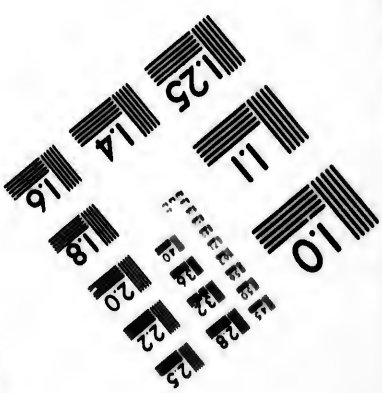


IMAGE EVALUATION TEST TARGET (MT-3)





Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

2.8
2.5
3.2
2.2
3.6
2.0
1.8
1.0

DISEASES OF THE DIGESTIVE ORGANS.

Sore Throat—Pharyngitis.

This is the technical name for what is popularly termed "sore throat." There are, it is true, several varieties of sore throat, some of which are features of the various infectious diseases, scarlet fever, diphtheria, etc. But by pharyngitis we understand a simple inflammation of the mucous membrane in the throat, such as occurs after taking cold. The surface of the throat and back part of the mouth are red and swollen; at first the throat feels dry and parched, and the act of swallowing is accompanied by considerable pain. After a time the throat becomes moistened by the secretion of thick mucus, which occasions constant efforts at expectoration. If the inflammation extends low down into the throat, there usually occurs a short, dry cough; yet so long as the disease does not reach the larynx, the voice is not affeicted, though in the majority of cases the larynx is involved in the inflammation resulting in hoarseness. The tonsils, also, are usually involved in the inflammation, and their surface presents white spots of thickened mucus. These white specks are not ulcers, as is usually believed, but merely the thickened secretion from the mucous membrane. There is usually a slight degree of fever attendant upon such an attack, though the constitutional disturbance is not sufficient to prevent the patient from attending to his usual avocation.

The disease subsides spontaneously in a few days, though it is apt to recur again upon slighter provocation than before, and, indeed, frequently assumes a chronic state. The treatment consists of mild gargles, such as a solution of chlorate of potash, or a little glycerine may be taken into the mouth at short intervals.

Chronic Pharyngitis is a frequent result of the acute form of the disease. After the first attack of acute pharyngitis, the throat will entirely recover its usual condition, but after repeated attacks

there remains a permanent condition of inflammation. In this condition the mucous membrane is reddened and thickened, and often presents on its surface a number of little projections, which are called *granulations*. In other cases the mucous membrane of the throat is smooth, dry and glazed, looking almost as if it had been varnished. In the latter case the patient complains of dryness of the throat, and frequently experiences unpleasant sensations upon swallowing. In other instances the throat is constantly covered with thick, stringy mucus, which is especially recognizable by the patient upon awakening in the morning. In most cases of chronic pharyngitis there occurs, sooner or later, an extension of the inflammation to the larynx, causing a hoarseness of the voice upon slight exertion in speaking or reading.

This form of pharyngitis occurs, therefore, with especial frequency among public speakers, particularly among clergymen, from which fact it has been called *clergyman's sore throat*. Yet it does not seem to be proven that this affection results from over use of the voice, for chronic pharyngitis is really not more common among clergymen than among others of sedentary habits. It is especially common among business men, bookkeepers, salesmen, etc., who are habitually confined many hours a day in close rooms. Such patients also not infrequently suffer from other ailments — dyspepsia, general debility and palpitation of the heart. Yet one point should be mentioned to correct a popular misapprehension: there is no tendency to consumption — as is generally supposed — in a chronic pharyngitis; indeed, it would seem that the subjects of this chronic sore throat rarely become tuberculous.

One of the most serious effects of chronic pharyngitis is the impairment of hearing which so frequently occurs. This results from the fact that the bony channels leading from the throat to the ears (the *eustachian tubes*) are very small, and the orifices leading from them into the throat become closed by the thickening of the mucous membrane; if the air cannot pass readily through these channels the hearing is apt to become impaired. Furthermore, the inflammation itself may extend along these eustachian tubes into the ear, and thus aggravate the impairment of hearing. Hence it has come to pass that patients who complain of deafness are regularly examined to see what the condition of the mucous membrane in the throat is.

C. E. Sajous, Pinxit

Burk y McFetridge Lit Filadelfia

DESCRIPCION DE LA LÁMINA.

FIGURA NO. 1. — Hombre, de 23 años de edad; faringitis aguda.

FIGURA NO. 2. — Hombre, de 44 años de edad: faringitis crónica simple.

FIGURA NO. 3. — Hombre, de 21 años de edad; faringitis folicular.

FIGURA NO. 4. — Hombre, de 67 años de edad; faringitis seca ó atrófica.

FIGURA NO. 5. — Apariencia normal de la faringe, úvula y pliegues palatinos —

e. velo del paladar.

f. Uvula.

n. Pared posterior de la faringe.

o. pilar posterior.

p. pilar anterior.

FIGURA NO. 6. — Hombre, de 23 años de edad; tuberculosis de la faringe.

FIGURA NO. 7. — Hombre, de 28 años de edad; absceso retro-faríngeo; el absceso abierto.

FIGURA NO. 8. — Hombre, de 29 años de edad; ulceracion sifilítica de la faringe y el velo del paladar.

FIGURA NO. 9. — Hombre, de 20 años de edad; adherencia del velo del paladar á la pared posterior de la faringe, siguiendo á la ulceracion sifilítica; perforacion del velo del paladar, permitiendo al paciente respirar por la nariz.

(Copiado con el permiso del que publica la obra del Dr. Cárlos E. Sajous sobre la Nariz y Garganta, Filadelfia, 1888.)

DESCRIPTION OF THE PLATE.

FIGURE NO. 1.—Man, 23 years of age; acute pharyngitis.

FIGURE NO. 2.—Man, 44 years of age; simple chronic pharyngitis.

FIGURE NO. 3.—Man, 21 years of age; follicular pharyngitis.

FIGURE NO. 4.—Man, 67 years of age; dry or atrophic pharyngitis.

FIGURE NO. 5.—Normal appearance of the pharynx, uvula and folds of the palate.

e. Curtain of the palate.

f. Uvula.

n. Posterior surface of the pharynx.

o. Posterior pillar.

p. Anterior pillar.

FIGURE NO. 6.—Man, 23 years of age; tuberculosis of the pharynx.

FIGURE NO. 7.—Man, 28 years of age; retro-pharyngeal abscess; the abscess free.

FIGURE NO. 8.—Man, 29 years of age; syphilitic ulceration of the pharynx and the curtain of the palate.

FIGURE NO. 9.—Man, 20 years of age; adherence of the curtain of the palate to the posterior surface of the pharynx, following syphilitic ulceration; perforation of the curtain of the palate, permitting the patient to breathe through the nose

(Copied with the permission of the publisher of the work by Dr. Charles E. Sajous on the Nose and Throat, Philadelphia, 1888.)

Description of Colored Plate of Throat.

Laryngoscopic Appearance of the Larynx, Normal and Diseased.

FIGURE No. 1.—In abduction.

j. Epiglottis.	*m.* Cartilage of Wrisberg.
r. Ventricular chord.	*d.* Cartilage of Santorini.
f. Vocal chord.	*g.* Inter-arytenoid commissure.
z. Trachea.	

FIGURE No. 2.—In partial abduction. Epiglottis in the form of an omega, hiding part of the larynx.

FIGURE No. 3.—In complete abduction. The depressed epiglottis hiding two-thirds of the larynx.

FIGURE No. 4.—Larynx of a baby.

i^1 Glosso-epiglottic fold.	*g.* Inter-arytenoid commissure.
i^2 Palato-epiglottic fold.	*w.* Oesophagus.
j. Epiglottis.	*y.* Posterior wall of the larynx.
v. Pyriform sinus.	

FIGURE No. 5.—Sub-acute laryngitis. Female, opera singer, 25 years of age.

FIGURE No. 6.—Sub-acute laryngitis. Woman, 47 years of age. Infiltration, threatening œdema.

FIGURE No. 7.—Acute laryngitis. Woman, 24 years of age. Accidental deglutition of liquid ammonia. Spontaneous resolution.

FIGURE No. 8.—Œdema in the larynx. Complete closure of the glottis.

FIGURE No. 9.—Chronic laryngitis. Woman, 36 years of age, opera singer.

FIGURE No. 10.—Chronic laryngitis, complicated with paralysis of the arytenoid cartilage. Male, 28 years of age.

FIGURE No. 11.—Papilloma in the larynx. Male, 22 years of age, stone-cutter. Removed by forceps and the base cauterized with galvanic cautery.

FIGURE No. 12.—Papilloma in the larynx. Girl, 5 years of age. Tracheotomy, and extirpation with forceps and sling.

FIGURE No. 13.—Fibroma in the left vocal chord. Male, 63 years of age. Removed with forceps.

FIGURE No. 14.—Fibroma in the right vocal chord from Mackenzie.

FIGURE No. 15.—Abductor paralysis of the right side, during inspiration. Woman, 48 years of age.

FIGURE No. 16.—Abductor paralysis; abduction and relaxation of right side. Chord shown in cadaveric position and intentional phonation. Woman, 61 years of age. Due to the pression of goitre on right recurrent.

FIGURE No. 17.—Paralysis of thyro-arytenoid muscles. Woman, 35 years of age, singer.

FIGURE No. 18.—Bilateral abductor paralysis of seven years' standing. Male, 47 years of age. Treatment has been fruitless, the patient being unwilling to submit to tracheotomy.

FIGURE No. 19.—Tuberculous laryngitis. Woman 24 years of age.

FIGURE No. 20.—Tuberculous laryngitis. Male 50 years of age.

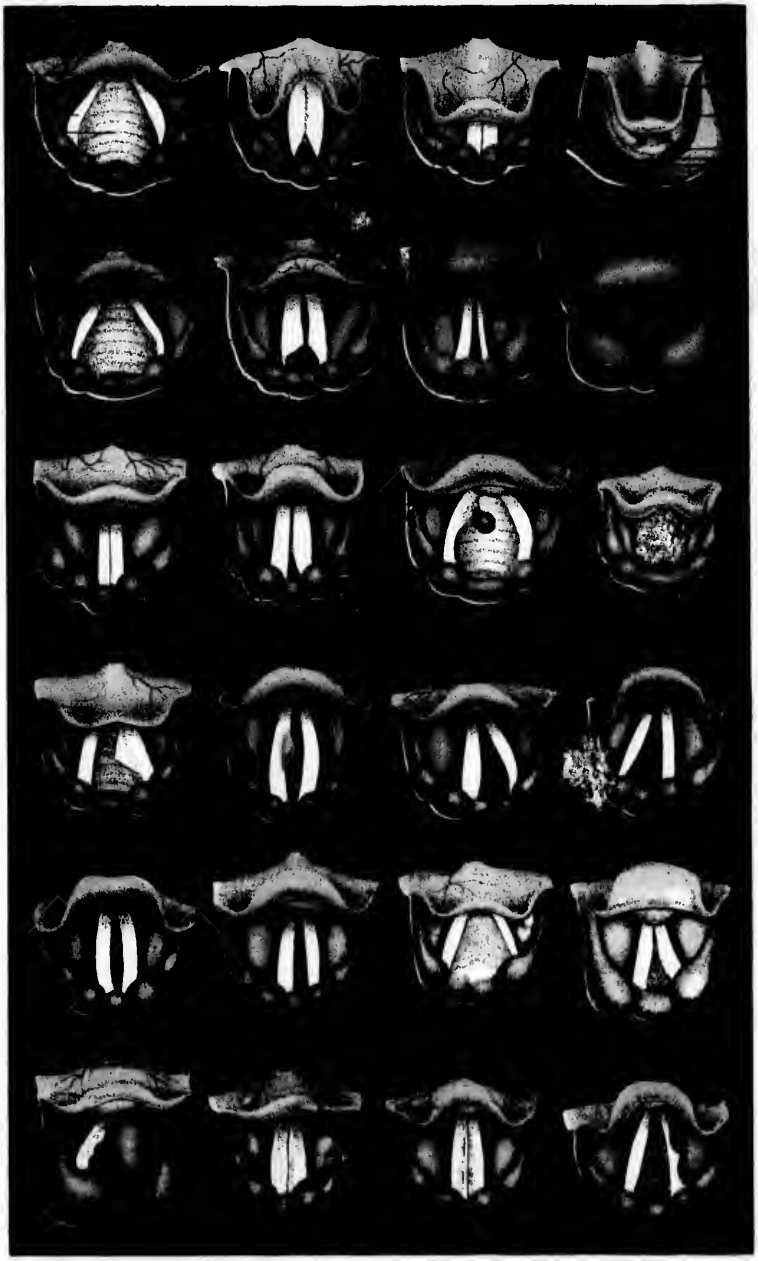
FIGURE No. 21.—Tuberculous laryngitis. Male, 27 years of age.

FIGURE No. 22.—Syphilitic laryngitis. Male, 24 years of age.

FIGURE No. 23.—Laryngitis. Woman, 27 years of age.

FIGURE No. 24.—Cancer of the larynx. Epithelioma on the left ventricular chord from Mackenzie.

(Copied by permission of the publisher of Dr. Charles E. Sajous' work, on the "Nose and Throat," Philadelphia, 1888.)



C. E. Sajous, Pinxit.

Burk y McFetridge Lit. Filadelfia.

DESCRIPCION DE LA LÁMINA.

Apariencia Loringoscópica de la Laringe, Normal y Enfermiza.

FIGURA No. 1. — En abduccion.

j. Epiglotis.
r. Banda ventricular.
f. Banda vocal.
z. Tráquea.
m. Cartílago de Wrisberg.
d. Cartílago de Santorini.
g. Comisura inter-aritenóides.

FIGURA No. 2. — En abduccion parcial. Epiglotis en forma de omega ocultando parte anterior de la laringe.

FIGURA No. 3. — En abduccion completa. Epiglotis deprimida ocultando dos terceras partes de la laringe.

FIGURA No. 4. — Laringe de una criatura.

1^1 Pliegue gloso-epiglótico.
1^2 Pliegue palato-epiglótico.
j. Epiglotis.
v. Seno piriforme.
g. Comisura inter-aritenóides.
w. Exófago.
y. Pared posterior de la laringe.

FIGURA No. 5. — Laringitis subaguda. Mujer, cantante de ópera, de 25 años de edad.

FIGURA No. 6. — Laringitis subaguda. Mujer, de 47 años de edad. Infiltracion; amenazando edema.

FIGURA No. 7. — Laringitis aguda. Mujer, de 24 años de edad. Deglucion accidental de agua de amoníaco. Resolucion espontánea.

FIGURA No. 8. — Edema en la laringe. Cerradura completa de la glotis.

FIGURA No. 9. — Laringitis crónica. Mujer, de 36 años de edad, cantante de ópera.

FIGURA No. 10. — Laringitis crónica complicada con parálisis del aritenóides. Hombre, de 28 años de edad.

FIGURA No. 11. — Papilloma en la laringe. Hombre de 22 años de edad. Cantero. Quitada con fórceps, y la base cauterizada con cauterio galvánico.

FIGURA No. 12. — Papilloma en la laringe. Niña de 5 años de edad. Traqueotomía. Extirpacion con fórceps y lazo.

FIGURA No. 13. — Fibroma (tumor fibroso) en la banda vocal izquierda. Hombre, de 63 años de edad. Quitado con fórceps.

FIGURA No. 14. — Fibroma en la cuerda vocal derecha. De Mackensie.

FIGURA No. 15. — Parálisis abductora del lado derecho, durante la inspiracion. Mujer, de 48 años de edad.

FIGURA No. 16. — Parálisis de abduccion, abduccion, y relajacion del lado derecho. Banda demostrada en posicion cadavérica. En fonacion intentada. Mujer, de 61 años de edad. Debida á presion de papera sobre recurrente derecha.

FIGURA No. 17. — Parálisis de los músculos tiro-aritenóides. Mujer, de 35 años de edad. Cantante.

FIGURA No. 18. — Parálisis abductora bilateral de siete años de duracion. Hombre, de 47 años de edad. El tratamiento ha sido inútil. El paciente no permite que se le haga la traqueotomía.

FIGURA No. 19. — Laringitis tuberculosa. Mujer, de 24 años de edad.

FIGURA No. 20. — Laringitis tuberculosa. Hombre, de 50 años de edad.

FIGURA No. 21. — Laringitis tuberculosa. Hombre, de 27 años de edad.

FIGURA No. 22. — Laringitis sifilítica. Hombre, de 24 años de edad.

FIGURA No. 23. — Laringitis. Mujer, de 27 años de edad.

FIGURA No. 24. — Cáncer en la laringe. Epithelioma en la banda ventricular izquierda. De Mackensie.

(Copiado con permiso del que publica la obra del Dr. Cárlos E. Sajous sobre la Nariz y la Garganta, Filadelfia, 1888.)

The treatment of chronic pharyngitis must usually consist in improving the patient's sanitary surroundings; thus a clergyman will rarely be relieved of the disease until he seek recreation away from his usual round of duties. Yet while reliance must be chiefly placed upon the improvement of the general health, certain benefits can be derived from the application of medicines directly to the inflamed mucous membrane of the throat. These applications can be made either with camel's hair brush or with a fine atomizer; in either case, care should be taken to apply the remedy not only to the sides and back of the throat and to the tonsils, but also to the top or *roof* of the pharynx; this is situated behind and above the soft palate, which hides it from view upon ordinary inspection through the mouth.

The medicines used for this purpose may be alum, tannin, or iodine. Any one of the following prescriptions may be employed:

Iodine, - - - - - -	Ten grains.
Glycerine, - - - - -	
Water, - - - - - -	Each one ounce.

To be applied as a spray or with a brush.

Tincture of the chloride of iron,	
Glycerine, - - - - -	Each one ounce.

Or,

Alum, - - - - - -	Two drachms.
Tincture of myrrh, - - -	One ounce.
Glycerine, - - - - -	
Water, - - - - -	Each four ounces.

This may be used either for application with a brush or as a gargle.

If the patient adopt no other measures for relief than these local applications for the throat, it is scarcely probable that immediate success will be achieved; in such cases it may be well to apply the following:

Nitrate of silver (lunar caustic), - -	Ten grains.
Water, - - - - - -	One ounce.

Apply carefully with a camel's hair brush. It will be well not to resort to lunar caustic until other measures have had a fair trial.

Quinsy.

By quinsy we designate a form of pharyngitis in which the tonsils especially suffer from the inflammatory process. In all cases it is true the tonsils are usually more or less involved in the inflammation; but in many instances they do not occasion any particular symptoms. In the inflammation of the throat known as quinsy, the tonsils become extremely swollen, so that they may indeed meet in the middle of the throat and seriously obstruct the passage of food or of air down the throat. There is usually a certain amount of general disturbance — headache and soreness in the throat — for a day or two before the disease becomes manifest. The symptoms already described as accompanying pharyngitis — pain, soreness upon swallowing, dryness of the throat — are present. In addition there are certain symptoms due to the excessive enlargement of the tonsils. The voice acquires a nasal twang; the patient is often compelled to keep the mouth open in order to get sufficient air for breathing; he is usually unable to swallow solid food, and may even find difficulty in swallowing liquids, which are frequently returned through the nostrils upon an attempt at swallowing. If the patient can open his mouth sufficiently, we observe at the commencement of the disease that the tonsils are red, swollen and dry; a few days later the tonsils and the back part of the mouth are bathed in profuse secretion, which may contain also a little blood. But the important point to be remembered with regard to quinsy is that the surface of the tonsils is frequently covered with a grayish layer, quite suggestive to an inexperienced person of the false membrane of diphtheria. Doubtless many cases of quinsy are for this very reason miscalled diphtheria. It is always easy to distinguish one from the other in this way: if we take a camel's hair brush and gently raise the whitish matter lying upon the tonsil, we find that in *quinsy* it is easily detached, leaving a smooth red surface beneath; whilst in *diphtheria* the grayish material can be raised from the tonsil with considerable difficulty, and when it is thus removed there remains a raw, uneven surface, on which a few drops of blood become visible. It is important that we make this distinction for the benefit both of the patient and of his neighbors. For if the disease be quinsy, we may anticipate a speedy recovery and no spread of the disease; while if it be

diphtheria, we must take the best care of the patient and prevent the communication of the disease to others in the vicinity.

The constitutional symptoms accompanying quinsy are often more severe than we would expect from the insignificance of the local disease in the throat. The fever is often very high, there is great headache, and pain in various parts of the body; there may occur also a decided chill and vomiting. The patient is greatly prostrated, a fact which becomes evident during convalescence, for even after the throat difficulty has subsided he remains for several days unable to resume his usual employment.

The disease appears to result from simple exposure to cold; it is most frequent in young persons and during the changeable weather of spring and fall. If the inflammation be severe, and the swelling of the tonsils extreme, matter may be formed in the tonsils; in many instances it becomes necessary to give exit to the matter thus formed by an incision into the tonsil. This operation, slight as it is, should not be performed by any but a professional hand, since it is easily possible, by a little awkwardness, to occasion serious damage.

Treatment.—The patient who has the disease for the first time will not, of course, recognize its nature until the tonsils have become swollen and sore, and may even then remain in ignorance of the true nature of the complaint. Many individuals, however, suffer repeatedly from quinsy, and usually know what they are to expect a day or two before the throat affection has become prominent. During the premonitory stage—that is, before the fever has become high — much good may be done by simply provoking profuse perspiration. To accomplish this the patient should take a hot foot bath in the evening before retiring, covering himself meanwhile with a blanket or comforter; after fifteen or twenty minutes, free perspiration will be excited, upon which the patient's skin may be carefully dried, and he should be warmly covered in bed; at the same time ten grains of Dover's powder may be administered. So soon as the inflammation has been developed in the throat, a gargle should be employed, either the chlorate of potash, or alum and myrrh, as stated above. If it can be accomplished, the most satisfactory results will be obtained from the inhalation of steam. If there be no steam atomizer at hand, it will be a simple matter to arrange a tube so that the steam issuing from a kettle of boiling water can be conducted into the patient's throat. If the patient be

a child, and therefore unmanageable, the steam may be conducted into a tent surrounding the bed. The throat may be enveloped in cloths wrung out in hot water, or in light linseed poultices.

An important item in treatment is to sustain the patient's strength by nourishing food, which must, of course, be liquid. Milk is the staple article of diet, reinforced, if necessary, by whisky or brandy. It may be necessary also to administer the following prescription:

Sulphate of quinine, - - -	30 grains.
Tincture of the chloride of iron, -	Half an ounce.
Water to make two ounces.	

Mix; take a teaspoonful in water every four hours.

Mumps.

This is an inflammation of one of the glands which secrete saliva—the *parotid gland*, situated at the angle of the jaw, just below and in front of the ear.

Symptoms.—The disease frequently begins with a slight chill and a feeling of general indisposition; within a day or two a perceptible degree of fever occurs, though this seldom attains a high degree of intensity. At this time the patient feels a certain tenderness at the angle of the jaw, which becomes quite painful during the act of chewing. This part of the face is swollen, tender and may be red; if the swelling be extreme, the patient is unable to take any solid food, and may find difficulty even in swallowing liquids. The swelling usually subsides in four or five days, by which time the other symptoms have disappeared; yet it is not unusual for the little patient, while still congratulating himself on his recovery, to find that the other side of the jaw is becoming similarly affected. In some instances, indeed, both sides may be attacked simultaneously, or one may be followed a day or two after the other. The disease always results in recovery, and is rarely complicated by the formation of matter within the gland; yet it is stated that mumps not infrequently induce an inflammation in the genital organs of male or female. Undoubtedly instances are known in which such inflammation has ensued upon an attack of mumps; yet it seems scarcely established that the latter causes the former.

The disease seems to attack, most frequently, individuals between 20 and 30 years of age, though it may occur at any time previous to this period, and is not infrequently observed before puberty. Males are more frequently affected than females, and one attack of the disease seems to secure protection against subsequent seizures.

Although mumps affect primarily and chiefly the parotid gland, it appears to be not merely a local, but also a constitutional disease. There seems but little doubt, moreover, that it is a communicable disease, which may indeed at times become epidemic. It is especially during these epidemics of the disease, that the cases are observed in which the disease is followed by a swelling of the testicle in the male, and of the breast in the female.

Treatment.— The only treatment required is the palliation of the pain, which is often very severe. The application of cloths wrung out in hot water, or of linseed poultices, frequently changed, will usually relieve the severity of the pain. If the painful feeling be felt especially in the ear, it may be well to syringe the ear gently with warm water three or four times a day, yet there is no danger that the ear itself is involved in the inflammation. The use of mild liquid diet — milk and soups — completes the care necessary during this disease.

Ulcerated Sore Throat.

This term is rarely used by physicians, but is popularly employed to designate several different affections.

The first of these is merely a severe form of "sore throat," or *pharyngitis*, already described. If the inflammation be very severe, ulcers are formed on the tonsils and at the back of the mouth. These raw spots usually heal, under the treatment recommended for sore throat; if they remain ulcerated, they must be touched either with a pointed stick of lunar caustic, or with the following solution:

Lunar caustic, - - - -	Forty grains.
Water, - - - - -	One ounce.

A camel's hair brush should be dipped in this liquid, and applied to the raw spots once a day.

Ulcerated sore throat is often caused by *syphilis*. Ulcers appear in the throat, on the tonsils, on the gums and on the inner surfaces of the lips. A description of this affection, and directions for treatment will be found in the chapter devoted to the subject of syphilis.

A third form of ulcerated sore throat results from tuberculosis or *consumption*. In some cases the affection of the throat occurs a considerable time before the lungs are visibly affected. The nature of these ulcers can be recognized only by an experienced physician.

DISEASES OF THE STOMACH.

Inflammation.

Acute inflammation of the stomach occurs almost exclusively as the result of irritation caused by matters taken into the stomach; thus it often occurs as the result of attempts at suicide, in which individuals swallow corrosive substances, such as large doses of arsenic. A more frequent cause, however, is the swallowing of alcoholic stimulants; the derangement of the stomach which follows a debauch is usually an attack, more or less mild, of acute inflammation; it may also follow excessive indulgence in the pleasures of the table, though in this case it amounts to but little more than a mild catarrh.

While the acute inflammation of the stomach alone is thus a comparatively rare affection, an acute catarrh involving the stomach and the upper part of the small intestine is a frequent incident, attributable to indulgence in food of improper quality or quantity; this catarrh is the condition commonly termed "biliousness," and will be discussed hereafter.

An acute inflammation of the stomach occasions intense burning pain in the region commonly termed the "pit" of the stomach; this pain is increased during breathing, so that the patient often carefully avoids any movement which would require more active breathing. But the most prominent symptoms are violent and obstinate nausea and vomiting, the stomach rejecting everything, even water in small quantities; the matter vomited is thick and ropy, of a yellowish green color and bitter taste; there is often, also, blood to be seen. There is usually intense thirst, and the patient constantly gratifies it by drinking water or other liquors, although he knows that this act will be followed by painful vomiting.

The constitutional symptoms, also, are severe. While the fever may not be very intense, yet the patient's countenance exhibits great depression and anxiety. The skin is usually at first warmer than natural, though it may be later cool and clammy. The disease is usually fatal within a few days. The acts of vomiting become more frequent and exhausting, the matter ejected resembling coffee-grounds, an appearance due to the large admixture of blood. In the latter days of the disease, violent hiccough becomes a prominent symptom. If the patient ultimately recover, the convalescence is slow and protracted, and the stomach usually remains extremely susceptible for a long time afterward.

Treatment. Acute inflammation of the stomach will probably never be met by the reader, except as the result of attempts to destroy life by swallowing poison, or by the accidental introduction of poisonous substances into the stomach; the treatment of such cases will be discussed at length under the head of *poisons*. It may suffice to say here, that the first object is always to remove the offending substance from the stomach, and that this can be done best and quickest by the use of the so-called "stomach pump." This consists merely of a rubber tube, one-half or three-quarters of an inch in diameter, which is introduced through the mouth and œsophagus into the stomach, and thus constitutes a channel whereby the stomach can be thoroughly washed out. In this way, by the use of large quantities of warm water, the poisonous matters may be rinsed out of the stomach, and any medicines which may be deemed necessary can be applied. Although the introduction of this tube into the stomach is a comparatively easy and simple procedure to one who has been properly instructed, yet it is a somewhat formidable and dangerous operation in the hands of an inexperienced person.

Aside from the use of the stomach pump, comparatively little can be done in the treatment of acute inflammation of the stomach. To quench the intense thirst small pieces of ice may be held in the mouth, or minute quantities of ice water may be swallowed at short intervals. An opiate should be administered preferably as one-eighth of a grain of morphine injected under the skin. If this be impracticable, the same quantity may be placed dry upon the tongue, where a certain amount of it will be absorbed. A mustard plaster or a light Spanish fly blister may be placed over the stomach, with the hope of relieving the vomiting; but *nothing* should be administered by the mouth except the small pieces of ice or quanti-

ties of ice water, as already mentioned; for during the acute inflammation, nothing will be retained by the stomach, and any attempt to introduce substances, no matter how bland and unirritating, will merely aggravate the already obstinate vomiting.

The patient's nourishment must be provided for by injections into the rectum. For this purpose several preparations are recommended, the best perhaps being a mixture of milk and beef tea or broth in equal parts. If the patient's strength be failing, a tablespoonful of whisky may be added to this mixture and administered every two hours.

Chronic inflammation of the stomach may follow the acute affection, but is more frequently the result of long-continued errors of diet. It is especially apt to occur in habitual drinkers, but may also be found in those addicted to excesses in diet. In the earlier stages it is indicated by tenderness over the region of the stomach, and by a tendency to vomit after meals. There is usually considerable pain, too, during the first half hour or hour after the consumption of food. In the later stages it becomes merged into the condition popularly known as "dyspepsia," which is really in many cases merely a symptom of a chronic inflammation of the stomach.

The treatment consists chiefly in the regulation of the diet, especially in the avoidance of excessive consumption of food. The diet should consist only of bland articles of food; in obstinate cases the habitual use of *kumyss* is found extremely beneficial. In general, the diet may consist of milk, eggs, rice, oatmeal, and similar articles of food. Heat, alcoholic stimulants, and all highly-seasoned food should be avoided. It will be, also, found advantageous to take food in small quantities and at shorter intervals than usual, so that the patient partakes of food five or six times per day. But few medicines can be used with profit in this affection; subnitrate of bismuth may be taken in twenty-grain powders half an hour before eating.

Ulcer of the Stomach.

This is one of the most obstinate and troublesome of the many diseases affecting the stomach, as well as one which is often difficult to recognize. In the most troublesome cases, which often end

fatally, there is found to be a hole in the wall of the stomach, round and clean cut as if made with a punch. This ulcer may vary in size from that of a pea to that of a silver dollar. So long as only the inner coats of the stomach are eaten through, the disease involves no danger to life, except from long-continued impairment of digestion; the chief danger lies in the possibility that the ulcer may eat through the outer coat of the stomach, opening, therefore, into the cavity of the abdomen, and permitting the food and other contents of the stomach to escape into the abdomen. The result of this accident is a fatal inflammation in the abdominal cavity, *peritonitis*.

Symptoms. — The most prominent symptoms are pain, tenderness on pressure over the stomach, vomiting after eating, and the escape of blood with the vomited matters. The pain is usually of a gnawing or burning character, beginning very soon after food has been taken into the stomach, and continuing until the food has escaped from this organ, either into the intestine, or has been ejected by vomiting. The pain then usually ceases, to begin again so soon as more food is taken into the stomach. Sometimes pain is felt not only in the region of the stomach, but also in the back, between the shoulders.

Vomiting is a quite constant symptom, occurring a short time after food has been taken. The act of vomiting is not usually preceded by much nausea, but is followed by marked relief from the pain. The vomited matter usually contains some blood, and at times a quanty of bright red blood may be ejected with the food; indeed, alarming, and even fatal, hemorrhage has been known to occur immediately after food has been taken into the stomach. This symptom — the vomiting of blood very soon after food has been swallowed — is especially characteristic of this affection. It will be noticed, too, that the vomiting and the quantity of blood ejected vary considerably with the kind and quantity of food taken. Indigestible and highly-seasoned articles are more likely to provoke the stomach to vomiting and to cause the appearance of blood than bland substances, which are easy of digestion. Hot food, too, is not so well borne as cold articles.

Sometimes it happen that, although but little blood is present in the vomited matters, a considerable quantity may be passed with the stools. In this case the blood is black and tar-like, so that the nature of the substance may not be suspected.

Cause.—There are two or three varieties of ulcer of the stomach, which may be traced to different causes. It is not necessary to explain the somewhat complicated processes by which ulcers are formed in the stomach. It may suffice to say, that the disease occurs most frequently in women, especially in those of feeble constitutions; an especially large number of cases have been noted among young female servants.

Ulcer of the stomach may ultimately recover; in fact this termination is believed to occur in a large majority of cases. On the other hand the disease may prove fatal in any one of several ways: death may occur from profuse hemorrhage; or from perforation of the coats of the stomach, causing peritonitis; or the patient's strength may be ultimately exhausted, because he is unable to retain sufficient food upon the stomach to nourish his body; in this case he dies therefore of starvation.

The duration of the disease is very uncertain. Death may take place from hemorrhage, or from perforation, within a few weeks after the commencement of the ulcer; on the other hand, if these accidents do not occur, the disease may last for many months or even years. Flint reports a case in which an ulcer existed for thirty-five years, and instances of shorter duration than this are not uncommon. In some cases recovery occurs either spontaneously or under treatment; in others the symptoms disappear for a time, but subsequently return.

Treatment.—The most important object of treatment is to give the stomach as much repose as possible. This object can be secured, if at all, by the regulation of the diet. It is important, of course, that the patient be properly nourished, while at the same time all unnecessary irritation of the stomach is to be avoided. For this purpose the bland and sole articles of food, liquid when possible, are to be employed — milk, eggs, arrow root, jellies, etc.; and if necessary, the patient can live for a considerable time on milk or kumyss. Solid and indigestible food, meat, sugar, spices, alcoholic stimulants, should be avoided. In this disease it will be found advantageous to administer food in small quantities at short intervals; for in this way there will be less probability of provoking vomiting.

Yet cases are found which obstinately resist all attempts to secure repose for the stomach; the blandest articles of food, even cold water itself, provoke vomiting and pain; in such cases there is

still a resort which has been successfully employed in many instances otherwise unmanageable: The patient can be nourished entirely for weeks or months by the injection of food into the rectum, nothing whatever being taken into the stomach, and only small pieces of ice being held in the mouth. In such cases there is apt to come a time when the rectum becomes so irritable as to eject all food. In these cases the patient must of course be nourished again through the stomach, and it will be found that after a rest of a month or two the stomach has become far less irritable than before, so that the patient can now be sustained by a careful diet without provoking pain or vomiting. An instance of this sort is quoted by Prof. Flint, as follows: The patient was a female, age 26. She appeared to vomit everything taken, a few moments after eating; circumscribed tenderness existed over the stomach; she was emaciated, feeble, and had been confined to the bed for three months; purulent matter (pus) was ejected from the stomach with the food, and sometimes by itself. Severe pains were referred to the region of the stomach. Remedies, as well as food, being quickly vomited, Dr. Pierce proposed to her to submit for a month to entire abstinence as regards food by the stomach, and to try the plan of taking nourishment by injections into the rectum, to which she assented. A half pint of good lamb or mutton broth was injected every three hours. For the first week she took by the mouth, several times a day, a tenspoonful of gum arabic or pure water, but after the first week this was discontinued. The skin over the stomach was blistered and the surface sprinkled with morphine. During the first week vomiting of pus occurred several times daily, but during the three following weeks it was diminished, and she was in all respects more comfortable. It was resolved to continue the plan for another month. The vomiting of pus occurred during this month only occasionally, and the improvement continued. It was agreed to continue the plan for still another month. The improvement still progressed rapidly, and by the middle of the month all evidence of stomach disease had disappeared. She began, before the month ended, to take a little water and mucilage. She had gained in flesh and strength during this plan of treatment. On returning to the introduction of food by the stomach, the symptoms did not return, and two years afterward the patient was in the enjoyment of excellent health.

In order to arrest hemorrhage, small pieces of ice may be swallowed, and lumps of ice wrapped in cloth may be applied over

the stomach. If the bleeding still continues, twenty grains of tannin, or half a teaspoonful of the tincture of ergot, may be given; yet little reliance can be placed upon these measures, since vomiting usually occurs when the blood escapes into the stomach.

To relieve pain, opium in some form should be used, the best form being the hypodermic injection of morphine, beginning with one-eighth of a grain in ten drops of water.

Dyspepsia.

This term is popularly used to designate almost all the chronic ailments of digestion, and there is accordingly the greatest diversity of symptoms presented by different cases, all of which may be designated dyspepsia. Thus an attack of acute indigestion, such as follows excessive indulgence in food or stimulants, is called dyspepsia; while on the other hand, the group of unpleasant symptoms which are apt to occur after eating in brain-workers is also called by the same name. For our purpose it will be well to describe, under the head of dyspepsia, two distinct conditions — *acute* and *chronic indigestion*.

Acute indigestion may be occasioned by gormandizing, by taking indigestible articles of food into the stomach, by excessive mental emotion, bodily fatigue, etc. The disorder is indicated by a feeling of fulness, weight, and pain over the stomach, which continue until nausea and usually vomiting occur. The bowels are at first constipated, but subsequently become relaxed. Meanwhile there is some fever, and dull, aching pain in the head, constituting what is ordinarily known as "sick headache." For several days after these prominent symptoms have subsided the patient suffers from general indisposition, bitter taste in the mouth, and impaired appetite.

In other cases the difficulty is not traceable directly to errors in diet, but seems to occur as the result of taking cold. In these cases there is less pain and uneasiness in the stomach, but the feeling of nausea is usually greater, and the headache is very severe The matter vomited is greenish or yellowish in appearance, and has a bitter taste — it contains, in fact, the bile. The tongue is heavily

coated, and the patient has a bitter taste in the mouth; the face is often sallow, the bowels are usually constipated.

This is the condition popularly known as "biliousness," and is really a catarrh of the stomach and the upper part of the small intestine; when the headache is so severe as to be the most prominent symptom, this affection, like the other form of acute indigestion, is called "sick headache."

Treatment. — If the symptoms be caused by errors of diet, but little is necessary beside abstinence from food for twenty-four hours; the prevalent practice of dosing such patients with cathartics and emetics certainly does not hasten recovery. All that is necessary is to give the stomach a rest and a chance to recover from the effects of the abuse to which it has been subjected. If the patient must take medicine, he may have some alkaline water, magnesia, or the bicarbonate of sodium.

The treatment of a so-called "bilious attack" is somewhat different. In these cases it is well to administer a cathartic so soon as the vomiting has subsided a little. For this purpose three grains of blue-mass combined with ten grains of the bicarbonate of sodium may be given at night, and followed the next morning by some citrate of magnesia; or, instead of the blue-mass, one fourth of a grain of podophyllin (May-apple) may be given at night. A bilious attack can often be warded off at the appearance of the first symptoms. To accomplish this the patient should restrict his diet to a small quantity of food of a bland character, and should take the blue-mass and soda at night, as recommended above. If this be done when the headache and feeling of nausea are just beginning, it is often possible to escape the subsequent symptoms of an ordinary attack.

Chronic Indigestion.

The various conditions grouped under the general term *dyspepsia* are but different forms of chronic indigestion.

Symptoms. — A description of the symptoms of dyspepsia may seem superfluous to many, since the disease is so prevalent throughout the country; yet the fact is, that this term is so loosely employed that it is made to cover almost any difficulty of the

stomach. The symptoms vary largely with the cause of the disease, and with the general health of the sufferer. They may be described in general as, *first*, those which proceed directly from the stomach difficulty; and *second*, those which result from the impaired nutrition of the body.

In most cases of dyspepsia both sets of symptoms are combined; the patient suffers perceptibly during process of digestion, and his general health suffers evidently from the imperfection of his digestion. While this combination of symptoms is the rule, instances occur in which only the local symptoms are present. That is, the patient suffers distress after taking food, but his general health remains unimpaired.

Of all dyspeptics it may be said that they *feel the stomach*. The healthy individual has only a vague idea as to the existence or location of the stomach; the dyspeptic is always conscious of the existence and of the exact location of this organ. He does not, it is true, always experience pain in the stomach; but he has always a dull, heavy sensation, especially upon rising in the morning. The patient is apt to awaken with a bitter taste in the mouth; he has a dull, heavy pain in the head, and but little inclination for food. Often there is a discharge of considerable phlegm from the throat upon rising. There is a general lack of vigor and energy, an indisposition for exertion, physical or mental; the face gradually becomes pale and sallow, the eyes sunken, the body somewhat emaciated; yet the abdomen is usually quite full, being distended with gas in the stomach and intestines. The derangement of digestion is soon followed, naturally, by derangement in the action of the bowels; the general tendency is to constipation, though this is often interrupted by transient attacks of diarrhea. After the continuance of dyspepsia for some time, there often occur symptoms which indicate difficulty in other organs than the stomach; thus, there is often an obstinate troublesome dry cough, and perhaps even palpitation of the heart, which may mislead the patient into the belief that he has heart disease.

There are certain symptoms which appear quite prominently during most cases of dyspepsia, and which are of importance as enabling us to distinguish dyspepsia from other diseases of the stomach. Among these symptoms is the habit of bringing up liquids from the stomach into the mouth. This act — technically termed *regurgitation* — may occur at any time, but is especially

frequent immediately after eating, and after long fasting. The materials thus brought up into the mouth vary somewhat, but are usually quite sour, and even scalding to the throat. At other times large quantities of gas will be belched up — an almost characteristic symptom of dyspepsia. This gas may be merely sour to the taste, or if it be expelled during digestion, may have various unpleasant odors, even that of bad eggs. These gases indicate that the food is undergoing putrefaction and not digestion. Sometimes these expulsions of gas are accompanied by the ejection of a sour or salty liquid into the mouth. This occurs especially when the stomach is empty, and therefore in the morning, and is known as *water brash*.

Another symptom of dyspepsia is what is popularly termed *heart-burn*. This consists of pain over the stomach, of a gnawing or burning character, gradually spreading into the breast, and seeming to the patient to involve the heart. This symptom seems to depend upon the presence of an acid liquid in the stomach, for it can be at once relieved by taking an alkali, such as baking soda. Another symptom, which is often quite distressing, is a distention of the stomach with gas. This gas is produced by the decay of food in the stomach. The result is a decided fullness of the abdomen, which may become so great as to interfere with breathing, and to embarrass somewhat the action of the heart, causing palpitation. This is especially apt to occur in females, and in them may be accompanied by painful contractions of the intestines. The habitual distention of the stomach with gas occasions in some individuals a peculiar splashing sound whenever liquids are taken upon an empty stomach, a sound which is often heard in horses. This feature of the case, while occasioning no physical distress, is the source of much mortification, especially to women. It may usually be avoided by swallowing only small quantities of liquid at a time.

Dyspepsia is not usually accompanied by vomiting — a point whereby it may be distinguished from certain other disorders of the stomach, such as chronic inflammation and ulcer. There are times, it is true, when the condition of the stomach becomes aggravated by some error in diet or neglect of personal care; at such times the individual may suffer from repeated nausea and vomiting. As a rule, however, while there may be large quantities of gas and liquid expelled from the stomach by the act of belching, yet there

rarely occurs any genuine vomiting, or even nausea. Exception must be made to this, however, in a certain form of dyspepsia confined almost exclusively to young females. In these cases the vomiting is obstinate and constant, so that the patient seems to be in danger of death from starvation. In consequence of the violence of the vomiting, there may be at times a few streaks of blood in the ejected matter. Indeed, the symptoms may simulate very closely those of ulcer of the stomach, for which the disease has been mistaken. This variety of dyspepsia must be distinguished from the usual forms; it seems to be largely dependent upon a hysterical element in the patient—a point of importance with regard to treatment.

Among the second class of symptoms—those associated with other organs than the stomach—the most prominent are perhaps the mental disturbances, for dyspeptic patients seem unusually languid and dull, not only during the somewhat painful process of digestion, but also at other times. "There is great languor and incapacity for exertion, coming on generally about an hour after food, and accompanied in some cases by an almost irresistible drowsiness, which lasts for several hours. This symptom is particularly marked in the afternoon, if the patients dine in the middle of the day, and endeavor to continue their employment afterward. Yielding to the drowsiness and taking a siesta seem to make matters worse, for there is usually felt after such an indulgence an intense headache or giddiness, which continues longer than the symptoms would have done had the inclination to sleep been resisted. The depression of spirits is not so remarkable as the feeling of utter helplessness, both of mind and body, accompanied, in persons naturally active, with a sense of shame at their unwonted apathy."—*Chambers*. This dullness and languor are apt to be followed by some general impairment of the mental faculties, which is often indicated by the patient's nervous anxiety about his health, and his disposition to magnify the importance of every unfavorable feature, however slight. As the disease progresses, other symptoms are added to these of mental disorder. The action of the bowels becomes very irregular; the skin becomes rough and dry; the sleep is unsatisfactory and disturbed by dreams; the patient often rises in the morning quite wretched and miserable; and not infrequently a dry cough is added to the other annoyances of the patient.

Cause.—The popular idea that dyspepsia is always and necessarily the result of errors in diet, is not warranted by the facts. Doubtless in many cases the disease can be traced directly and positively to excesses in eating and drinking; but to induce the disease the food need not be excessive in quantity, if the quality be improper. Not the least frequent cause of dyspepsia is the abuse of spirits, resulting first in inflammation of the stomach and then in dyspepsia. This variety of dyspepsia has been described as the "remorse of a guilty stomach."

There are various departures from health which indirectly induce dyspepsia. Among these are mental causes — long continued anxiety and depression; the excessive and continuous mental effort of professional or commercial pursuits. So, too, a combination of mental worry and physical fatigue, of bad air and insufficient food, sedentary habits — these are merely instances of the cases which may ultimately develop dyspepsia. Other causes, which may be easily overlooked, may be found in the absence of teeth — more than one obstinate cause of dyspepsia which has resisted all manner of treatment, has promptly recovered upon the substitution of artificial teeth for decayed stumps; doubtless the peculiarly American habit of bolting the food half masticated is also responsible for much of the dyspepsia so prevalent in our country. That simple excessive quantity of proper food can induce dyspepsia is not denied; but it is equally true that very many high-livers and professional epicures escape the disease entirely.

Treatment.—In the treatment of dyspepsia the first consideration is to determine, as accurately as possible, the *cause* of the difficulty. It is quite irrational and impossible to prescribe any treatment "for dyspepsia" which will be valuable in all cases. For in some instances we have to do with the results of improper modes of eating and the use of improper food; in other cases we have, in a case of dyspepsia, merely the case of mental worry and exhaustion. In some instances, therefore, the dyspepsia is merely an incident to the depressed condition of the body generally, and in such cases the treatment should be directed to the restoration of the health without especial attention to the stomach itself. In other instances the disease is evidently the result of inflammation of the stomach, and the treatment must consist of measures intended to improve the condition of this organ. Generally speak-

ing, we may say that measures of treatment in all cases may be divided into three classes: *First*, those relating to the regulation of food; *second*, those addressed to the general condition of the patient; and *third*, medicines.

If the dyspepsia be apparently the result of errors or excesses in diet, the stomach should be rested by restricting the food to reasonably small quantities of easily digested food. Yet it is important that the patient should not go to the other extreme, as he is so often inclined to do. Many individuals doubtless derive a certain moral benefit by thus doing penance for their previous excesses; but the effect upon the body is rather disastrous, if the quantity of food be suddenly reduced from excess to a starvation or slop diet. Indeed many cases of dyspepsia occur in persons who have acquired the idea that they should live upon coarse food in small quantities. Not a few of those who follow out some hobby of this sort become victims to dyspepsia, which they fondly believe attacks only epicures.

"As regards the diet for dyspeptics, there are no rules suited to all cases. Individual experience in each case is to be a guide. But there is a liability to error in regard to this experience. Unusual difficulty or disturbance of digestion after a meal is often imputed by the patient to certain articles of food, when it was due to some other incidental circumstance. Peculiarities in relation to particular articles of food are far less common than the statements of patients would lead one to suppose. In general, articles which are wholesome to most persons, are not unwholesome to any. It is rarely true that what is one man's meat is another's poison. As a a rule, when a patient says that he cannot take such and such articles, which general experience shows to be digestible and nutritious, it is fair to presume that he is deceived, and of this the patient may generally be convinced, if he be persuaded to persist in their use. At first the expectation that an article will prove hurtful, contributes to render it so; but after a time the idea is overcome; it is often an object in the treatment of dyspepsia, to do away with these fallacious ideas respecting various kinds of food. Some persons seem to be fond of encouraging the notion that their digestive organs are endowed with peculiar susceptibilities which prevent them from conforming to general rules of diet. In most cases of dyspepsia animal food is best digested, especially old and tender meats plainly but well cooked; but in some cases a milk and

starchy diet is found to agree best. An obvious reason why so many persons imagine they do not digest milk well, is that it is generally taken as a beverage after or with solid food, the fact that it is in effect a solid article of food not being appreciated. Bread to be readily digestible should not be new, nor is it desirable when stale. Well boiled rice and corn meal mush are easy of digestion. Crude vegetables are apt to be digested with difficulty in cases of dyspepsia, but not invariably; some dyspeptics find the much abused cucumber grateful to the stomach as well as to the palate. Pastries, rich puddings and sweetmeats, are generally to be eaten sparingly or discarded. Ripe fruits in moderation are useful. It is generally not advisable for the patient to limit himself to a restricted range, or to adopt any particular system of diet; on the contrary, he should persevere in attempting to digest all the varied forms of wholesome food, not confining himself to meat or a vegetable diet, but aiming to eat like persons in health, without the need of particular care in the selection of food."—*Flint*.

It is also advisable that the meals should be taken at regular intervals, and in most cases it will be found more agreeable for the patient to take food at least four or five times a day, including a light supper shortly before retiring. It follows, of course, that if food be so frequently taken, the quantity should be proportionately less at each meal. It is a general principle, that in dyspepsia the appetite is not a reliable guide as to the quantity of food required; for, in many instances, there is a craving for more food than can be digested.

The most readily digested articles are, among meats, beef, mutton, chicken, turkey; roast, stewed or steamed oysters — not raw nor fried. Young vegetables generally are desirable. As to the use of spirits, certain care must be exercised, though it will generally be found beneficial to take an ounce or two of claret, or other light wine, with the meals. Tea and coffee, especially the latter, are best avoided, unless the patient has become inseparably attached to their use; even in this case the quantity may usually be diminished. Yet it may never be forgotten that the object in dieting a dyspeptic patient is not to have him live upon just as little food as will support life, but simply to give him such food and at such times that he can readily digest it. Hence *under-feeding* is to be avoided as carefully as *over-feeding*.

Another important object in the treatment of dyspepsia is to provide for proper exercise in the open air. On this point, too, the

general impression and the usual practice of dyspeptics is incorrect and injurious. An individual who finds himself dyspeptic usually ascribes the affection to over-eating, and endeavors to counteract the effect by indulging in unusual and violent exercise. He begins to take long walks, to exercise with the health-lift, or perhaps indulge in still more laborious exercise. This is carrying matters to an extreme, which is doubtless more injurious than even a complete abstinence from exercise. This is especially so if, as so often happens, the patient, while performing this increased amount of work, diminishes at the same time the amount of food taken. Certainly, exercise in the open air is desirable for a dyspeptic patient as well as for other individuals. It tends to recruit the system and to improve the general health; but such exercise should never be carried to exhaustion.

One of the most valuable restorative means in dyspepsia, as in other chronic complaints, is a change of scenery and of employment. It may not be necessary to take a formal vacation and a long journey, since the same benefits may accrue from relaxation and amusement.

Much good may accrue, also, from the moral treatment of patients by securing the sympathy and confidence of the sufferer. It is doubtless true that many dyspeptics, especially those who have suffered long, indulge in many imaginary complaints and conjure up many symptoms and fears which have no foundation in fact or experience. The tendency among the friends, and even on the part of the physician, is, therefore, to ignore or even to ridicule the complaints of the patient, and to make light even of those symptoms which are genuine evidences of the disease. The patient need not be humored in all his vagaries, but can be instructed that his mental state is largely due to the disordered condition of his body. By securing his confidence, we may not only divert his attention from many needless fears, but may also secure a hearty co-operation in the measures recommended for his relief. It has been observed that when dyspeptic individuals dine alone, they are very prone to employ themselves in watching minutely all the sensations connected with the process of digestion, and to interpret as unfavorable as possible the slightest indication of unhealthy action. By keeping the mind pleasantly occupied during digestion, as well as other times, the patient is rendered less morose, and positive good is accomplished in the treatment of the disease.

The use of drugs, although perhaps the least important part in the treatment of dyspepsia, is nevertheless a matter of some consequence. For much may be done to relieve some of the most distressing symptoms of this affection. The distension of the stomach with gas can often be at once relieved by the administration of *charcoal*, either in powder or in the shape of wafers prepared for that purpose. This effect may also be induced or assisted by the oil of cajeput, two or three drops of which may be dropped upon a small lump of sugar and swallowed. This is especially useful if the distension of the stomach be accompanied with pain, as is so often the case. Instead of the cajeput, the following mixture may be given :

Bicarbonate of sodium, - - -	One drachm.
Compound spirits of lavender, - -	One ounce.
Spirits of camphor, - - - -	Two drachms.
Aromatic syrup of rhubarb - -	Half ounce.
Peppermint water, -	Enough to make four ounces.

Take a teaspoonful every half hour until relieved. A domestic remedy much used for the same purpose is the familiar Jamaica ginger.

Heartburn.

Heartburn seems to depend chiefly upon an unnatural acidity of the stomach, and can be relieved by alkaline remedies with or without aromatic substances ; thus a pinch—five to ten grains—of baking powder will often accomplish the result if taken immediately after eating ; or half a tablespoonful of lime water may be given for the same purpose. If these be unsuccessful, five to ten drops of chloroform may be given in a teaspoonful of weak brandy or whisky.

The water-brash can often be relieved by fifteen or twenty grains of the subnitrate of bismuth; yet, in most cases, this troublesome symptom will disappear only after the patient's general condition has been much improved. The hiccough, an occasional symptom, often disappears under the use of hydrate of chloral, in doses of ten to fifteen grains three times daily.

One of the most important objects to be obtained by medicine is the improvement of the patient's general condition by the use of tonics. This is especially valuable if the dyspepsia be the result

not of errors in diet, but of nervous exhaustion. One of the best formulæ for this purpose, is as follows:

Fowler's solution of arsenic, - - -	One drachm.
Sulphate of quinine, - - - - - -	One drachm.
Tincture of nux vomica, - - - - -	One ounce.
Wine of pepsin, - - - - - - - -	Three ounces.

Take half a teaspoonful after meals. In these cases it is well for the patient to take five or six drops of the dilute muriatic acid just before eating. If the patient be quite pallid or *anæmic*, benefit may be derived from the following prescription:

Sulphate of quinine, - - - - -	Forty grains.
Arsenious acid, - - - - - - -	One-third of a grain.
Extract of nux vomica, - - - - -	Eight grains.
Reduced iron, - - - - - - -	Twenty grains.

Mix, and make into twenty-four pills. Take one before meals.

In order to afford some assistance in the selection of diet for dyspeptic patients, the following table, adapted from Hartshorne, is added:

Easy of Digestion.	*Moderately Digestible.*	*Hard to Digest.*
Mutton,	Beef,	Pork,
Venison,	Lamb,	Veal,
Chicken,	Rabbit,	Goose,
Turkey,	Duck,	Salt meats,
Hare,	Pigeon,	Sausages,
Beef tea,	Snipe,	Salt fish,
Mutton broth,	Soups,	Lobster,
Milk,	Eggs,	Herring,
Most fresh fish,	Raw oysters,	Salmon,
Turbot,	Stewed oysters,	Shrimps,
Sole,	Potatoes,	Oils,
Haddock,	Beets,	Cheese,
Roasted oysters,	Turnips,	Fresh bread,
Rice,	Cabbage,	Toast,
Tapioca,	Lettuce,	Pastry,
Sago,	Celery,	Cakes,
Arrowroot,	Apples,	Nuts,
Asparagus,	Raspberries,	Pears,
Cauliflower,	Bread,	Plums,
Baked apples,	Puddings,	Cherries,
Oranges,	Rhubarb,	Cucumbers,
Grapes,	Chocolate,	Onions,
Strawberries,	Coffee,	Carrots,
Peaches,	Porter.	Parsnips,
Ale.		Pickles.

Dilatation of the Stomach.

This is one of the conditions which often result in long continued dyspepsia. The gas which is constantly formed in the stomach when the food is not properly digested, distends this organ, occasioning a sense of fullness and the belchings of wind so characteristic of dyspepsia; in course of time the stomach yields to this continued pressure and becomes permanently *dilated*—that is, stretched so as to occupy a much larger space in the abdominal cavity than is natural; in fact the organ is sometimes so much distended as to extend over the entire cavity of the abdomen; its capacity being increased from less than a quart, which is the natural size, to several gallons.

This condition of dilatation may result from any one of several causes, but is usually associated with dyspepsia or chronic inflammation of the stomach. The condition may exist in a dyspeptic patient without exciting his suspicions, or those even of the attending physician; for unless the dilatation become excessive the symptoms are essentially those of dyspepsia.

Symptoms.—The symptoms which have been mentioned as characteristic of dyspepsia are usually present in dilatation of the stomach. In addition there may be a decided and persistent prominence over the region of the stomach, and extending downward in the abdomen. By tapping gently upon this prominence, a resonant, drum-like sound will be heard, indicating distension of the organ with gas. If the patient take a glass of water, and the body be gently shaken, a splashing sound may be heard. The food collects in large quantities in this dilated cavity, occasioning a constant sense of uneasiness, which is relieved every few days by vomiting. The ejected matter often gives signs of putrefaction, and consists of the imperfectly digested food as well as of much thick mucus from the stomach. In consequence of the imperfect digestion the patient is poorly nourished and often becomes quite emaciated; he suffers extreme inconvenience from the constant distension of the abdomen and frequent escape of gas from the stomach. At times the patient gets into the habit, or rather the stomach acquires the independent habit of expelling food and liquids without any premonitory signs, causing the individual much inconvenience and annoyance.

Treatment.—The regulation of the patient's diet and habits, already described in connection with dyspepsia, is an important measure in the treatment of this affection also. But something more is necessary here, since even if it be possible to cure the dyspepsia, the stomach remains dilated, and the result will be accumulation of food and a return of the symptoms as before. The only satisfactory method of treatment for this condition consists in regular and thorough *washing out* of the stomach. This can be accomplished very readily by the use of the elastic stomach tube, already described, whereby the contents of the stomach can be removed, the accumulation of undigested food prevented, and the stretching of the stomach by the formation of gas avoided. An individual suffering from this complaint can readily learn to introduce the tube himself, and to wash out the stomach without any assistance. For this purpose it is desirable to use first lukewarm water; the quantity to be poured into the stomach at once varies according to the amount of dilatation present, from a quart to a gallon; in general terms it may be said that the amount of water poured into the stomach through the tube should be just sufficient to cause a feeling of distension in that organ. After the stomach has been rinsed out with warm water, it may be washed with a solution of the *sulphite of sodium*, half an ounce of which may be dissolved in a pint of water for that purpose.

At the beginning of the treatment it may be necessary to wash the stomach every day; but if care be taken to regulate the diet, if the patient will be content to live upon milk, eggs, and liquid food taken in small quantities at short intervals, it may soon be possible to discontinue the use of the stomach tube, or at least employ it but once in three or four days. It may be necessary to continue the treatment for months, especially in those cases in which the disease has lasted for a long time; improvement can always be obtained, though an actual cure cannot be predicted unless the dilatation of the stomach has occurred very recently.

Pain in the Stomach—Gastrodynia.

This is a symptom of various affections of the stomach, such as inflammation, ulcer, dyspepsia, and cancer; if it occurred only as an incident in these affections there would be no occasion for separate discussion.

There are, however, cases in which a severe pain in the stomach is a most prominent and distressing symptom, but in which no *structural* disease of the organ, such as ulcer or cancer, can be discovered. In these cases the pains appear to be neuralgic, and the affection is indeed often called *neuralgia of the stomach.*

Symptoms. — The pain begins suddenly, oftentimes awakening the patient at night; it becomes at times agonizing, causing the patient to twist and groan from the severity of his suffering. There is sometimes decided tenderness over the stomach, though in most cases this feature is absent, and the pain is indeed often somewhat relieved by pressure of the hand. There is sometimes a feeling of tightness or constriction around the body. In many cases violent vomiting occurs, though this is not a necessary symptom. In some instances, particularly in women, the pain recurs at intervals with especial severity, so that it is to be described as "bearing down" pain. The attack varies in duration from a few minutes to several hours, and leaves the patient sore and exhausted.

These attacks of neuralgia in the stomach rarely occur in individuals who enjoy robust health. The sufferers from this affection are usually in a state of general debility from over-work, either physical or mental, from excessive mental emotion and strain, or from neglect of sanitary regulations. In such individuals these attacks occur spontaneously, or may be induced by eating certain articles of food; such individuals usually learn by experience to avoid particular articles of diet, which may be eaten by other people with impunity. Thus, in one instance, strawberries will be found to provoke such an attack if a patient be at all exhausted; while in another, even stewed oysters may have the same effect.

Treatment. — The treatment of such an attack comprises two measures: first, the relief of the pain; and second, the effort to avoid future attacks. The pain can of course be removed by the various agents at our command; if severe, so that the patient writhes in anguish, chloroform should be administered at once, a teaspoonful being poured upon a handkerchief and held *near*, not *to*, the patient's nostrils. Meanwhile morphine should be given, a sixth of a grain, if the patient has not vomited; but if his stomach has been irritable, and rejects all medicines, an eighth of a grain of morphine may be administered hypodermically. A light mustard plaster applied over the stomach and a tablespoonful of whisky containing Jamaica ginger will often shorten the paroxysm of pain.

To avoid repetition of such paroxysms the effort must be made to improve the patient's general health. In the majority of instances it will be found that the patient is already suffering from mental or physical exhaustion; until this exhaustion is relieved by recreation, diet, and medicine, the attacks of neuralgia will be apt to recur. This disease appears to be confined to middle life, rarely occurring in childhood or in old age.

Cancer of the Stomach.

In nearly one-third of all the cases of cancer, the stomach is the seat of the disease, and the cancer occurs with special frequency at that end of the stomach which joins the small intestine, and which lies nearly under the end of the breast bone.

Symptoms.—When the disease has existed for some months, the symptoms are so plain as to admit of but little doubt concerning the nature of the affection. But in the early stages of cancer of the stomach the symptoms do not enable us to distinguish this disease with certainty from several other affections of the stomach, such as ulcer, chronic inflammation, and dyspepsia.

For some months previous to the development of marked symptoms the patient usually suffers from an impairment of the appetite, and some of the symptoms of indigestion. There is usually some pain, even at an early stage — a pain which is described as gnawing or cutting. There may be, also, tenderness over the stomach. Even before it becomes possible to detect a tumor in the abdomen, there is usually decided evidence of impairment of the general health; there is some loss of strength and of flesh, an unusual pallor of the skin, sometimes fever and derangement of the bowels.

As the disease progresses, vomiting becomes a prominent symptom. The matters ejected are at first merely the partially digested fragments of food which have been swallowed, but later contain also considerable blood and mucus. This blood is at first dark, giving the vomited matter an appearance resembling that of coffee grounds; but later in the disease the blood appears in larger quantities and with a bright red color. After the vomiting becomes frequent the patient's strength fails rapidly, and emaciation becomes

a marked feature of the disease. The sufferer's condition now becomes deplorable. All food, even the blandest articles, is rejected by the stomach. The act of vomiting is now accompanied by extreme pain. In the intervals between attempts at eating there is more or less pain, often sharp and shooting. The escape of blood may take place not only during vomiting, but also at other times without apparent provocation. At times the hemorrhage becomes quite severe, the patient expectorating great quantities of bright red blood. In other instances death occurs suddenly from hemorrhage into the stomach.

Sooner or later there is usually developed in the abdomen a tumor, situated a little below the breast bone, and ordinarily somewhat to the right of the middle of the body. This tumor may not be appreciable to the eye, but can be felt by gently pressing upon this locality. This swelling is usually detected by the patient himself, though it may at times escape his observation and be discoverable only upon careful examination.

While this is the usual history of cancer of the stomach, yet cases occur in which most of the symptoms detailed above are absent. In these cases the patient appears to have merely some dyspepsia. The appetite remains fair. There is no vomiting of blood, perhaps no vomiting at all. The pain is merely of the dull, aching character so often met in simple dyspepsia. In these cases death may occur after a very short illness, the real nature of the difficulty being unsuspected perhaps until a post-mortem examination is made.

It will be seen from the above description that the symptoms presented by cancer of the stomach are very similar to those of several other diseases; even the vomiting of blood occurs as regularly and uniformly in cases of ulcer of the stomach. It is important that this similarity should be remembered, in order that no groundless suspicions may annoy and terrify the patient. It must be stated, that in the early stages of the disease the physician himself is often puzzled to decide whether or not the affection is a cancer, though with the lapse of time the diagnosis usually becomes easy.

In this connection, a word may be properly said regarding the popular ideas concerning cancer. The prevalent impression attaches entirely too much importance to the hereditary influence of cancer. It is by no means proven that there is any hereditary predisposition for cancer; although physicians generally attach

some importance to the fact that a patient's parent has suffered from cancer, yet such a fact carries no weight in deciding a doubtful case. Many people, some of whose relatives have had cancer, live in constant dread of becoming victims to the disease; the slightest ailment whose cause is not at once apparent, serves to arouse their slumbering fears that the long-dreaded disease has finally appeared. To all such it cannot be too emphatically asserted, that the previous occurrence of cancer in the family does not warrant the least anxiety as to the safety of the individual. It is, doubtless true, that the children of cancerous parents are sometimes attacked by the disease; but, while this fact is generally known and appreciated, it is forgotten that the great majority of the children of cancerous parents do *not* suffer from the disease, while the great majority of cases of cancer are found to occur in individuals whose family history contains no record of the disease.

Cancer of the stomach rarely occurs before forty years of age, usually after fifty. Males are more frequently attacked than females, the ratio being about two to one.

Treatment.—The only hope of relieving a patient from cancer lies in the removal of the tumor. If situated on the skin, or elsewhere within reach of the eye and finger, the nature of the disease can be recognized early, and its removal at an early period often relieves the patient permanently of the disease. Within recent years the internal organs of the body have been rendered more accessible to the surgeon's knife; cancers of the womb, of the rectum, and of the larynx, have been successfully removed with the result not only of relieving the patient from the tumor in question, but also of protecting him from a return of the disease. Within the last three years the same plan has been pursued as to cancers of the stomach. In 1881 Billroth, the celebrated surgeon of Vienna, removed about a third of the stomach of a woman afflicted with cancer. He had, in connection with his assistants, experimented for several years upon dogs, and had found that these animals recovered perfect health after the removal of considerable parts of the stomach. The history of this case showed that the human animal, even when suffering from disease, possesses the same power; for the woman operated upon recovered entirely, and was able to consume ordinary diet without any discomfort. Since that time Billroth has performed the same operation on two other

patients with the same happy result. One of them is now living, two and a half years after the operation, and enjoys robust health. It is, as yet, too early to affirm, or even hope, that this operation will become a general means for relieving these painful cases of cancer of the stomach; indeed, there are many difficulties to be overcome besides the performance of the operation itself. Time and experience alone can decide how useful this operation may prove.

Aside from this operative procedure, we have absolutely no means for relieving cancer of the stomach. There are, it is true, cases which are falsely called cancer of the stomach, that ultimately recover; these are generally cases of *ulcer* of the stomach, in which the symptoms closely resemble those of cancer, as has been already stated. True cancer always results fatally. The duration of the disease appears to be, on the average, about a year; the patient dies, in most cases, from exhaustion and starvation.

The treatment consists merely in an attempt to palliate suffering. Foremost in this direction comes opium in some form, preferably morphine. In most cases of disease the physician is very reluctant to prescribe morphine habitually, fearing that his patient will acquire the opium habit; in these cases of cancer of the stomach such an objection has, of course, no weight; the patient should be supplied with morphine in sufficient quantities to keep him free from pain.

The diet should, of course, be unirritating and nutritious, and should be taken in such quantities and at such intervals as the patient finds to be best. Sometimes much comfort can be derived from washing out the stomach through the rubber tube, as already described in discussing dilatation of the stomach.

DISEASES OF THE INTESTINES.

Diarrhea.

Diarrhea is a symptom rather than a disease—a symptom of numerous disorders; among them typhoid fever and cholera. Yet, aside from these cases, there occur numerous instances of diarrhea which appear to be largely local diseases of the intestines, and not dependent upon any constitutional disease.

Symptoms.—The disorder is so familiar that no detailed account of symptoms is necessary. It is, however, important to distinguish diarrhea from another disease characterized by frequent liquid stools—dysentery. In the latter affection there is an inflammation of the mucous membrane lining the intestinal canal; and the discharges are usually mixed with blood and slime, and are attended with great pain.

For convenience we may distinguish cases of diarrhea as *acute* and *chronic*. The acute diarrhea is familiar to us all as the result of errors and indiscretions in diet, being produced by excessive indulgence in food as well as by eating certain indigestible articles. This diarrhea is usually transient and subsides spontaneously in a few days. In such cases there should be no meddling interference with the discharge, which is really nature's effort to rid the stomach and intestines of irritating material. If at the end of a day or two the discharge continue to be profuse and frequent, the following prescription may be given:

Aromatic syrup of rhubarb, - - -	Two ounces.
Magnesia, - - - - - - - -	One drachm.
Compound spirits of lavender, - -	One drachm.
Camphor, water, - - - - -	Each one ounce.

Mix, and take half a teaspoonful every half hour.

Diarrhea sometimes results not from indigestion, but mental emotion, or from exposure to cold. In these cases, also, the affection is usually cured spontaneously within a few days.

The *chronic* forms of diarrhea are by no means so simple nor so easily managed as the acute form. A chronic diarrhea is in most cases a symptom of some serious disease of the intestinal canal; and the physician's tact and knowledge are tested to the uttermost to detect the origin of the difficulty. Sometimes the cause is to be found in a *tuberculous* condition of the intestines; sometimes the difficulty lies in obstinate indigestion or dyspepsia; at other times the fault is to be found in disease of the liver, and still again cases occur in which inflammation of the kidney is responsible for the diarrhea. In fact a chronic diarrhea, notwithstanding its apparent simplicity as a disease, is one of the most troublesome and often intricate affections which the physician is called upon to treat. It will be, therefore, out of place to attempt a detailed account of the means for recognizing the various causes of diarrhea in the individual cases.

Yet certain general measures will be found advantageous in all cases of chronic diarrhea, and may be mentioned here. In every case the regulation of the diet is a matter of importance, for persons often acquire improper habits of eating, the avoidance of which suffices in itself to cure the diarrhea. It will be well to keep the patient upon animal food largely, avoiding fresh fruits and vegetables. Milk, eggs, and broth, reinforced by rare meat and old bread, will be found most suitable, especially if taken in small quantities and at shorter intervals than usual. Starchy food may be allowed when properly cooked, as well as a moderate indulgence in *ripe* fruits. In this disease, too, attention should be directed to the teeth, since the difficulty may arise from imperfect mastication of the food.

The medicines to be used vary extremely, according to the nature of the case; some chronic cases of diarrhea, those especially which have originated during military life and are especially frequent among soldiers, have been cured by large doses of ipecac—twenty grains every four hours. This measure is not however to be adopted until milder ones have failed, since it causes profound nausea and vomiting. Various admixtures are found to be beneficial in different cases, among them the following:

Manikin of the Body.

The first view is the surface of the trunk of the body; it is not covered by the skin, in order that the muscles may be seen in their respective positions. In the upper part are the muscles of the neck, by which the head is moved in any direction. They also aid in respiration. Immediately below are the pectoral muscles, or muscles of the chest. Still lower and uniting in the centre are the abdominal muscles; finally, we see the commencement of the muscles of the thigh.

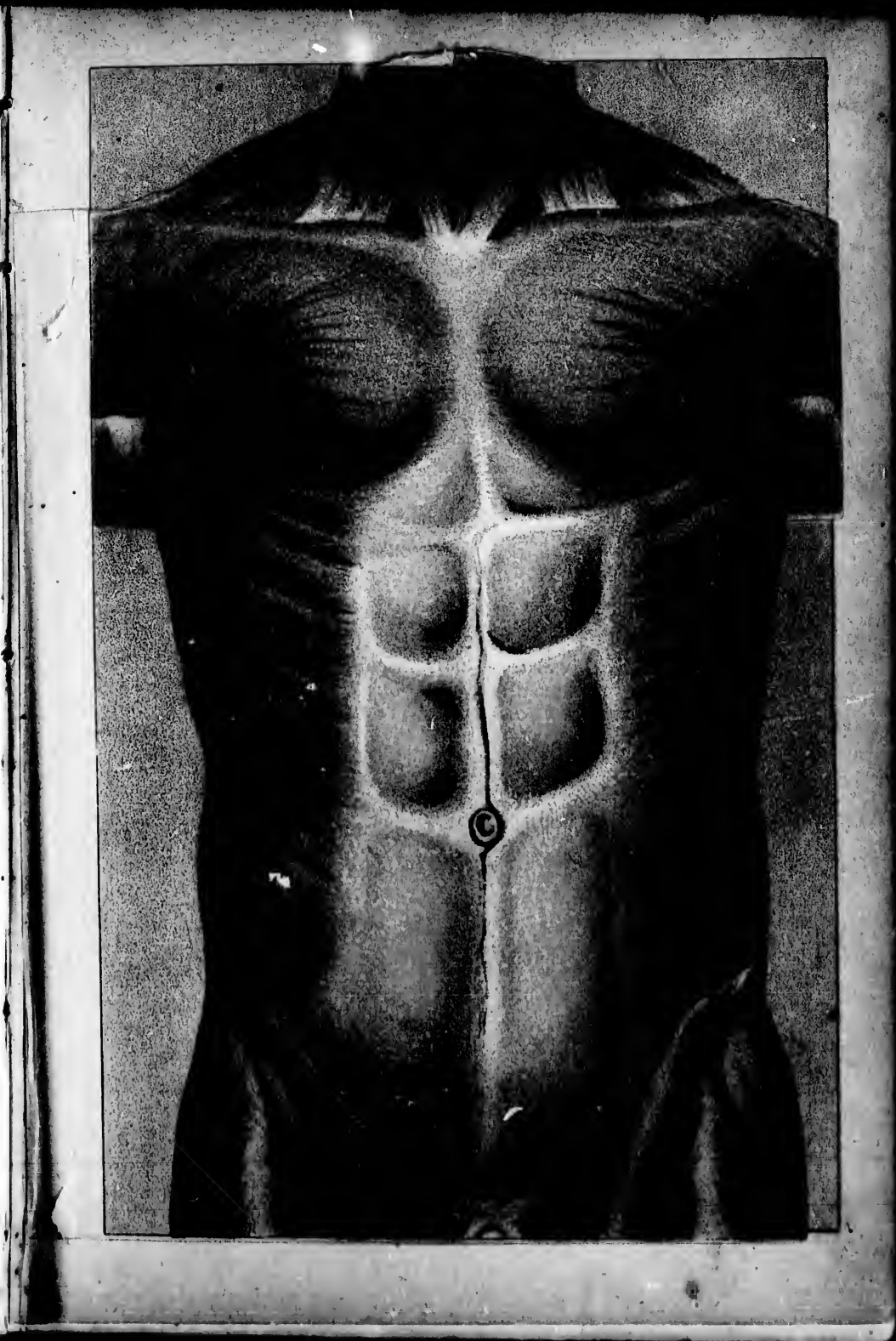
Raising the first leaf, we shall see the lungs and heart complete.

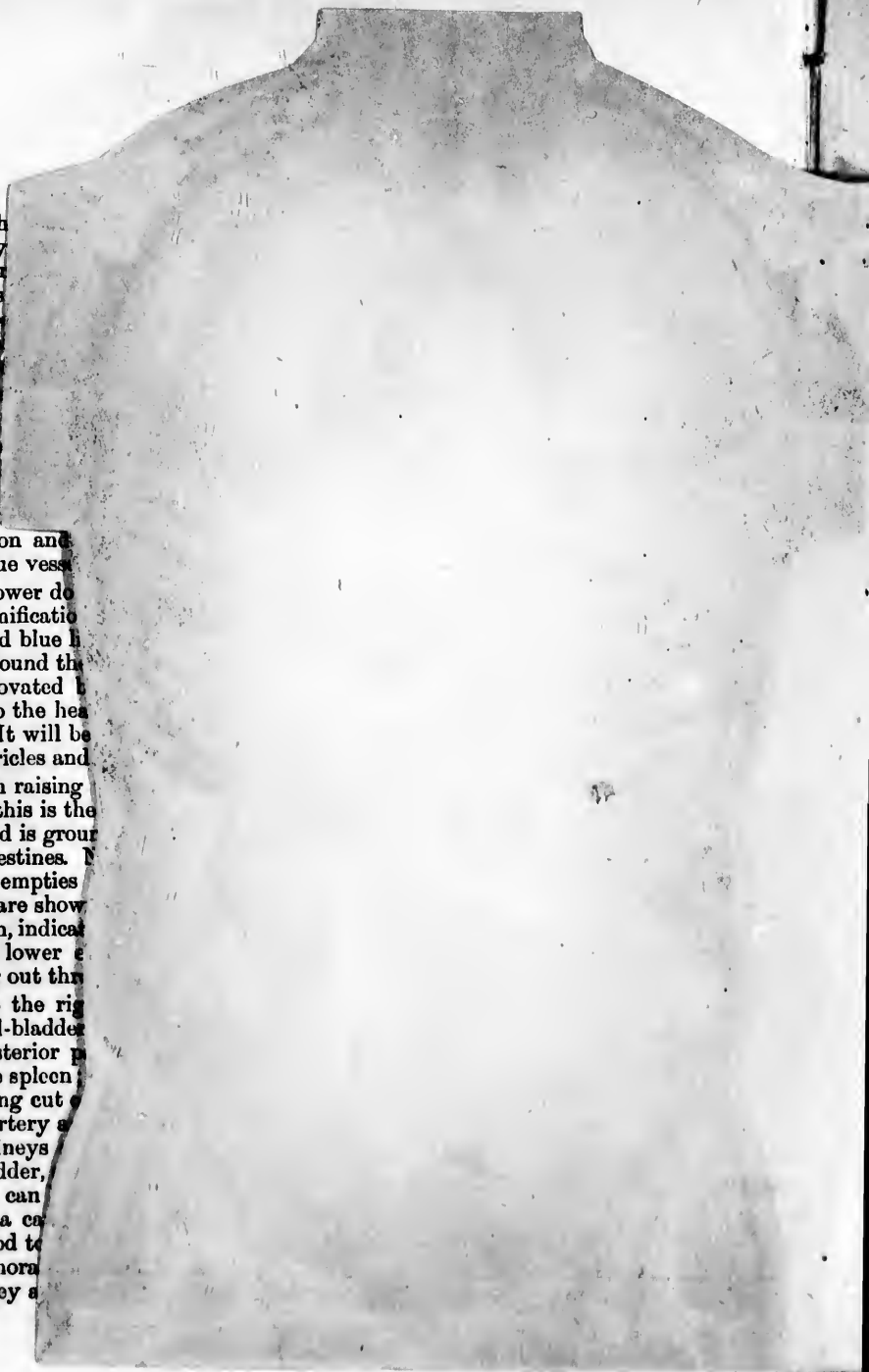
Lifting this section of the leaf, we have the internal constr on of the lungs and the heart; the blue lines represent the large blood vessels through which the impoverished blood returns from all parts of the body to the heart, that it may be sent to the lungs to be renovated: the red lines show the large arteries which take the red and pure blood for the nutrition and building up of all the different organs. Between the red and blue vessels is the œsophagus, which goes to the stomach.

Lower down and towards the right of the yellow drawing, are seen the ramifications of the bronchials, with the lungs, while to the left, the red and blue lines indicate the ramifications of arteries and veins over and around the tissue of the lungs, taking the blood to where it has to be renovated by means of the air contained in the lungs, and send it back to the heart, whence it is distributed through all parts of the system. It will be noticed that the heart is cut through the centre, to show the auricles and ventricles contained in that organ.

On raising this leaf we notice a yellow sac somewhat rounded in form; this is the stomach. It is by means of the folds shown inside that the food is ground up and mixed with its juices, before passing out into the intestines. Next to the stomach is the duodenum or second stomach, which empties itself into the small intestines, the numerous folds of which are shown in the centre; and at the lower part the large intestine or colon, indicated by the broad line which encircles the other intestines. At the lower end this returns to discharge itself through the rectum, passing out through the anus or orifice.

To the right is the liver, shown in its proper place, together with the gall-bladder which is united to it. Taking up this leaf also, we see the posterior parts of the shoulders, the large blood vessels to the left and the spleen; to the right the pancreas; and lower down, the kidneys, one being cut open to show its internal structure. Here are seen also a large artery and large vein, which furnish the necessary blood; below the kidneys are the ureters, which convey the urine, drop by drop, to the bladder, shown as a rounded sac and colored yellow. Between the ureters can be seen the bifurcation of the aorta or great artery and of the vena cava, also the branches, right and left, which serve to convey the blood to and from each leg. These divisions are called "right and left femoral." In the same way above where the branches go to each arm, they are called "right and left brachial."





Th
ered by
positio
head is
ately b
and un
comme

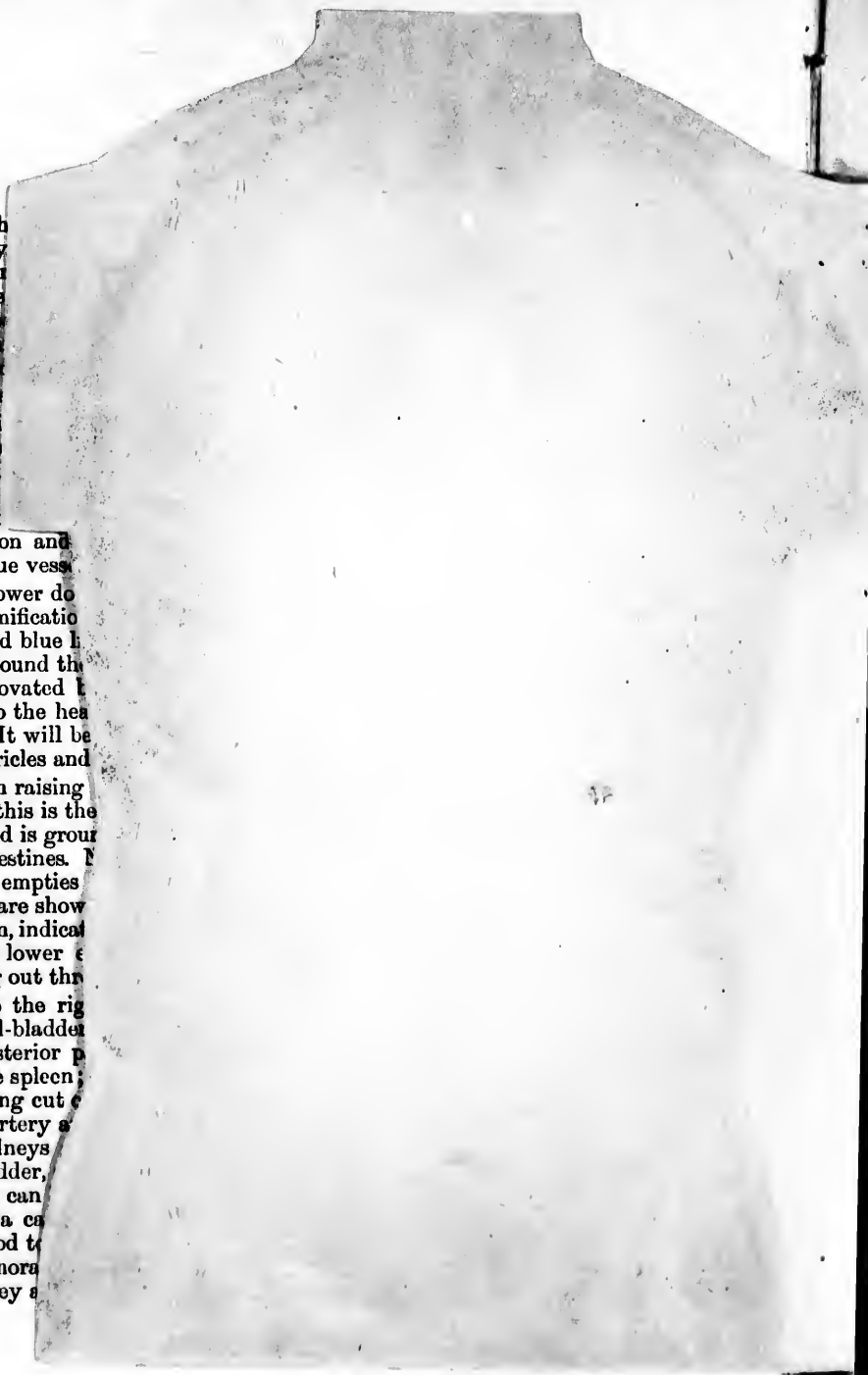
R

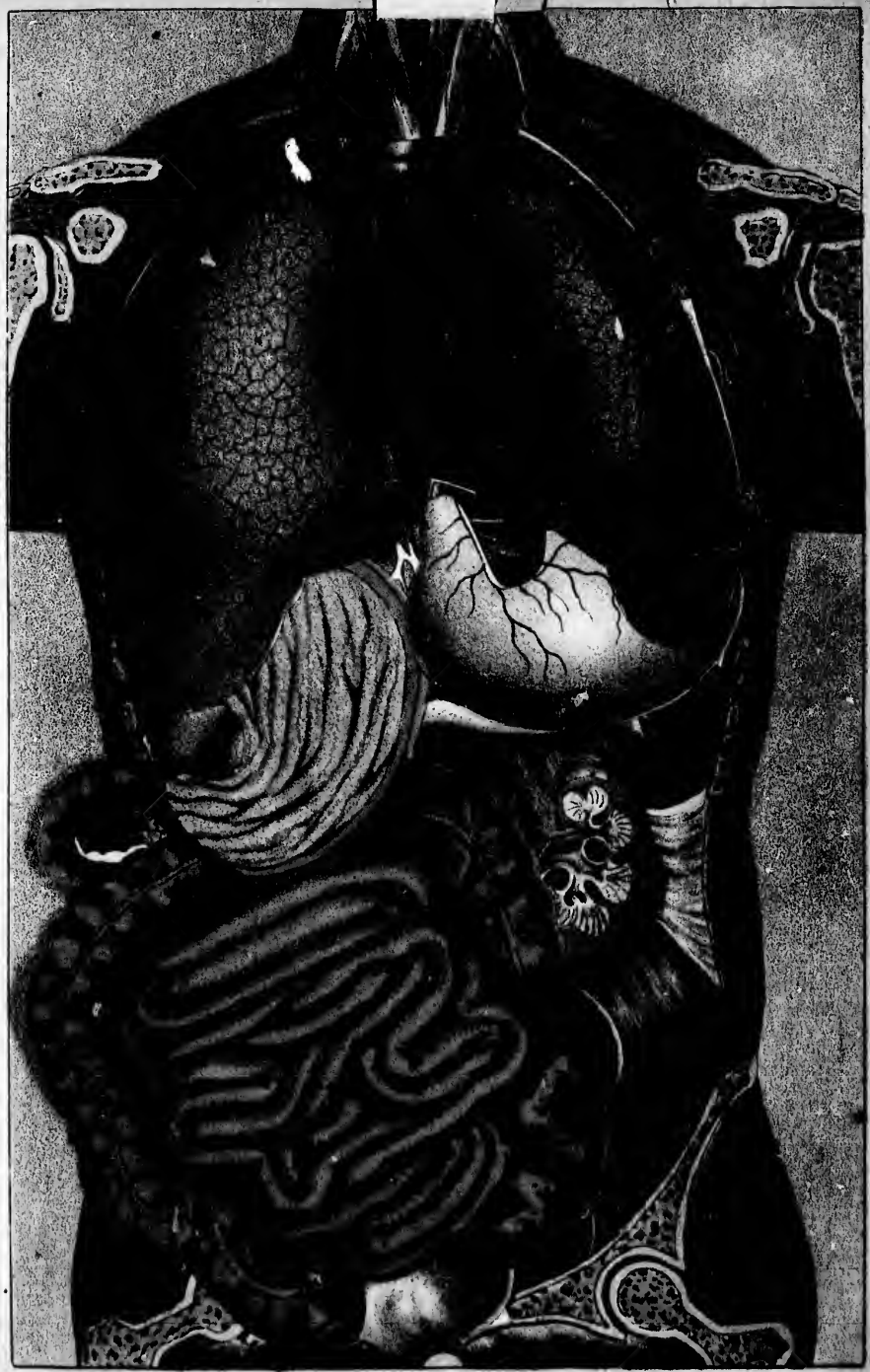
Li
the lun
throug
to the
lines sh
nutrition and
and blue vess

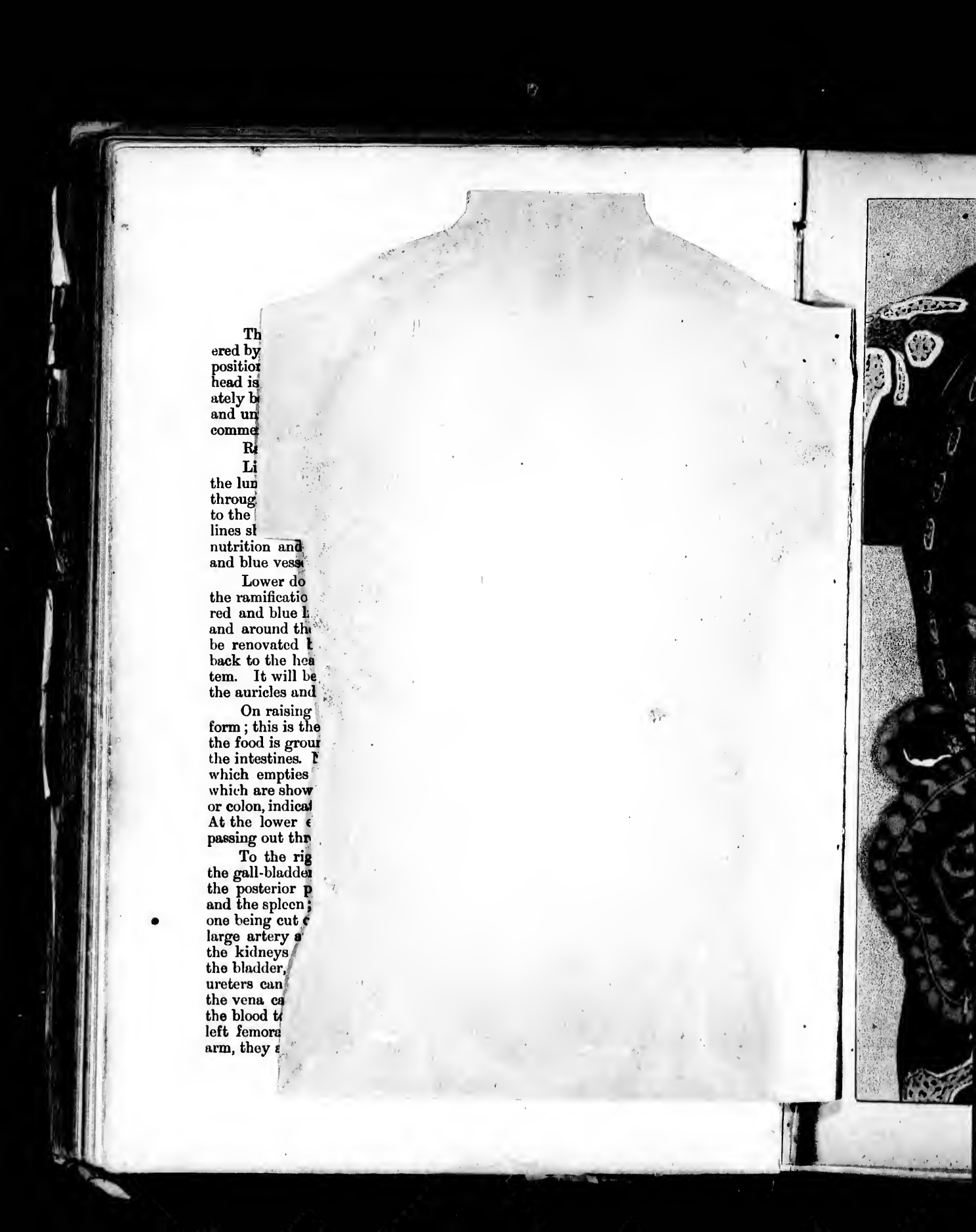
Lower do
the ramificatio
red and blue li
and around th
be renovated b
back to the hea
tem. It will be
the auricles and

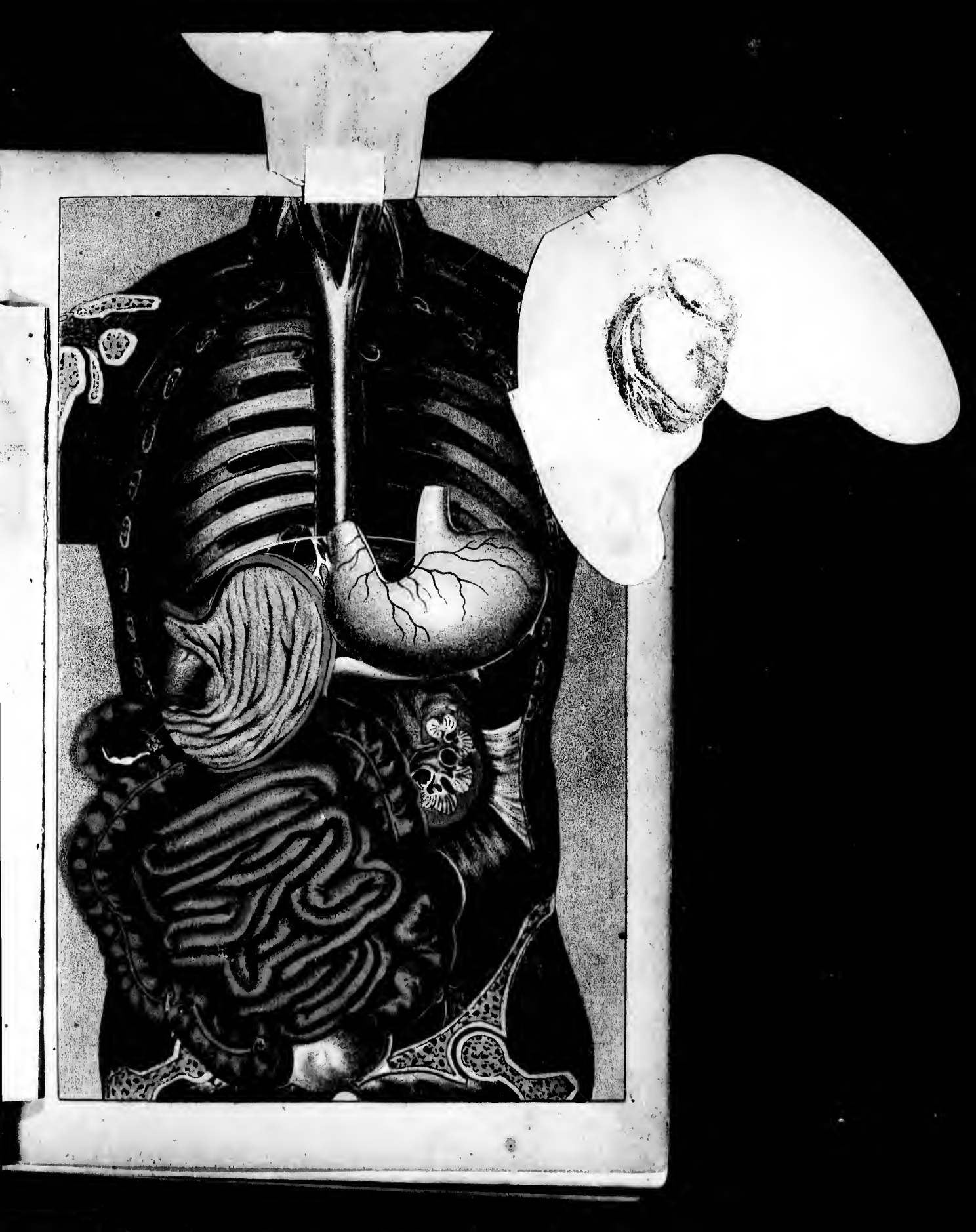
On raising
form; this is the
the food is grou
the intestines. N
which empties
which are show
or colon, indica
At the lower e
passing out thr

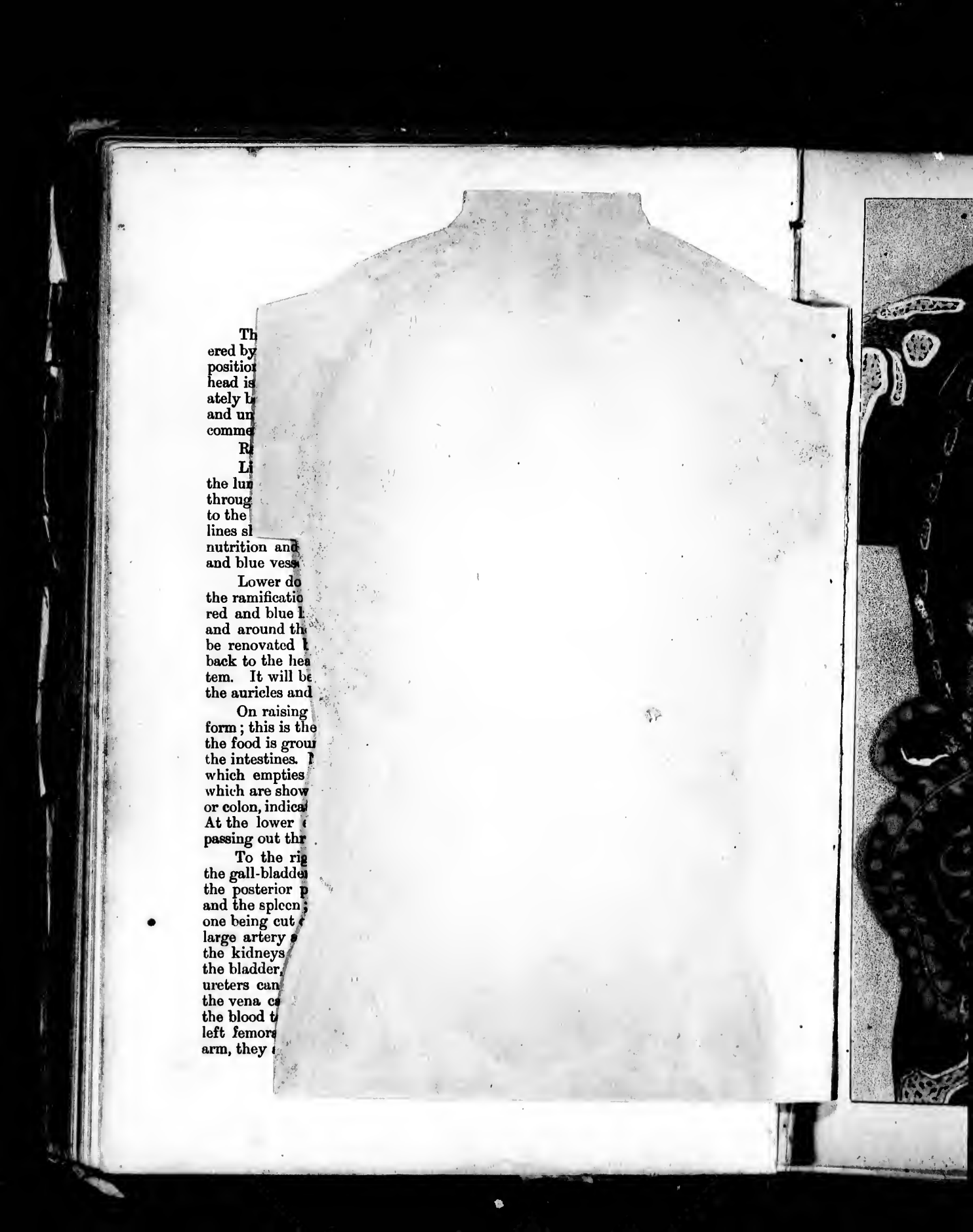
To the ri
the gall-bladde
the posterior p
and the spleen;
one being cut
large artery a
the kidneys
the bladder,
ureters can
the vena ca
the blood t
left femora
arm, they a

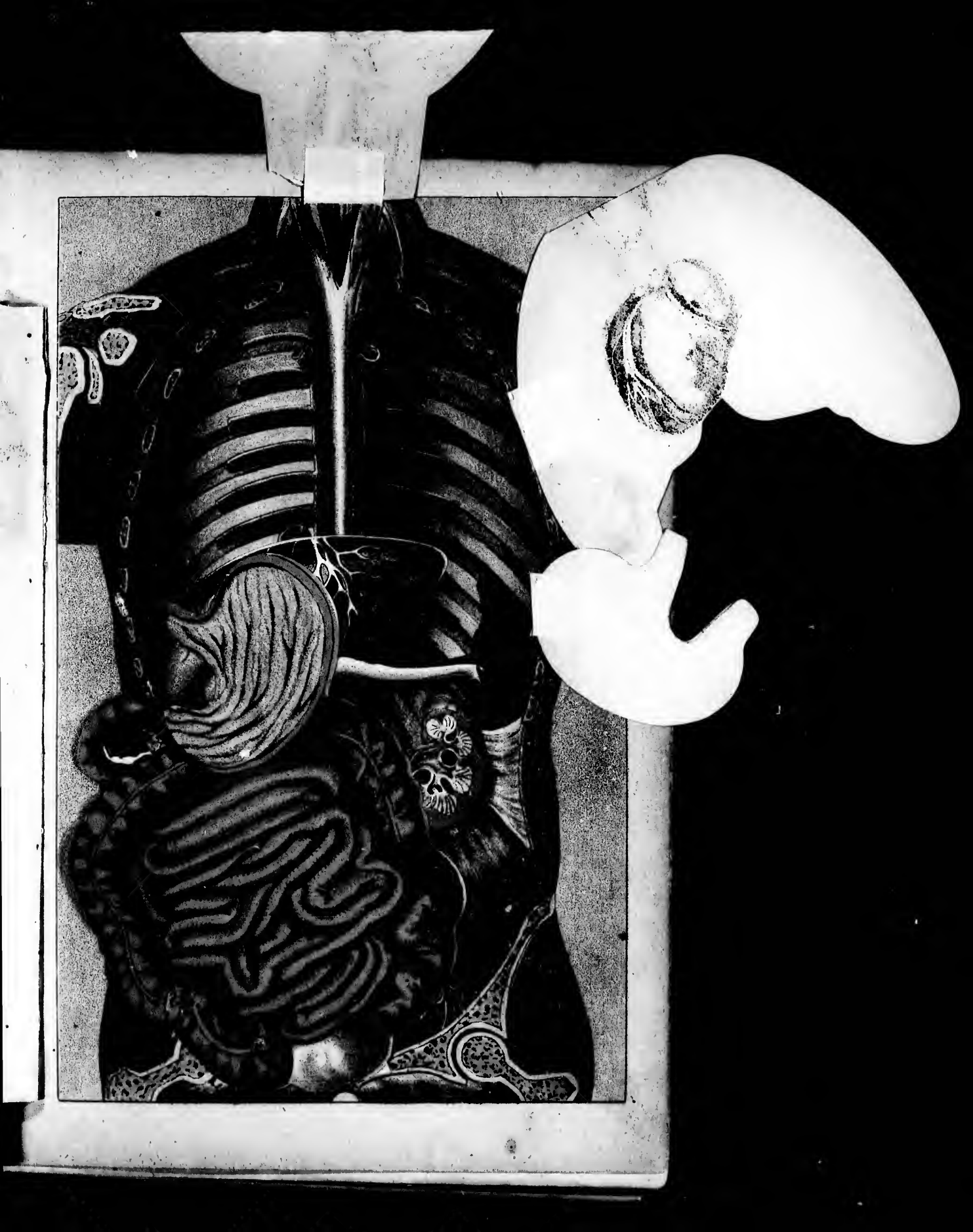


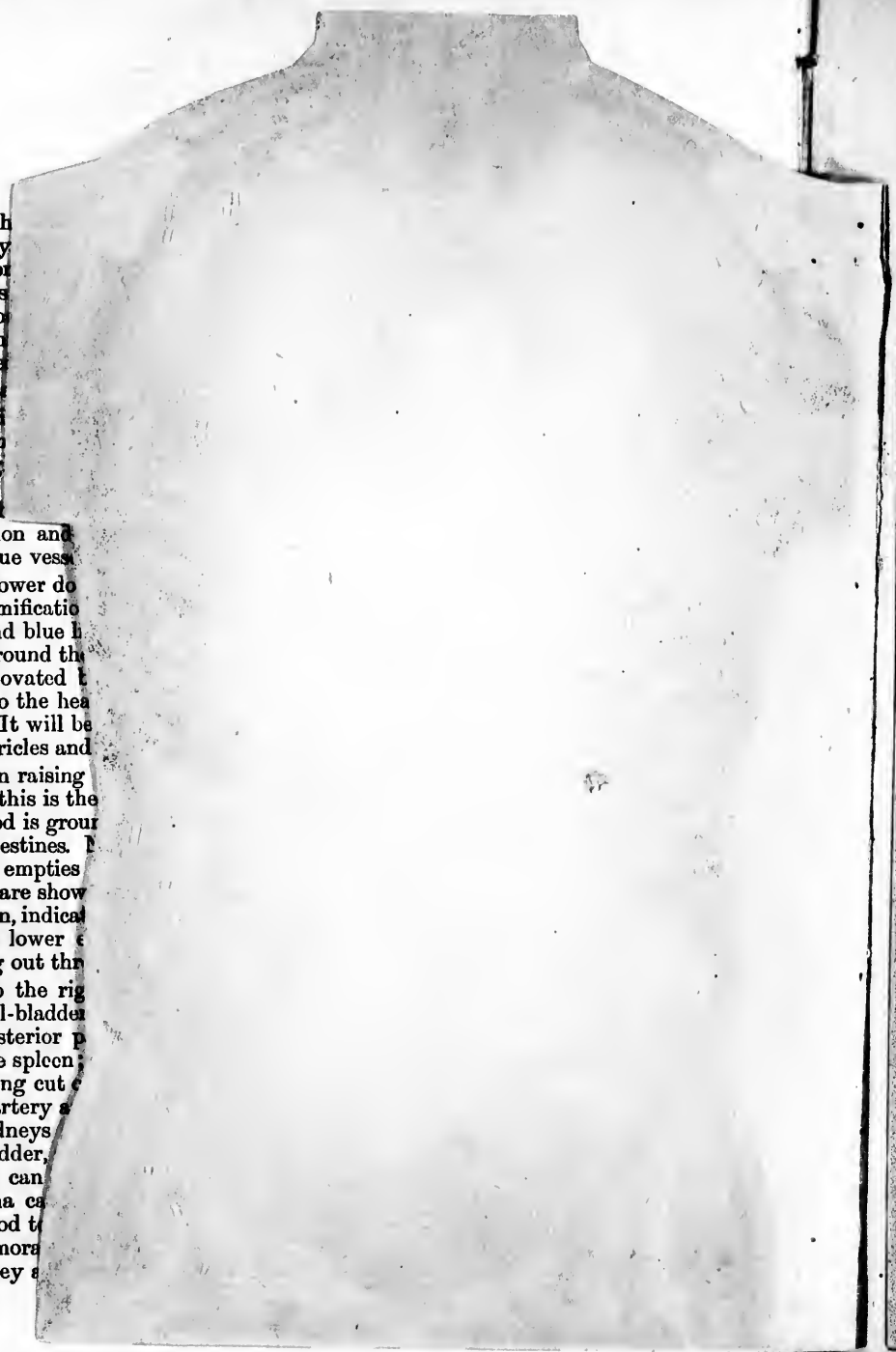












Th
ered by
positio
head is
ately b
and un
comme

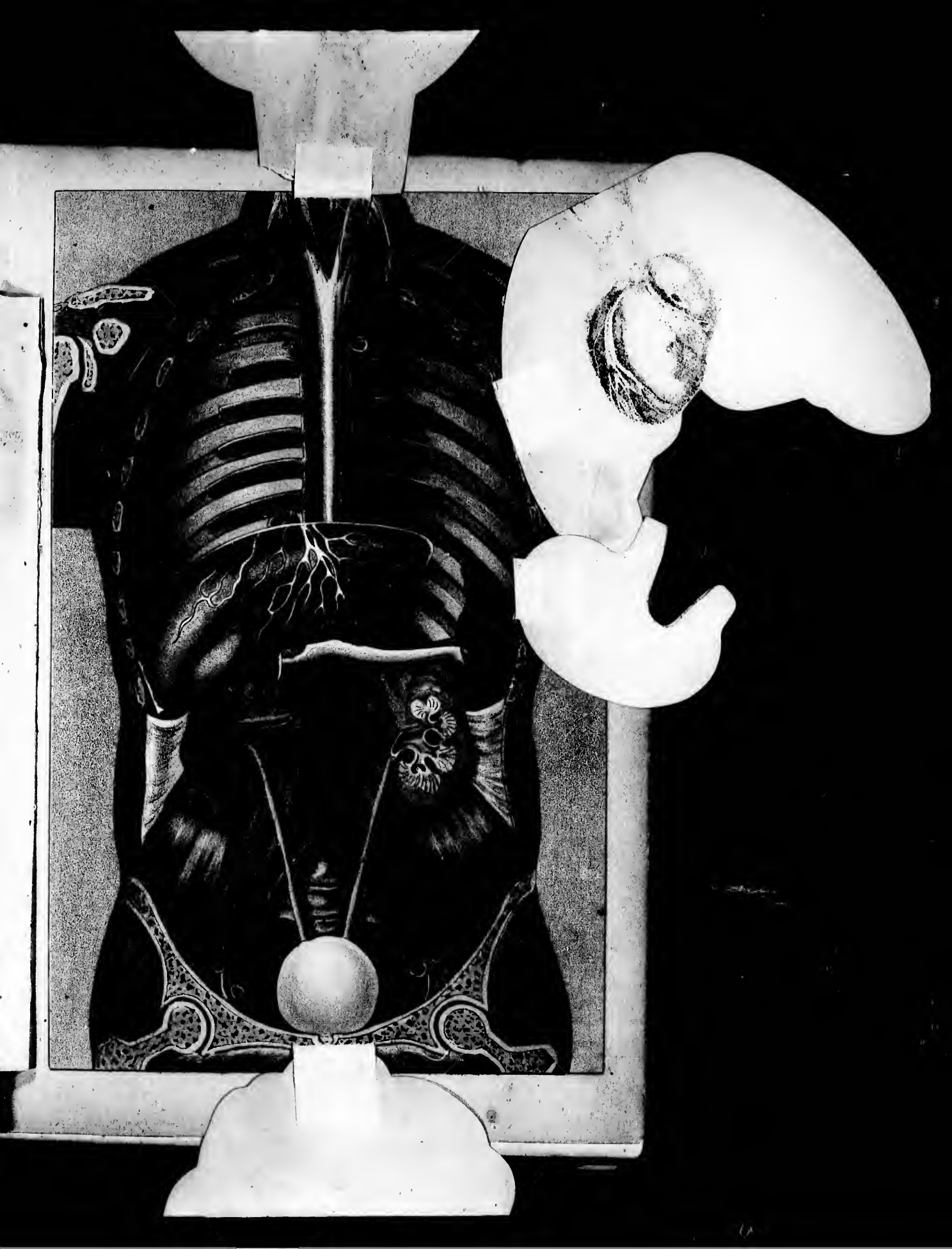
R

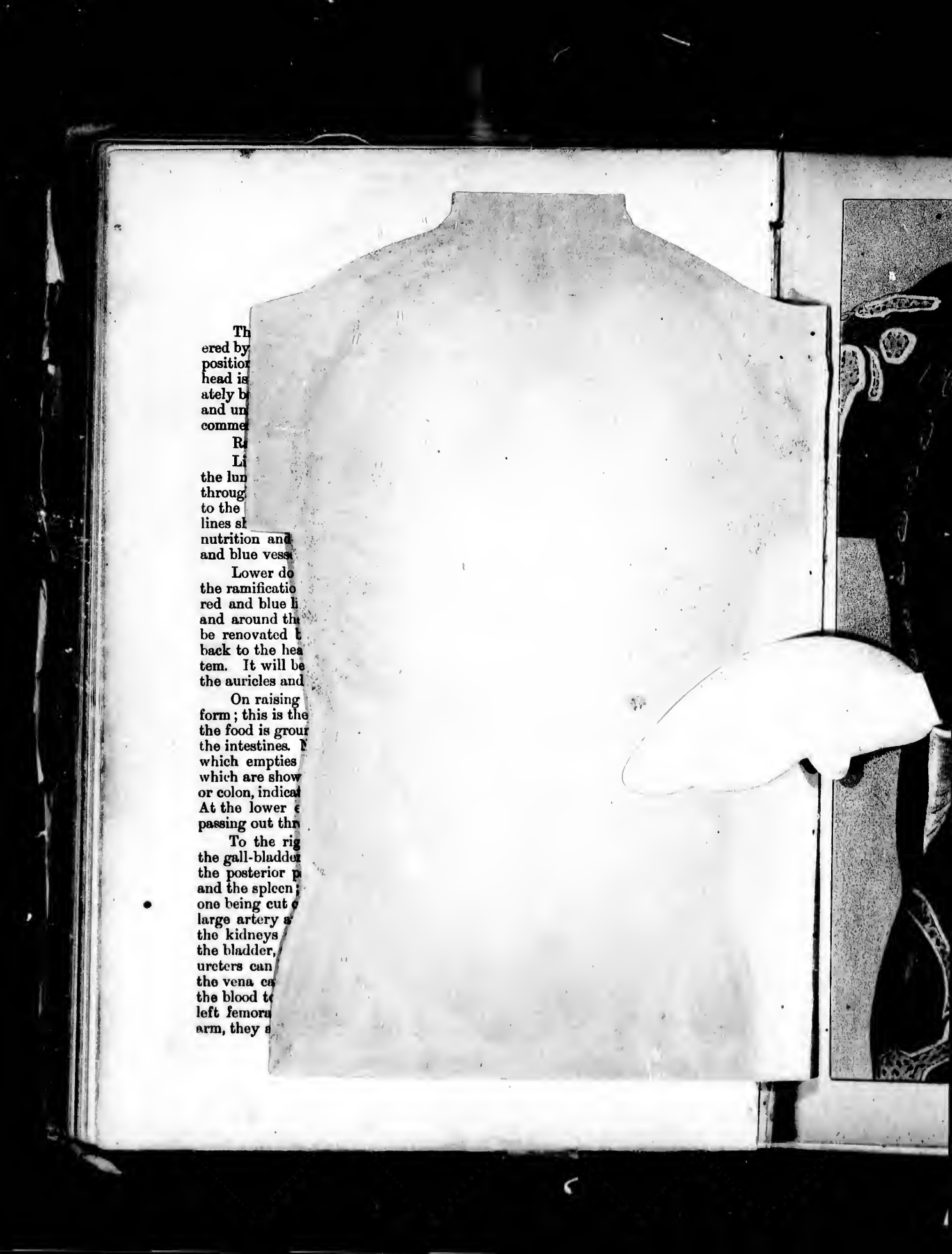
Li
the lun
throug
to the
lines sh
nutrition and
and blue vess

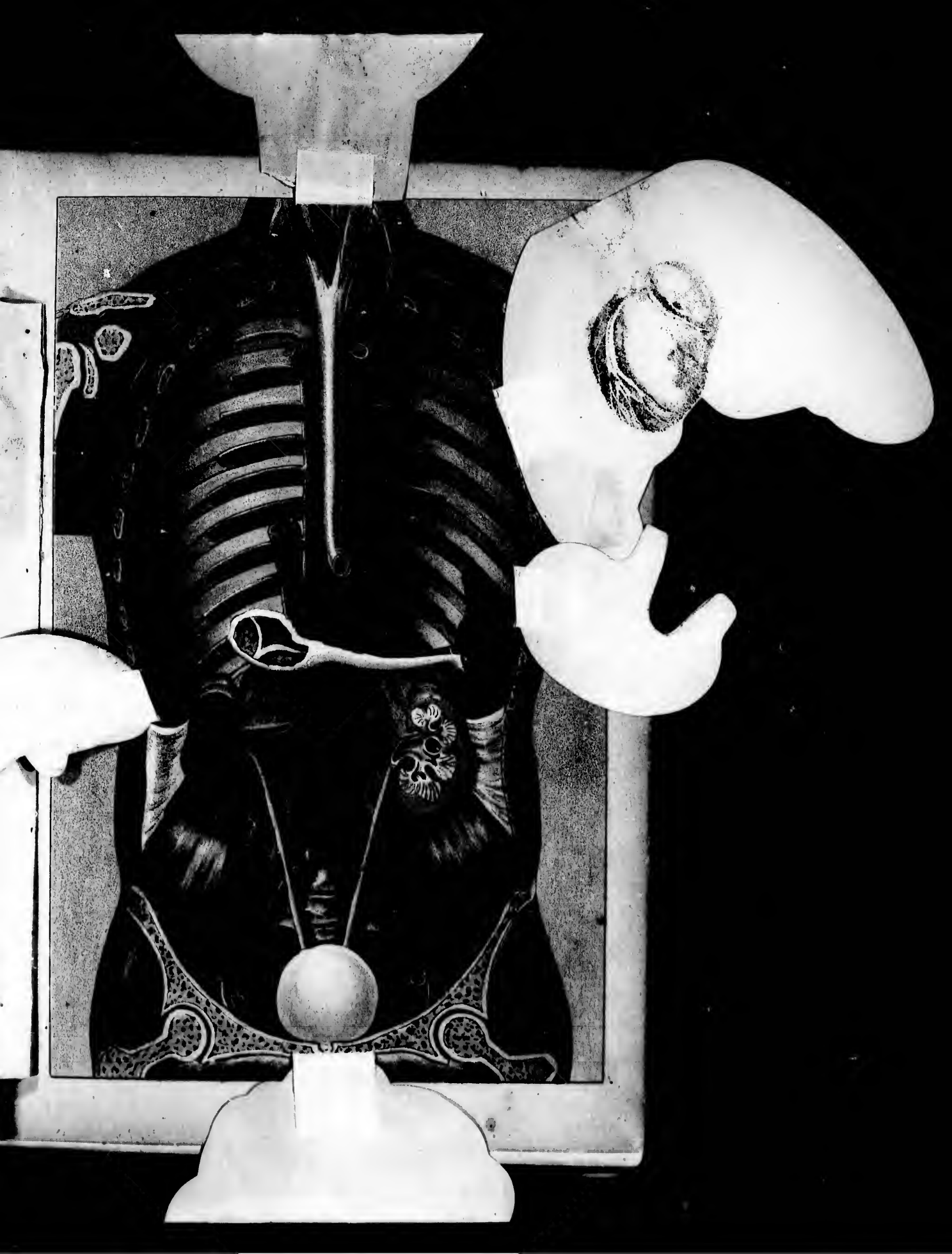
Lower do
the ramificatio
red and blue h
and around th
be renovated b
back to the hea
tem. It will be
the auricles and

On raising
form; this is the
the food is grou
the intestines. N
which empties
which are show
or colon, indica
At the lower e
passing out thr

To the rig
the gall-bladde
the posterior p
and the spleen;
one being cut c
large artery a
the kidneys
the bladder,
ureters can
the vena ca
the blood t
left femora
arm, they a







Camphor, - - - - - 20 grains.
Ipecac, - - - - -
Opium, - - - - - Each six grains.

Mix and make twelve pills. Take one every four hours; or

Prepared chalk, - - - One drachm.
Tincture of kino, - - - Three ounces.
Laudanum, - - - - One ounce.
White sugar, - - - -
Gum arabic, - - - - Each one drachm.

Mix. Take a teaspoonful every three or four hours.

In many cases the following combination will be effectual:

Subnitrate of bismuth, - - Four drachms.
Tannin, - - - - - Half a drachm.
Ipecac, - - - - - Fifteen grains.

Mix and make eight powders. Take one every two hours,

A prescription commonly known as Hope's mixture is often beneficial; it is made as follows:

Nitric acid, - - - - Four drops.
Laudanum, - - - - One drachm.
Camphor water, - - - Four ounces.

Take a tablespoonful every two or three hours.

In all cases of chronic diarrhea the patient should be extremely careful to protect himself against sudden changes of temperature, against wetting the feet, etc. He will find it advisable to be warmly clothed, even during the summer, and so long as the diarrhea is severe, to avoid unnecessary physical effort.

Dysentery.

This is an inflammation of the mucous membrane of the large intestine, especially of the rectum.

Symptoms.—As it occurs in scattered or "sporadic" cases, dysentery is ordinarily preceded for one or more days by an ordinary diarrhea; there may also be some nausea and vomiting, though these do not differ necessarily from the symptoms of diarrhea. After a time the stools begin to contain an unusual amount of ropy mucus; the desire to go to stool is frequent, and accompanied by severe griping pains; the act itself causes a burn-

ing sensation and even sharp pain in the bowels. Meanwhile, there is apt to be considerable constitutional disturbance, general prostration, some fever, perhaps repeated chilly sensations. After a few hours or days, blood appears in the stools, at first in small quantity, but afterwards increasing so that the entire stool seems to consist of almost pure blood. One of the most distressing symptoms — one quite characteristic of this disease — is the irresistible desire to *strain*, even after the bowel has been completely evacuated. In mild cases, these symptoms persist from five to ten days, after which the bowel gradually returns to its natural condition, or at least the more acute symptoms subside, leaving the bowel in an irritated condition, which constitutes chronic dysentery.

Sporadic cases of dysentery usually terminate in recovery under proper treatment; but occasional cases are observed in which the symptoms occur with much greater intensity; there is constant and severe pain in the abdomen, the stools are very frequent and painful, and the patient's general condition indicates extreme prostration. These fatal cases are, however, more apt to occur during an epidemic of dysentery than at other times.

Cause.— Acute dysentery usually occurs during the late summer and early fall, especially during particularly hot seasons. In this regard the disease resembles several of those which are known to be induced by the entrance into the body of agents from without. However, we have no knowledge as to the existence of any specific agent in the production of this disease; whatever may be its cause, it is certainly favored by exposure to cold, by sudden changes in temperature, by excesses in eating and drinking, by indulgence in unripe fruits, etc.

Treatment.—The first requisite in the treatment of dysentery is *rest;* the patient should be kept perfectly quiet on his back, then a single dose of some laxative should be administered; for this purpose a teaspoonful of castor oil with twenty drops of laudanum used to be generally employed. This will answer if administered *early* in the course of the disease, otherwise some citrate of magnesia may be given. After this, the plan usually adopted in India, may be followed: thirty drops of laudanum are given, and half an hour later twenty grains of ipecac — the latter administered in a little syrup of orange peel, to conceal the taste. For three hours afterward the patient should abstain from all liquids and remain per-

fectly quiet; in this way nausea and vomiting can be usually avoided. Eight hours after the first dose of ipecac a second of fifteen grains may be given, followed, as before, by perfect rest on the part of the patient. The English physicians in India report exceedingly good results from this plan of treatment.

In this country such treatment is always supplemented by injections into the rectum. The tendency to strain and the pain at stool can be much diminished by injecting into the rectum two ounces of starch, with forty or fifty drops of laudanum — to be repeated in three hours if necessary. If the difficulty is not improved, the rectum may be filled with a pint of hot water, which can usually be retained, and is found to be very soothing to the patient.

If the ipecac in the above description be not well borne, that is, if vomiting occur after it is taken, there should be administered one of the following prescriptions:

Camphor, - - - - -	Twenty-four grains.
Ipecac, - - - - -	Twenty grains.
Opium, - - - - -	Ten grains.

Mix, and make twenty-four powders. Take one every hour.

Blue mass, - - - -	Ten grains.
Camphor, - - - -	Fifteen grains.
Opium, - - - -	Ten grains.

Make twenty pills, and take one every hour. This will be found more useful than the foregoing if there be much tendency to vomiting. If the patient be much exhausted, his strength should be supported by the administration of a tablespoonful of whisky or brandy, mixed with a little milk, every hour or two, and if necessary, two grains of quinine may be given with the brandy every two hours until six doses have been taken. During the attack of dysentery, and the convalescence which follows it, the diet should be restricted to liquid food, though no attempt should be made to starve the patient, since the object is merely to relieve the intestine so far as possible, and not to reduce the patient's strength.

Epidemic Dysentery.

This is essentially the same disease as the sporadic variety, though it is usually far more dangerous, and often fatal. The symptoms are those just described, though usually much aggra-

vated. The discharge from the bowels contains so much blood that the disease is popularly known as *bloody flux*. It is especially apt to occur when large numbers of persons are closely quartered, as in military camps, on shipboard, and in densely populated portions of large cities. The disease is usually accompanied by far greater prostration and debility of the patient than is observed in the sporadic cases. In the treatment there is, therefore, greater demand for those measures which support the patient's strength, such as alcoholic stimulants, and opium is ordinarily required and endured in larger quantities than in the sporadic form of the disease.

Chronic Dysentery.

In this affection, which is sometimes the sequel to an acute attack, the symptoms are much milder, occasioning the patient considerable annoyance but not much distress. The stools do not exhibit the blood and mucus to the extent which characterizes the acute attack; indeed, the discharges are sometimes of a clay color. The patient's general condition is, however, unsatisfactory, the constant annoyance and loss of strength resulting in marked impairment of the general health.

This disease is usually found in those who have suffered an acute attack in warm climates, and is especially frequent, in our latitude, among the soldiers of the late war; cases were still more numerous among the United States troops who were engaged in the war with Mexico forty years ago. It is an extremely obstinate affection. Dr. Flint, in discussing the subject, says:

"Chronic dysentery is one of the most intractable and hopeless of diseases. For a time, if the evacuations be held in check by palliative measures, the appetite and digestion not being greatly impaired, the general aspect and strength may not show much deterioration, but at length the appetite and digestion fail, and a continued irritation and loss of fluids induce progressive emaciation and debility. The duration of the disease embraces usually several months, and sometimes years. If not destroyed by some intercurrent affection, the patient becomes extremely emaciated, reduced almost to a skeleton; the surface is usually dry, cool or cold; the pulse becomes more and more feeble; the mental faculties are

weakened, delirium rarely occurring, but the mind, in certain cases, falls into an apathetic state, the patient being indifferent to and taking but little notice of persons and things around him. The appetite is lost, and vomiting, in some cases, is a prominent symptom.

"The diet for this class of patients should be restricted theoretically, at least, to those articles of food which are as completely digested as possible. This is done upon the principle of keeping an inflamed part at rest. Our object is to prevent as far as possible the exercise of any function by the large intestine—that is, we administer nourishment which leaves but little matter to pass into this portion of the alimentary canal. Cold water and ice applied to the rectum sometimes relieve the straining. Warm soothing applications over the abdomen usually afford a certain measure of relief. We are to be guided to a certain extent by the instincts and desires of the patient, and I am willing to say that in almost every disease, if the patient has a well-defined desire for any article of food, it is wise to allow it to be taken. We are much safer in following the instincts of the patient in this respect than in following out any set of dietetic rules with theoretical form. I cannot but think that adopting the same general dieting rules and endeavoring to apply them to every case is harmful.

"Next, with regard to the treatment of the severer cases of dysentery, which are usually epidemic. In severe cases of epidemic dysentery we have to deal with a very formidable disease. So far as medical treatment is concerned our chief reliance must be placed upon opium. It is a noteworthy fact that the quantity of opium which can be administered in these cases without exposing the patient to danger from over use of the drug, is sometimes very large. For example, I have given a patient suffering from epidemic dysentery, a grain of the sulphate of morphia every hour—twenty-four grains in the day—and continued such doses for several days without producing the least manif station of narcotism; and the patient was a person not accustomed to taking opium. That was an extraordinary case, it is true, but I have been repeatedly led to observe a greatly increased tolerance of opium in this class of cases.

In our climate we rarely see a case of chronic dysentery. It is essentially a disease of the tropical climates. With regard to sporadic and epidemic dysentery, as it occurs in this climate, there

is scarcely any tendency to the supervention of the chronic form of the disease, whereas in tropical climates there is considerable tendency to this result.

These patients are to be sustained by *tonic* remedies and a nutritious diet. More advantage may perhaps be derived from hygienic treatment than from any other. A change of climate is a most important element in the treatment of chronic dysentery. I am speaking particularly of cases occurring in a tropical climate. A change from a warm to a temperate or cold climate is beneficial. A uniformly cold and dry atmosphere is best suited to these cases. During the late civil war and also during the Mexican war, we had occasion in New York to treat numerous cases of chronic dysentary contracted in the Southern States and in Mexico, and the most effectual measure for their relief was a change of climate."

Constipation.

This is essentially an affection of the rectum, which becomes unable to perform properly its usual function. In its natural condition the rectum is usually empty, and is endowed with a sensibility which at once gives notice of the necessity for an evacuation. The act is performed partly by the contraction of the muscular coat of the rectum. When, however, this organ is habitually distended, its muscular coat becomes more or less paralyzed, and is thus unable to expel its contents. This habitual distention is usually the result of neglect to respond to the calls of nature. In consequence of the artificial relations of our social life, it is often extremely inconvenient to perform the act when required; and many individuals seem to exhibit an unaccountable reluctance in the discharge of this duty, deferring it so long as possible; it is considered an annoyance to be avoided. The result is in some cases an incredible degree of constipation; some persons, especially women, not infrequently permit one, two, or even three weeks to elapse between two consecutive evacuations of the bowels. Many other influences contribute also to constipation, such as those which interfere in general with the health of the body—excessive brain work and mental emotion, neglect of physical exercise, and improper diet.

Treatment.—The treatment of habitual constipation is a tedious, and by no means always successful, effort; for the difficulty seems so trifling, its effects are apparently so insignificant, that many persons cannot be induced to adopt the simple measures necessary, which seem to them needlessly irksome. The favorite plan is a resort to cathartics — a plan which, while securing immediate relief, aggravates the difficulty in several ways. Laxatives certainly have a proper place in the treatment of many cases of constipation, but they are abused far more than they are properly used.

The individual who is subject to habitual constipation should awaken to the fact that he is suffering from a serious complaint, which can be relieved only by energy and perseverance on his own part; a cure will depend far more upon himself than upon his physician. His first effort should be to remove the cause of the constipation. If he be the subject of dyspepsia, his bowels will scarcely resume their natural action until the stomach does its work properly; if he is cultivating and exercising the mind, to the neglect of the body, he can scarcely hope that the latter will perform all of its functions properly. To remedy the constipation, it will be necessary, perhaps, to effect a radical change in his personal habits, quite independently of medicines.

Then comes attention to the diet; and here we come upon a subject which has given rise to numerous hobbies that are enthusically ridden by non-professional persons as well as by physicians. First among these is the graham bread and fresh fruit idea. There can be no doubt that brown bread and fruit are beneficial in those cases of constipation which depend upon torpor of the bowels; but it is a mistake to suppose that an exclusive diet of these substances will cure all cases of constipation, or indeed any case unless other measures be added. It is well to have a variety in the diet — fruits, vegetables, bread and meat; but it is not desirable to exclude digestible articles which are eaten with avidity, for it must be remembered that the food must be digested in the stomach before reaching the intestine; and to derange the stomach by a diet improper for it is to promote constipation, by favoring dyspepsia. One kind of food should probably be avoided in all cases of constipation—pastry; aside from this, the individual may consult his own tastes and inclinations.

Another item of importance is bodily *exercise;* not a dismal

and formal performance of certain bodily motions, which passes for the name of exercise, but a hearty indulgence in some sort of movement which interests and amuses the mind, while keeping the body active. The particular exercise best adapted for any individual case can, of course, be better determined by the person himself than by any set of rules.

"The most important part of the management in cases of habitual constipation is the adoption of a rule to solicit an evacuation of the bowels at the same hour daily. The importance of this rule is to be enforced; but, of course, its success will depend upon the perseverance of the patient. The time of the day most convenient for the act of defecation is to be selected, and in general the most favorable time is in the morning, after breakfast. At the time fixed upon the patient should devote a reasonable period to the evacuation of the bowels, but without persisting in violent, fruitless efforts. This should be considered in the light of a duty, not to be omitted a single day, except from necessity. It may be long before the desired object is accomplished, but sooner or later, with the aid of some of the other means which have been indicated, the desire will be felt at the appointed hour, and the ability to empty the bowel at that time will be acquired in the great majority of cases. It is impossible to secure regularity and sufficiency of the evacuations without perseverance in this part of the management.

"If this plan were early inculcated and carried out *in health*, habitual constipation would be as rare as it is now frequent. The prevention is not less sure than simple. The function may be brought fully under the control of habit. This fact should be generally understood, more especially in the training of girls, most of whom become affected with habitual constipation, and suffer from it all their lives. Unfortunately, the existence of the function of defecation is often ignored from notions of false delicacy, and the affection becomes established, because parents and teachers are either themselves ignorant of this simple method of prevention, or consider the subject as belonging exclusively to the physician."

If it become necessary to use medicines, care must be taken to avoid harsh and violent cathartics; a mild laxative is often sufficient as an assistance to the efforts of nature in relieving the

Explanation of "Tongue" Plate.

FIGURE No. 281.

1. Hyoid bone, point of union of many muscles of the tongue.
2. Muscles fastened in the corners of the maxilla to retract the tongue.
3. Muscle forming the exterior ridge.
4. Deep-seated muscle for turning the tongue to one side.
5, 6, 7. Muscles facilitating the revolving of the food in the mouth.
8, 8. Salivary glands.
9. Muscle forming the bottom of the mouth.
10. Cross muscle forming the lip.

FIGURE No. 280.

1, 1. Muscles forming the outer border.
2. Hyoid bone.
3, 3. Muscles moving the base of the tongue.
4, 4. Exterior insertion of the transversal muscles.
5, 5. Line of union of the transversal muscles.

FIGURE No. 277.

1. Amygdalæ, or tonsils.
2. Base of the epiglottis or valve closing the trachea, while food is swallowed.
3. Lateral arches.
4. Muscle uniting the tongue with the epiglottis.
5. Blind opening in the base of the tongue, called foramen cæcum.
7. Filiform papillæ.
8, 9. Fungiform papillæ.
10. Apex of the tongue.

FIGURE No. 279.

1. Exterior muscle of the tongue.
2. Openings of the mucous glands.
3. Apex.
4. Inferior muscles, as seen by removal of tongue.
5. Periglottis, turned backwards.
6, 7. Conduits in the base of the tongue.
8. Papilla in the base.
9. Salivary glands.
10. Muscles uniting the tongue to the epiglottis.
11, 12. Depressions on the periglottis.

FIGURE No. 278.

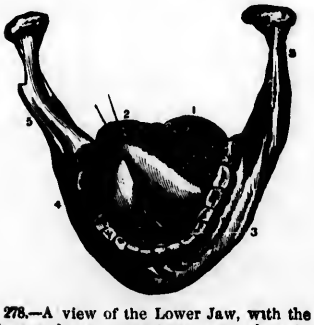
1, 2. Salivary conduits.
3. Wharton's channel.
4. Sublingual gland.
5. Angles of the inferior maxillary bone.

FIGURE No. 282.

1. Papillæ of the tongue.
2, 2, 2. Submucous tissues.
3. Profound muscular larynx.
4. Union of the transversal muscular layers.
5, 5. Transversal muscular layers.
6, 6, 7, 7. Salivary ducts.
8. Flexors, or muscles retracting the tongue.

281.—A view of the muscles of the Tongue as seen in its lower surface.

277.—A front view of the upper surface of the Tongue, as well as the Palatine Arch.



278.—A view of the Lower Jaw, with the Tongue drawn upwards, so as to show its under surface in situ.

280.—A view of the under surface of the Tongue, with the muscles connected with it.

279.—A view of the Dorsum of the Tongue, from which, by maceration, the Periglottis has been removed and turned back on the right side.

282.—A view of a section of the anterior portion of the Tongue, as seen from behind.

TONGUE.

bowels. One of the best remedies for habitual constipation is the following:

Senna leaves,	Three ounces.
Licorice root,	" "
Sulphur,	Two "
Fennel seed,	One ounce and a half.
White sugar,	Six ounces.

Pulverize thoroughly and mix. Take from a teaspoonful to a tablespoonful, either dry or in water.

This powder has the advantage that it can be used for a considerable time without weakening the bowels, and thus creating a demand for more powerful laxatives.

Another prescription which will be found beneficial in constipation resulting from indigestion, is the following:

Powdered rhubarb,	12 grains.
Podophylline,	4 "
Extract of nux vomica,	8 "

Mix and make 24 pills. Take one at night.

Another formula which has been much used is the so-called "safety pill:"

Extract of hyoscyamus,	10 grains.
Extract of nux vomica,	6 "
Extract of aloes,	30 "
Powdered ipecac,	2 "

Mix and make 20 pills. Take one at night.

If the patient have been in the habit of abusing the bowels by the habitual use of cathartics, it may be well for him to resort for a time exclusively to rectal injections. The injection of a pint to a quart of water, in the morning, is a measure which may be used for a considerable time without damage; yet these become, after a time, absolutely essential, so that the patient is unable to secure an evacuation without such assistance. Injections, therefore, do not tend to cure the constipation, but are merely temporary aids in avoiding the ill effects.

The use of various popular and well-advertised mineral waters has now become a very common means of treatment in constipation. Of these, it must be said that, like other laxatives, they create a demand for their use, so that the patient becomes dependent upon them, instead of acquiring health by attention to hygiene.

In this way, and this only, can the various ills consequent upon habitual constipation—piles, diseases of the genital organs, etc.—be avoided.

Colic.

This term is applied to sharp, spasmodic pain in the abdomen, which may be caused by any one of several conditions. We recognize, for convenience, several varieties of colic: 1. Flatulent, or *wind colic*; 2. Bilious colic; 3. Lead colic; 4. Uterine colic; 5. Gouty, or Rheumatic colic.

Flatulent colic is familiar to all from personal experience. It is due to the collection of gas in the intestine, which is, in its turn, the result of indigestion. This form of colic often follows constipation in one unaccustomed to it, and continues until the bowels are evacuated. This form of colic may follow exposure to cold, or the consumption of indigestible articles of food. It would seem also, to follow simple exposure to cold, or physical exhaustion, though these causes probably induce colic indirectly by occasioning indigestion.

The symptoms are so familiar that no description is necessary. Yet it may be well to remark, that the abdomen is sometimes the seat of spasmotic pain from other causes than the collection of gas in the intestine; thus, the passage of gall stones from the gall bladder into the intestine may occasion spasms of pain similar to those of colic, and which are, indeed, called "Hepatic (liver) colic." Then, again, attacks resembling those of ordinary wind colic occur as an early symptom in one of the severest diseases of the nervous system—*locomotor ataxia*. Again, attacks of colic occur as one of the results and symptoms of a most dangerous accident—acute *rupture*, or strangulated hernia. The possibility of these causes for colic must be borne in mind, though, of course, the instances in which they occur are few in comparison with the numerous cases of ordinary wind colic resulting from errors of diet.

Treatment.—In mild attacks, it will suffice to place hot cloths or a light mustard plaster upon the abdomen, and to give a little Jamaica ginger in a tablespoonful of brandy or whisky, by the mouth. If this be not efficient in relieving pain, chloroform may be administered, either by inhalation or twenty drops of it may be

given in a little brandy. In most cases it will be desirable that the patient take some opium, not only to secure immediate relief from the spasm, but also to promote the evacuation of the bowels, which must happen before the patient will be entirely safe from a recurrence of the pain. Twenty drops of laudanum may be given, or if the patient be constantly vomiting, a teaspoonful of laudanum mixed with a little starch may be injected into the rectum. If the pain be not subdued within an hour, this dose may be repeated.

In most cases vomiting constitutes one of the features of the attack; if this be not the case, and there be reason for supposing that the colic is the result of indigestion, an emetic should be administered in order to empty the stomach. The quickest, though not the most certain, way of securing vomiting, is to tickle the throat with the finger or with a feather; if this measure be not successful, half a tablespoonful of common salt or mustard may be dissolved in a glass of warm water and swallowed. This may be repeated in ten minutes if the vomiting be not induced within that time.

The patient will not be entirely free from pain and soreness until the bowels are evacuated. To secure this object it is much better to rely upon injections into the rectum, than upon cathartics; an injection of warm water containing a tablespoonful of castor oil or soap suds, will usually secure a speedy evacuation.

Bilious Colic.

This usually begins somewhat less abruptly than the ordinary wind colic, some hours elapsing before the pain begins. The matter vomited is often green or yellow in color, from the presence of bile; sometimes the patient's skin becomes slightly yellow during the attack. There is also more general depression and debility; that is, the patient's health is more deranged in this variety of colic than in the ordinary form, although the pain may be more intense in the latter case.

Treatment.—During the attack, bilious colic is to be treated in the same way as the form just described; the first object is to relieve the pain by hot applications externally, and the use of chloroform and opium internally; the stomach should also be

evacuated. After the attack has subsided, treatment should be adopted to avoid a repetition of the same; to acomplish this, the general health must be regulated, as will be described in discussing diseases of the liver; for bilious colic seems to depend upon some derangement in the secretion and discharge of the bile.

Lead Colic.

This is a symptom of a disease which may run a long and painful course, and may terminate in disaster or even death to the patient. The disease is most frequent among those whose avocations compel them to work in contact with lead or combinations of lead; such as painters, plumbers, glaziers, etc.; yet the disease is by no means limited to workmen of this class; it may occur from drinking wine, spirits or cider which have been kept in leaden vessels, or which have been submitted to the action of lead in course of distillation; it has also been known to occur from the use of drinking water which had become saturated with lead compounds by passing through improperly-made service pipes.

Another source of lead poisoning is in the use of powders and cosmetics for toilet purposes. It has been induced by the use of flour which had been ground on stones containing lead. Some years ago a local epidemic of lead colic was observed in New Orleans and traced to the presence of lead contained in soda water.

Symptoms.—The patient is usually ill for a considerable time before the colic is manifested. He becomes pallid, loses appetite, strength and flesh. He has a metallic taste in the mouth, and the breath emits a peculiar fetid odor. He becomes afflicted with obstinate constipation, and suffers pain in the abdomen, which is at first slight, but gradually increases in intensity, so as to become the most prominent symptom. The pain is generally felt around the navel, but may shoot to the back, the sides, and the hips. The intensity of the pain varies at different times, being sometimes dull and aching and at other times sharp and spasmodic in character. During the latter occasions the abdomen is usually hard and tense, perhaps tender. There is nausea and vomiting. The patient often experiences relief during these attacks of colic by gentle pressure upon the abdomen, and is therefore apt to lie upon the breast, with a pillow or other article placed under the abdomen.

Under proper treatment the first attack of lead colic usually subsides without leaving any permanent injury; but if the patient resume the employment or the habit which occasions exposure to the lead, the symptoms are apt to recur in an aggravated form. The strength fails rapidly. There is a blue line along the gums at the roots of the teeth. Paralysis is manifested in certain of the muscles, especially those of the fore-arm, as a result of which the patient is unable to extend the hand. The hand, therefore, hangs loosely from the wrist, a condition which is known as *drop-wrist*. This occurs more frequently upon the right side than upon the left. Subsequently various other muscles, the legs as well as the arms, may become paralyzed. In severe cases there occur symptoms indicating disease of the brain — delirium, convulsions, stupor.

Treatment.—To relieve the pain occurring during the paroxysms, the same general measures are useful which have been described in the treatment of ordinary colic. Yet in lead colic opium has a much more important part than in the other, since the drug not only diminishes the pain, but also relaxes the spasmodic contraction of the intestine. In fact, opium is absolutely necessary in the treatment of this disease. Next most important is the *iodide of potassium*, which may be given in doses of five to ten grains every four hours. If the lead poisoning have come on in a short time, the sulphate of magnesia will exert a good effect; otherwise it will be unnecessary.

Under the use of opium and the iodide of potassium the more acute symptoms, including the colic and the intestinal derangement, will subside; in treating the paralysis, however, it will be often necessary to resort to electricity.

Uterine colic is apt to occur during various chronic diseases of the womb; and is also a feature of certain affections of the ovaries. This will be discussed at length in connection with these several topics, and it may suffice to say here, that the treatment requires hot applications to the abdomen, and in most cases a hot hip bath or hot water injections into the vagina.

Infants are especially susceptible to colicky attacks, particularly during the first year of life. These attacks occur sometimes from the condition of the mother's milk, which may be deranged by improper diet on her part, or by excessive mental emotion. In many other cases the colic of infants is due to the almost universal habit of

giving them artificial food too early; it may also result from improper clothing, whereby the child is not sufficiently protected.

An infant afflicted with colic is very restless, screams constantly and draws the lower extremities violently upward toward the abdomen; there is often vomiting, and the abdomen is usually hard and distended.

Treatment.—Infants can be usually protected from colic if they can be properly fed and clothed, and escape from the innumerable household remedies which nurses are so fond of administering upon the slightest provocation. During an attack hot cloths may be applied, and an injection of a wine-glassful of water and a teasponful of castor oil should be given at once by the rectum; if this do not provoke an evacuation of the bowels the following mixture may be injected:

Gin, - - - - - -	One teaspoonful.
Tincture of asafœtida, - -	Ten drops.
Castor oil, - - - -	One teaspoonful.
Warm water, - - - -	Four ounces.

Passage of Gall-Stones.

A most painful form of colic is that which accompanies the passage of gall-stones from the gall-bladder into the intestine. These stones are collections of substances which have been deposited from the bile while retained in the gall-bladder. They may vary in size, from that of a pin-head to that of a hickory nut. So long as they remain in the gall bladder they may occasion no difficulty; but if they are carried into the little tube which leads from the gall-bladder into the intestine—the *biliary duct*—they occasion intense pain by stretching this duct, as well as by preventing the bile from passing through. Such spasms rarely occur, although it is a frequent occurrence to find gall-stones in the bodies of individuals who have never been known to suffer from such attacks.

The paroxysms attending the passage of gall-stones often occur in individuals in perfect health, without apparent cause. The attack is sudden, beginning with extreme pain in the right side, just under the ribs, spreading over to the left side. The pain is sporadic, occurring with the greatest severity at intervals.

There is usually nausea and vomiting; the bowels are constipated; if the attack be a long one, the skin may acquire a yellow hue. The duration of the pain varies from a few minutes to several hours, according to the time required for the escape of the stone into the intestine. Finally the symptoms suddenly cease, leaving merely the exhaustion and soreness. This sudden cessation of the pain indicates the escape of the stone into the intestine, which, because of its large size, affords ample room for the accommodation of the gall-stone.

These attacks are apt to recur in the same individual after intervals varying from years to days. In some cases a series of paroxysms is experienced in rapid succession, prostrating the patient and seriously deranging his digestive organs.

The paroxysm usually terminates by the passage of the gall-stones into the intestine; yet, in some cases, the stone is too large to escape in this way, and remains permanently in the gall-bladder. The result of this may be an ulceration through the wall of the gall-bladder and a general inflammation of the abdominal cavity. If this accident occur, the symptoms of *peritonitis* supervene.

Treatment.— During the passage of gall-stones nothing can be done except to palliate the severity of the suffering. For this purpose opium is employed, as described under the treatment of ordinary wind colic; if the pain be excessive, relief can be obtained from the inhalation of chloroform. Hot applications over the abdomen, or immersion in a hot bath, may also be employed. To obviate subsequent attacks, nothing better can be done than careful attention to the digestion and the general health.

"Inflammation of the Bowels"—Peritonitis.

We have already described a membrane called the *pleura*, which surrounds the lung and lines the inner surface of the ribs; and another membrane of similar nature, the *pericardium*, which surrounds the heart. Still another smooth membrane, much larger in extent than either of those named, though possessing essentially the same structure, surrounds the intestines, liver, and other organs in the abdomen, so that they may move freely upon one another

with as little friction as possible. This membrane is called the *peritoneum;* and an inflammation involving this membrane is called *peritonitis.* If the entire membrane be inflamed, the disease is one of the most dangerous affecting the body, and usually results fatally; but if only a portion of this extensive surface become inflamed, the patient may escape without serious illness.

Symptoms.—The disease usually begins abruptly, though in exceptional cases some pain and soreness may be felt for two or three days before the patient becomes seriously ill. The pain begins at some particular point, and extends over the entire abdomen; it is usually of a sharp, cutting nature, aggravated by movements of the body, or even by a deep breath. The patient, therefore, is extremely careful to avoid any change of position, or any violent use of the lungs, such as sneezing or coughing. The patient usually finds that the pain is less acute if the knees be drawn up toward the abdomen; he therefore assumes this posture in the majority of instances. The abdomen is extremely tender, even the pressure of the bed-clothes occasioning pain; and there is usually swelling and distension of the abdomen from the presence of gas in the intestines. The attack is usually ushered in with vomiting, an act which occasions great pain.

The prostration of the patient is a marked symptom of the disease; the countenance denotes anxiety and distress, and the face sometimes exhibits a peculiar pinched expression, the upper lip being drawn tightly over the teeth. This, the so-called "hippocratic countenance," is quite characteristic of the disease when present. There is usually difficulty in emptying the bladder and bowels — a difficulty largely due, doubtless, to the pain occasioned by the effort.

Cause.—Acute peritonitis is usually secondary to an inflammation in some one of the abdominal organs; most frequently to the inflammation of the womb which occurs in child-bed. Sometimes disease of the intestines will cause peritonitis; and the disease may also result from an inflammation in the female genital organs, which so often occurs from imprudence during menstruation; from attempts at abortion; and from the various affections of the female genital organs. Acute peritonitis may also result from direct injury to the abdomen, such as a blow, or the kick of a horse. In a few cases there appears to be no cause for the disease, which is apparently spontaneous.

It is necessary for the non-professional observer to remember that several other affections present symptoms more or less resembling those of peritonitis. The most frequent of these is colic, in which, however, the prostration of the patient is far less severe.

In some cases the inflammation remains confined to a portion of the peritoneum, in which case the disease is, of course, less severe. The pain and tenderness are confined to a limited part of the abdomen. The prostration of the patient is less marked.

Treatment.—The most important agent in the treatment of this disease is *opium*. As the patient usually vomits, the drug must be given either by injection into the rectum or by insertion under the skin. The patient can usually endure, without danger, an amount of opium which could not safely be administered to a healthy person; thus half a grain to a grain of opium can be given every three or four hours, according to the severity of the pain; the general plan is to administer the drug until the pain is subdued. Hot applications should also be made to the abdomen; these may consist of light mustard poultices, or of cloths wrung out in hot water; the latter may be sprinkled with turpentine. It should be remembered that the bowels must not be disturbed during peritonitis; even though the patient have no evacuation for several days or a week, it is advisable to avoid the use of cathartics. Whenever it becomes necessary to secure a passage of the bowels, this may be done by a rectal injection of hot water.

These constitute the measures which are applicable to all cases of peritonitis. In many individual instances it is desirable to employ other remedies also, which must be determined for each particular case.

Chronic Peritonitis.

This disease may occur as a sequel to an acute attack of peritonitis, but is more commonly due to some constitutional cause. Thus it is especially frequent in tuberculous individuals, and may also occur in those suffering from cancer. In these cases the disease is very insidious, and may exist for a considerable time before its true nature is suspected.

Symptoms.—These consist of pain and tenderness of the abdomen, not so marked as in an acute attack, but often sufficient to confine the individual to the bed. General debility and emaciation, in some cases also fever, are observed; and there may occur some effusion of liquid into the peritoneal cavity, so that a certain amount of swelling or dropsy is apparent.

The disease always terminates fatally; that is, the general condition — of tuberculosis or of cancer — is one from which recovery cannot occur.

Inflammation of the Bowels.

This name is often applied to the affection just described, peritonitis; but the latter is really and primarily an inflammation of the membrane *covering* the bowels. Inflammation of the intestines begins in the mucous membrane lining the bowels, and need not extend to the peritoneum at all.

Symptoms. — The symptoms resemble in many respects those of peritonitis; there is pain, tenderness on pressure over the abdomen, nausea, vomiting and diarrhea. The latter symptom is an almost invariable occurrence in inflammation of the bowels, but exceptional in peritonitis, where constipation is the rule. The pain is not so intense as in peritonitis, and the general prostration of the patient is less marked.

The disease must be distinguished from several affections presenting similar symptoms, prominent among which is typhoid fever. The latter disease is, however, usually acompanied by far more constitutional disturbance than is found in simple inflammation of the bowels.

This inflammation is in adults rarely a serious disease, the patient recovering in most cases within two weeks. In children it constitutes many of the cases of the dreaded "summer complaint," and will be discussed under that head.

Treatment. — The object of treatment is to secure rest of the bowels, which can be best accomplished by opium. One of the best forms for this purpose is Dover's powder, ten grains of which may be administered every four hours, until six or eight powders have been taken.

Intestinal Worms.

Like other animals, man harbors numerous smaller creatures in various parts of his body. It seems to be a general law of nature, that the larger and stronger organisms shall furnish sustenance to other beings less capable than themselves of maintaining the struggle for existence with the inorganic world. These creatures, which thus live at the expense and in the bodies of other organisms, are termed, in general, *parasites*. The human animal harbors a considerable variety of parasites, animal as well as vegetable; and this is true of the healthy as well as of diseased human beings. Every one of us, however healthy and however cleanly, nourishes a considerable colony of vegetable parasites in the mouth and alimentary canal; and many perfectly healthy individuals harbor, also, numerous animal parasites. Most of these organisms are so minute as to be visible only with the aid of a powerful microscope, and unless present in great numbers occasion no symptoms of ill health. Even that object of popular dread, the *trichina*, is found after death in the bodies of many individuals who had never been suspected of harboring a dangerous parasite.

Many of the organisms which live in the human body, however, are of large size, so as to be plainly visible to the naked eye. Among these are several varieties of worms which find the most favorable conditions for their existence in the human intestine. Those of most frequent occurrence are the *round worm* (*Ascaris Lumbricoides*), the thread worm (*Ascaris Vermicularis*), the various species of tape worm (*Tænia*) and the *trichina spiralis*.

The round worm is familiar to every mother of a large family. It resembles in appearance the common earth-worm, though it is usually of larger size. The body is round, tapers toward either extremity, and is of a yellowish white color. It varies in length from six to twelve or fourteen inches.

This worm is quite rare during infancy, being most frequently found between the ages of four and twelve years; yet it may also inhabit the intestines of adults. Numbers of these worms are usually found in the same individual, sometimes coiled together in balls of considerable size. They are frequently passed from the bowels with the evacuations, and sometimes though less frequently pass upward into the stomach and even into the mouth. They are

occasionally found in matter which has been ejected from the stomach by vomiting.

These worms are generally supposed to be found in the intestines of poorly nourished individuals, though this is by no means the invariable rule. They are sometimes observed in the stools of perfectly healthy individuals, who present no symptoms of any difficulty of the bowels or other organs. It seems, therefore, probable that these worms are not generally detrimental to health, or at least that their presence is the result rather than the cause of the ill health of those who happen to harbor them. It may be said of most of the intestinal worms that they are not known to occasion serious illness.

The round worm grows from eggs which are laid by the parent worm in the intestine, and escape with the stools; these probably enter the body of another individual with the drinking water. Having once found access to the intestine the eggs develop into mature worms.

Various symptoms are supposed to indicate the presence of these worms in the intestine; among these are swelling of the abdomen and colicky pains over the bowels; impairment of the appetite, unusual flow of saliva, an offensive odor of the breath, itching about the nose, and especially grinding of the teeth during sleep. All of these symptoms may, however, be present in cases in which no worms can be found; but in such cases it is advisable to administer a cathartic, and to observe the stool as to the presence of these worms.

Treatment.—The expulsion of round worms from the intestine is usually an easy matter. A full dose of some cathartic, such as the citrate of magnesia, may be administered, and after it has acted, the following prescription may be given:

Santonin, - - - - Twenty grains.

Divide into ten pills, and take one morning and night. This dose will suffice for a young adult; for a child it should be reduced; or, instead of this there may be given a teaspoonful of the fluid extract of senna and spigelia, which may be taken before breakfast on an empty stomach. For children the latter prescription will usually be the better, because safer, since santonin has been known to produce serious prostration and nervous exhaustion in young individuals.

Since these worms are probably taken into the stomach with the drinking water, it becomes desirable to exercise some care in avoiding a recurrence of the trouble. To do this the child should not be permitted to drink water from shallow wells or from muddy streams, especially from such as are found in the immediate neighborhood of dwellings.

Thread Worms.

These worms, also called pin worms, or seat worms, are found chiefly in the lower part of the bowel, especially in the rectum. They are much smaller than the round worm, varying from ¼ to ½ an inch in length. They, like the round worms, are often found in masses of considerable size. They occur chiefly in young children, though occasionally found in adults.

These worms usually indicate their presence by itching around the fundament, sometimes accompanied by pain. The patient often feels a great inclination to strain at stool, and may experience the same sensation upon passing water. In females the worms sometimes escape from the rectum into the vagina, and occasion itching and unpleasant sensations in this organ also. At times the worms leave the body, especially at night, and may be found on the bed-clothes or on the skin of the buttocks. It is believed, and, doubtless correctly, that the irritation caused by these worms may occasion unnatural excitement of the sexual organs, and perhaps lead to unnatural habits of gratification; at any rate, leucorrhœa may be caused by the presence of these parasites in the vagina.

If there be any doubt as to the presence of these worms in the intestine, the question can be decided by inspection of the stools, as well as of the skin of the fundament. They can usually be discovered without difficulty.

Treatment.—The worms can usually be destroyed and expelled from the bowels by simple injections of salt water, while the irritation of the parts may be soothed by applying vaseline, or by the injection or an ounce or two of sweet oil. If the injection into the rectum fail to accomplish the purpose, one of the prescriptions already mentioned for round worm may be employed, or a teaspoonful or two of turpentine may be given in a cup of milk an

hour after breakfast. In any case an occasional laxative, such as castor oil or the citrate of magnesia, may be given every second or third day. In most cases it will be found necessary to persevere in the use of injections or medicines, or both, for one or two weeks, in order to expel all the worms, otherwise even though several days elapse without any of the worms appearing, there may nevertheless still be some remaining in the bowel, in which case they will subsequently reappear in numbers as great as before.

Tape Worms.

Several species of tape worm are known to inhabit the human body, as well as those of other warm blooded animals. The life history of these parasites is a peculiar one, and quite different from the ordinary course of events in the development of the animals familiar to us. These animals usually attain their mature form only after passing through and residing in another animal from the one in which they attain their full development. To illustrate: There is a tapeworm which inhabits the bodies of dogs; the eggs of this worm are expelled from the dog's intestine, and become scattered around upon the surface of the ground. These eggs find their way into the stomachs of sheep, for instance, being swallowed with the grass; arrived in the body of the sheep the eggs develop into an immature worm, surrounded by a little sac containing liquid, at which stage the tape worm is called a *cysticercus*, and is located in various organs of the sheep's body, — brain, liver, etc. In the sheep the worm undergoes no further development, but when the flesh of the animal is devoured by the dog the imperfectly developed worm — the *cysticercus* — develops in the stomach and intestines of the latter animal into its mature form, and becomes a tape worm. So, too, the commonest tape worm found in the human subject — the *tænia solium* — has a similar life history. Its eggs are discharged from the human intestine, and enter the stomach of certain animals, especially sheep and hogs, where the egg undergoes partial development, and becomes a *cysticercus*. These immature worms are found scattered through the body of the animal; when present in large numbers they give the flesh that peculiar speckled appearance which is familiar to us under the name of "measly

pork." If this flesh be eaten raw or partially cooked, these immature worms undergo development in the human stomach or intestines, and become full-fledged tape worms. Thorough cooking destroys the *cysticerci*, so that no development into worms occurs. It is a familiar fact that butchers and cooks are especially prone to tape worms, a fact which is explained by their habit of eating raw or partly cooked meat. In the same way tape worms are doubtless often acquired by children who are fed upon raw meat or slightly cooked broths — a practice which has become quite common in the treatment of the summer diarrhea of infants. It is said that in Abyssinia, where the practice of eating uncooked meat is general, almost every individual harbors at least one tape worm.

The solitary tape worm — *tænia solium* — so called because in most cases but one worm is found in the same individual, is a ribbon-like animal, composed of numerous joints, each of which is provided with male and female organs of generation. The worm varies in length from two or three to forty feet, consisting of from 500 to 1,000 joints. The end of the worm near the head is quite slender, the body becoming gradually larger toward the other extremity, the largest joints being half an inch or more in breadth. The head is small and provided with four suckers, and often with a row of hooks, ten or fifteen in number, surrounding the suckers. The joints composing the tail of the animal are often thrown off and escape from the bowel in the stools. In these joints are found enormous numbers of eggs, the number contained in the entire tape worm being estimated at from five to ten millions.

Symptoms.—There are no signs by which the existence of a tape worm can be positively asserted. Numerous symptoms are supposed to indicate the presence of the animal — dizziness, ringing in the ears, impairment of vision, flow of saliva, itching about the nose, impairment of appetite and digestion, colicky pains in the abdomen and general emaciation. These, however, may all exist from other causes in cases where no tape worm is present; while on the other hand the worm may be discovered in individuals who consider themselves perfectly well. The bad effects caused by these worms have doubtless been much exaggerated by the popular horror at the idea of the existence of such animals in the human body. When a patient is once aware of the existence of such a worm in his body, he is apt to refer all unusual symptoms of whatever nature to the presence of the animal.

The only positive proof of the existence of a tape worm is the passage of some of its joints from the intestine. If the worm have attained considerable size, such fragments are passed daily, or at least at short intervals. If careful examination for several days fails to reveal any of these joints, a cathartic may be given, which generally results in the detachment of several pieces. A negative result may satisfy the physician that there is no worm present; but the patient is apt to remain fully convinced that there is a tape worm in his bowel. Not infrequently such an individual retains this conviction in spite of all argument and proof to the contrary; he may, indeed, acquire an insane delusion in regard to the matter. These are, indeed, the most troublesome to treat — not those who have, but those who have not a tape worm, though fully convinced to the contrary.

Treatment.—One of the commonest, and certainly a very efficient, means for expelling the worm is *turpentine*. This is given in quantities varying from one to two tablespoonfuls for adults, usually mixed with the same quantity of castor oil, and taken floating on milk. This dose may be repeated every second or third day, until the fragments of the worm cease to appear. The objection to the use of turpentine is that it sometimes causes difficulty in passing water, and it may induce a state of intoxication in some cases.

Another popular remedy is the oil of *male fern*. This may be given in doses of one or two teaspoonfuls, either in mucilage or in gelatine capsules. Two hours after this dose the patient may take a teaspoonful of turpentine in a tablespoonful of castor oil. A still more familiar remedy is made of pumpkin seeds. Two ounces of the seeds are pounded in a mortar with six ounces of water, the mixture then being strained. Half of this may be taken in the morning and half in the evening. It will probably be necessary to repeat this treatment for several successive days.

Several other remedies have been proposed and successfully used for the expulsion of tape worms. Among these is *kousso* and the bark of *pomegranate* root; and common salt has been sometimes found efficient in cases where other remedies had failed. Half an ounce to an ounce of salt taken in gruel before breakfast every morning for several days may be tried, if other means are found inefficient.

Whatever remedy may be selected, it is important that certain preparatory treatment should be adopted before the worm remedy itself is given. This treatment consists in abstinence from food for several hours, or a day; or the patient may employ light diet, such as broth and milk, for two or three days previous to the use of the remedy. It is supposed that by thus withholding food the worm is weakened, since its nourishment is derived from the matters which pass along the intestine, and not from the wall of the intestine itself. After one or two days of this treatment the worm remedy may be given, and followed in three or four hours by a purgative dose of castor oil. If the first dose be unsuccessful, the plan may be repeated, after an interval of two or three days. Complete success is indicated by the appearance of the worm's head in the stools. Yet it should be remembered that if the greater part of the body be expelled — as may be inferred from the passage of successively smaller joints — the animal will probably die, even though the head may not have been expelled. Unless fragments are again observed in the stools, it may be assumed that the treatment has been successful.

The *preventive* treatment of tape worm is not less important than the measures for the cure. These worms are taken into the body with imperfectly cooked beef, mutton and pork. Prevention, therefore, consists simply in eating only thoroughly-cooked meat. It is also possible that the worms gain access to the stomach with the drinking water. Hence a certain amount of caution in this regard is also to be recommended.

Trichina Spiralis.

In 1832 it was discovered that the flesh of human beings sometimes contains large numbers of microscopic worms, which are found coiled up in the muscles of the body. This worm was named, from its hair-like appearance, *trichina*, and from the spiral coil in which it is usually found in the muscles, *spiralis*. In 1860, Zenker, of Dresden, observed a case in which it was shown for the first time that these minute worms were capable of causing a fatal illness. A girl died after an illness lasting several weeks, during which she had suffered from fever, prostration, sleeplessness, great pain and tenderness in the abdomen and limbs. It was found that

her flesh was swarming with trichinæ, and that numerous worms were present in the intestines. Zenker was able to trace the source of the disease to certain ham and sausages, after eating which the girl had been taken ill. It was found, on microscopic examination, that the ham and sausages contained numerous living trichinæ.

Since that time numerous cases have been observed in which a similar disease has been traced directly to the consumption of pork—commonly as uncooked ham or sausage—in which trichinæ have been detected. In one instance a large party, partaking of a festival dinner during a celebration, consumed among other things some raw sausage. Among one hundred and three persons at the table, nearly all were attacked by the disease, and a considerable number died. On microscopic examination it was found that these sausages, and the pork from which they had been made, contained numerous trichinæ, and the same worms were discovered also in the muscles of those who had died of the disease. In our own country cases of this malady—*trichinosis*—have been frequently reported, many of them ending fatally. The trichina obtains entrance to the human body through the consumption of pork. The original source of the worm is not as yet definitely known, but it seems that the rat is the natural host of the parasite, and that the worm enters the body of those hogs which devour infected rats. However that may be, the fact remains that a considerable percentage of American hogs are infested with the trichina; the exact percentage has varied somewhat in different examinations, according to the source of the pork and the care of the examiner. Examinations of many hundred hogs shipped to the Chicago market have shown that from two to eight hogs in every hundred contain trichinæ. The presence of the worm in the hog does not necessarily occasion any symptoms which attract attention to the animal's condition; in fact, it has been found that many hogs whose bodies contain a large number of the worms, are in perfect health up to the time of being slaughtered. The condition which gives to pork the appearance known as "measly" is not due to trichinæ, as is commonly supposed, but to the eggs of a tape worm. One who is familiar with the appearance of trichinous meat can often detect the presence of the parasites when they occur in large numbers, for in this case, especially after they have been contained in the animal a considerable time, numerous white specks, like grains of fine sand, can be observed scattered

through the meat. Yet the absence of these specks does not prove that there are no trichinæ present, since the white specks are really due, not to the worm itself, but to little masses of matter which collect around the worm as it is coiled up in the muscles. When flesh containing the worm is taken into the stomach of a human being, the little sac containing the worm is dissolved, and the animal is set free in the juices of the stomach and intestines. Here they undergo a rapid development; so long as they remain coiled up in the muscles they are immature and sexless creatures, of comparatively simple structure; but when they arrive in the human stomach and intestine they grow rapidly, acquire sexual organs, and within eight or ten days the now fully developed female worms contain hundreds of living young. These microscopic worms escape from the body of the parent into the alimentary canal, and pass soon afterwards out from the intestine into the muscles of the human body. Having thus migrated all over the body, they coil themselves up in the muscle, and remain an indefinite period — even twenty years — without undergoing any further change: in fact, they are capable of no development until taken into the stomach of another animal. It is the irritation caused by the passage of these worms from the intestines to different parts of the body, it is the irritation and fever attendant upon it, which constitutes the disease known as trichinosis. So soon as the adult worms in the intestine have ceased to propagate, and so soon as the young produced have escaped from the intestine, the fever ceases, and the individual begins to convalesce.

The number of worms contained in the human body is sometimes enormous; this can be readily understood when we consider the rapidity of propagation. For the trichinæ may exist in the infected pork in large numbers; as many as 200,000 having been estimated to occur in a cubic inch of the meat; now, when it is remembered that many cubic inches of infected meat may be devoured at a meal, and that each female worm may produce from 600 to 1,000 young within ten days, it may readily be believed that the entire number of young produced and coiled up in different parts of the human body may amount to 30,000,000 or 50,000,000. Such at least seems to be the case in many instances, yet it is important for us to remember that the number of worms taken into the stomach varies according to the amount of flesh eaten, as well as to the number contained in every cubic inch of the infected meat; that

the amount of meat eaten at a meal varies considerably in different persons and at different times is familiar. Hence it sometimes happens, that of two individuals who consume trichinous flesh at the same time, one will be taken seriously ill, while the other will escape with slight symptoms, or even entirely. In the same way the effects vary according to the number of worms contained in the infected pork. In some instances as many as 200,000 trichinæ have been found in a cubic inch, while at other times only ten or twenty worms were contained in the same quantity. It is evident that the consumption of pork containing only a few worms would be followed by less serious effects than by that of meat which was crowded with the worms. Hence the severity of trichinosis varies extremely, all degrees of illness being caused, from a slight indisposition to death itself.

Yet it must not be supposed that the consumption of trichinous meat necessarily causes the symptoms of trichinosis; there is nothing poisonous about the worm itself, the damage which it inflicts being due simply to the irritation caused by its burrowing through the flesh. Hence if only a few worms—say one or two thousand—are produced in the intestine, there may be no symptoms whatsoever to indicate disease, and the individual may therefore never suspect that his flesh contains trichinæ. Doubtless many of us carry a considerable assortment of these worms in our flesh; at any rate, it has been found that over two per cent. of individuals dying in certain large European hospitals, contained some trichinæ; and that, too, without regard to the cause of death, there being no suspicion in any case that the individual had ever had the disease.

After the young worms which have thus migrated from the intestine become coiled up in the muscles they cease to cause any symptoms of illness, and remain for an indefinite time, even many years, without undergoing any development. For it will be remembered that these worms can develop only when taken into the stomach of another animal. So long, therefore, as they remain in the muscles of the first animal, they retain their immature sexless condition, and do not propagate. Having, therefore, recovered from the early effects of eating the infected pork the individual is safe from any further sickness from this cause, unless, indeed, he devours infected pork a second time.

Symptoms.—For the first few days after the infected pork is eaten the individual manifests no symptoms of disease. It is only

when the young worms are born and begin to pierce the walls of the intestine on their way to the muscles that the evidences of disease become manifest; this begins from six to ten days after the meat has been taken into the stomach. The first symptoms consist of pain in the abdomen, diarrhea and vomiting, accompanied by great constitutional disturbance. The general condition is one of nervous exhaustion, very much resembling typhoid fever, for which disease trichinosis is doubtless often mistaken. So soon as the young worms begin to find their way into and through the muscles, symptoms occur which indicate a disturbance in the muscles; these symptoms consist of acute pains in the limbs and in the back, usually aggravated by motion—a condition which the patient regards as rheumatism. In some cases several of the muscles will remain in a state of contraction, that is, the leg will be bent at the knee, or the arm at the elbow, for instance, any attempt to straighten these limbs causing severe pain. There usually occurs during the second or third week considerable swelling of the face, and perhaps of the skin generally. This is a symptom which should arouse suspicion of trichinosis in a patient who otherwise has the symptoms of typhoid fever.

Treatment.—In most cases of trichinosis the cause of the disease is not suspected until ten days or two weeks after the pork has been eaten. Exceptions to this rule occur only in cases where a considerable number of healthy people are suddenly taken ill with the same symptoms after eating at a common table—an instance of which occurred in Prussia, where three hundred people became ill within a few days from eating a certain lot of sausages. In those cases where there is no suspicion of the true source of the disease until the pain in the muscles and swelling of the skin occur—usually twelve or fourteen days after the flesh has been eaten—nothing can be done except to support the strength of the patient; for the young worms are now swarming through his body, and cannot be destroyed by any agency without injuring the patient himself. In these cases it remains simply to support the patient's strength by nutritious food combined with alcoholic stimulants—the quantity of the latter varying with the amount of nervous prostration. The pain may also be so severe as to require the use of an opiate.

If the nature of the difficulty be suspected within a very few days after the consumption of the pork—that is, before the young worms have begun to leave the intestines—it is advisable to admin-

ister brisk cathartics, with the hope of carrying the worms out of the alimentary canal. Some have advised the administration of carbolic acid, or the hyposulphite of sodium, with the hope of destroying the worms in the intestines. As to this mode of treatment, it can only be said that while these agents are certainly capable, *in sufficient strength*, of destroying the worms, yet it is very doubtful whether they ever have that effect in the alimentary canal, since we are compelled to administer them in weak solutions in order not to damage the intestine itself. In short, it must be said that we know absolutely no treatment which can be relied upon either to destroy the worms or to prevent them from burrowing into the muscles; all we can hope to do is to assist the patient in tiding over the attack.

Yet, while the treatment is thus unsatisfactory, the *prevention* of the disease is extremely simple. It consists merely in avoiding all pork, in whatever form, which has not been thoroughly cooked. Smoking, salting and pickling do not destroy the trichinæ contained in hog's flesh, so that hams and sausages are quite capable of communicating the disease; in fact, most of the cases observed have resulted from eating raw sausages and uncooked ham.

Guinea Worm.

This parasite is found only in tropical regions, especially on the western coast of Africa. It finds its way into the skin of the feet and legs of individuals who walk barefoot over swampy ground and in shallow streams. A small vesicle forms on the foot or leg, and finally bursts, giving exit to a number of small worms; these are the young brood, the mother remaining in the tissue just under the skin. This adult worm is from six inches to five or six feet long, and a twelfth of an inch broad; it is said that the natives remove the worm by seizing the end of it and winding it round a stick, windlass fashion; or a little weight is attached to the worm, which is thus gradually drawn out of the skin. The disease is a long, tedious and painful one, though fortunately rare outside of the tropics.

Filaria Sanguinis Hominis.

This name, which means the *thread-like worm of the human blood*, is found, as the name indicates, in the blood of man. It is a microscopic animal about $\frac{1}{75}$ of an inch long, and therefore invisible to the naked eye. This parasite, like the guinea worm and so many other animal and vegetable parasites, is found in tropical countries chiefly; it has been observed in India, China and Australia. These minute worms float in the blood, sometimes in enormous numbers; in a case which the writer saw, there were on the average 100 of these worms in every drop of blood, which would therefore indicate about 50,000,000 in the entire body.

Another peculiarity of this worm—one which remains as yet entirely unexplained—is the fact that they are visible in the blood only at night, disappearing entirely during the day. In the case above referred to, this fact was abundantly established by observations made night and day during a period of three months. The blood was examined with a microscope every three hours day and night, and it was found that while no worms could be discovered from 8 or 9 o'clock in the morning until 5 or 6 in the afternoon, yet at this hour they began to appear, and by midnight were very abundant. Toward morning they decreased again in number, and by 8 or 9 o'clock had entirely disappeared. These worms in the blood are in an immature, embryonic condition, like the *trichinæ* in the muscles. The fully developed worms are between two and three inches in length, as large around as fine thread; these appear to live in the water of shallow pools and streams.

The individual whose blood contains these worms may for a considerable time present no symptoms of disease; sooner or later, however, the urine becomes milky in appearance, and the patient often has considerable difficulty in passing water. In many cases there ultimately occur numerous abscesses in various parts of the body, and the condition known as *pyæmia*, or blood poisoning, which usually results fatally, is induced.

The existence of this parasite was discovered but a few years ago, and as yet but few opportunities have been offered for studying it and its effects upon the human body; as yet no means have been found for destroying the parasite within the body.

The only cases of this disease which have been observed

in Europe or America occurred in individuals who had recently arrived from tropical climates and who had contracted the disease in these climates.

Dropsy.

Dropsy is not a disease but a symptom; but as it is a symptom of very many diseases it may be as well to discuss it as a separate topic.

By dropsy is understood the presence of the watery elements of the blood in portions of the body where they are not usually found. There are various parts of the body where this fluid may collect in considerable quantity; these are, 1. The loose connective tissue situated under the skin; when the meshes of this tissue become filled with watery liquid the skin presents a white, puffed appearance, the foot and leg, perhaps also the body and arms, being swollen. This general dropsy of the tissue under the skin is called *anasarca*. 2. Another locality where the watery part of the blood often collects is the cavity of the abdomen. In this case the fluid collects between the abdominal wall and the intestine, and the dropsy is called *ascites*. 3. The water may also collect in the chest, between the lung and the ribs; in this case the dropsy is called *hydrothorax*. 4. The fluid may also collect between the brain and the skull, the dropsy then being called *hydrocephalus*, water on the brain. 5. The water may collect in a tumor of the ovary, and is then called *ovarian dropsy*. There are also various smaller cavities in the body where the watery elements of the blood may accumulate so as to constitute a local dropsy; such is *hydrocele*, dropsy of the testicle.

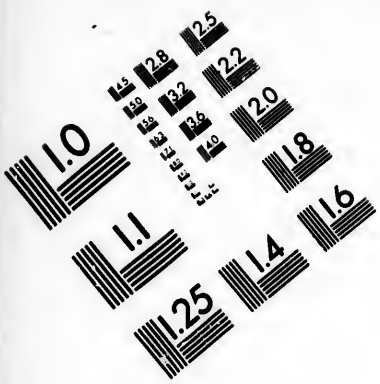
Causes.—Dropsy, whether general or local, is the result of either, 1. *interference* in the circulation of the blood; or 2, of *impoverishment* of the blood; or 3, of certain inflammations of the kidneys. Dropsy often occurs in the advanced stages of many wasting diseases, such as consumption; in this case it is probable that the dropsy is due to the first of the above named causes — *interference in the circulation* of the blood, from the weakness of the heart which accompanies the general failure of the patient's strength. The swelling which often occurs around a local inflammation, such as a felon or an erysipelas, is not properly called dropsy.

General dropsy—anasarca—may be due to any one of several causes. One of the most common of these is heart disease, as a result of which there is an impediment in the circulation of the blood. It follows, therefore, that the blood will collect in some parts of the body, most naturally at the lower parts,—the feet and legs—because the heart is not strong enough to force the blood up again from the feet into the trunk. The result of this accumulation of blood in the feet and legs is the escape of some of its watery elements into the loose tissue under the skin—that is *dropsy*. This dropsy begins at the feet and legs, and may for a considerable time remain limited to these parts of the body; but as the heart grows gradually weaker, the circulation becomes more and more feeble, and the dropsy correspondingly greater. Hence after a time the swelling usually extends up the legs to the trunk and even to the face and head.

Another form of dropsy results from disease of the kidney—"Bright's disease." In this case the dropsy usually begins in the feet, gradually extending up the body as the disease progresses in the kidney. Finally the face also becomes swollen and distorted.

An acute inflammation of the kidney may cause general dropsy within a few days; in this case the swelling often appears in the face first, especially under the eyes; but in a few hours or days there may be a general puffiness of the skin throughout the body. Such a dropsy will be readily recognized by the accompanying symptoms, since there is almost invariably fever, pain in the back and other evidences of constitutional disturbance. It is from this cause that the dropsy originates which often occurs during the convalescence from scarlet fever.

These are the most frequent causes of general dropsy; and an individual who becomes the subject of such a dropsy, should at once submit himself to medical examination, in order that the cause may be discovered, and, if possible, be removed. There are in addition numerous causes which occasionally induce general dropsy. It has been already noticed that an impoverishment of the blood results in anasarca (dropsy), examples of which are sometimes seen in those who have long suffered from malarial fever, and in the subjects of advanced consumption. So, too, any obstruction to the circulation of blood may be followed by general dropsy. This obstruction may be not merely organic disease of the heart, already mentioned, but also various tumors within the chest and abdomen



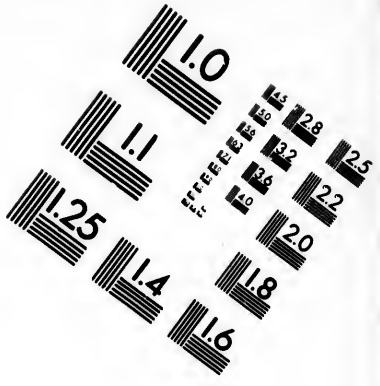
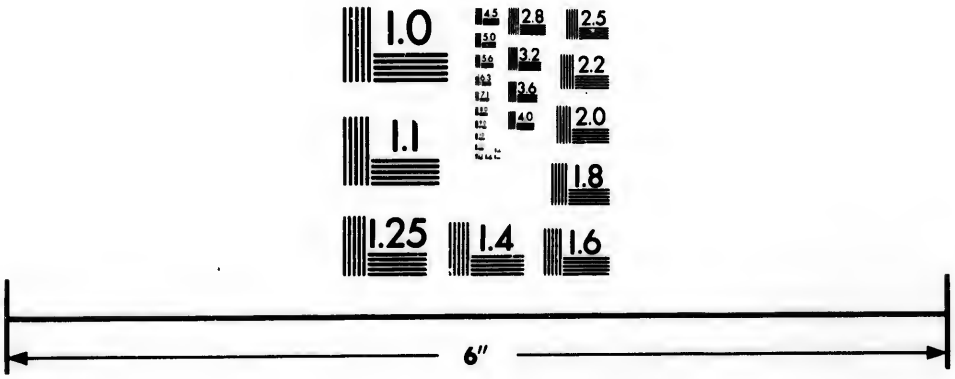


IMAGE EVALUATION
TEST TARGET (MT-3)



Photographic
Sciences
Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

may result in the same way by impeding the circulation. Several diseases of the lungs also, whereby the flow of blood through these organs is prevented, may result in more or less general dropsy.

Dropsy of the abdomen (*ascites*) is a frequent form of dropsy. It occurs not only in connection with general dropsy, from the causes which have been already enumerated, but may also exist without any swelling in other parts of the body. In this case the abdomen is swollen sometimes enormously, so that the skin of this part of the body is tightly stretched, and the veins are often sharply outlined as blue lines running near the surface. The most common cause of ascites is disease of the liver, especially that form of liver disease which is brought on by long indulgence in the use of alcoholic beverages. It may, however, also result from disease of other organs in the abdomen, as well as from pressure of a tumor on the large vein which leads from the liver, or from disease of the vein — the *portal* vein — which collects the blood from the intestines and carries it to the liver. Abdominal dropsy may also occur from an ovarian tumor or even from a natural pregnancy, because the tumor or the enlarged womb presses upon the veins; yet in pregnancy the dropsy is more apt to begin in the feet and to affect the feet and legs rather than the abdomen.

Dropsy, whether it be general or confined to the abdomen, is apt to result, sooner or later, in symptoms which seriously impair the patient's comfort. Not only do the different members of the body become unwieldy from the amount of water contained in them, but the breathing also is apt to become impaired in consequence of interference with the movements of the *diaphragm*. In many cases of general dropsy, too, water accumulates in the chest, still further interfering with the expansion of the lung.

The distension of the skin often causes serious difficulty when the dropsy has existed for a long time. The skin becomes bluish, and may finally break — an accident most frequent between the knee and ankle. If the difficulty do not result in actual breaking of the skin there may be, nevertheless, a diseased condition known as *eczema*, or salt rheum; in this state the skin becomes red and rough, and there is transuded a watery fluid, which keeps the limb constantly moist, and results in the formation of sores or *ulcers*. Even before this stage arrives the patient is troubled by the most intense itching of the skin, chiefly on the legs. Sometimes, too, when the swelling has involved the body, the patient is annoyed by a similar intense itching around the genital organs.

Treatment.—Since dropsy is merely a symptom and a result of certain diseased conditions of the body, it is evident that the treatment must be directed, not to the dropsy itself, but to the cause. If the swelling result from the disease of the heart, it is often possible, by the use of proper remedies, to strengthen the heart's action and thus improve the circulation of the blood, so that the dropsy may be much diminished or even entirely removed. So, too, in certain cases of dropsy from disease of the kidneys, it may be possible, at least, to improve the condition of the patient, though these cases are less promising than some others.

To strengthen the action of the heart we commonly employ *digitalis*, ten or fifteen drops of which may be given in water, three or four times a day, as already directed in discussing the diseases of the heart. To relieve the dropsy from disease of the kidneys, it is usually necessary to give the patient tonics, whereby the condition of the blood can be improved. In all cases, unless the patient is quite weak, the dropsy may be diminished by the use of certain purgatives which cause the watery part of the blood to be passed into the intestines and evacuated in the shape of watery stools. For this purpose the following prescription may be given:

Jalap, - - - - - -	Forty grains.
Cream of tartar, - - - -	Four ounces.

Give one-fourth of this every second day.

If the patient be much debilitated, these purgatives which provoke large and watery stools cannot be well borne, and should not be employed in quantities so large as indicated in the above prescription. In these cases, however, it may be possible to reduce the dropsy somewhat by giving the sweet spirits of nitre, one or two teaspoonfuls twice a day. Another remedy which is usually very successful in promoting the removal of water from the skin is *jaborandi*, or its active ingredient, *pilocarpine*. The objection to its use consists in the exhaustion which is entailed by it. If, however, the patient's condition is such as to warrant its use, ten grains of jaborandi may be given once a day; in all these cases where powerful drugs are used to diminish the dropsy, the patient's condition should be carefully watched, since it is possible to do more harm—even though the dropsy be diminished—by weakening the patient, than good.

Although these measures may succeed for a time in diminishing the dropsy, or at least preventing its increase, yet unless it be possible to remove the diseased condition upon which the dropsy depends, the amount of water in the skin and consequent swelling will gradually increase, in spite of all efforts to control it. Even then it is often possible to secure temporary relief by the operation of *tapping*, a measure which is especially useful in dropsy of the abdomen or of the chest. Tapping consists in the introduction of a tube through the wall of the abdomen or of the chest, whereby the accumulated water is permitted to escape. It is a matter requiring much care and skill, and should, of course, be performed only by a competent physician. The relief afforded is often very great; the patient is no longer compelled to struggle for breath, but becomes temporarily quite comfortable. In most cases the dropsy returns again far more rapidly than was the case originally; in a few weeks or months the patient requires tapping again. There is, of course, in this operation of tapping nothing which can tend to cure the disease, nor even to arrest its progress. Yet the relief obtained is so great that the operation is a boon to the patient, as well as to his friends. In some cases, tapping is repeated a dozen or a score of times, each time with the effect of improving the patient's condition, although he may ultimately succumb to the disease which causes the dropsy.

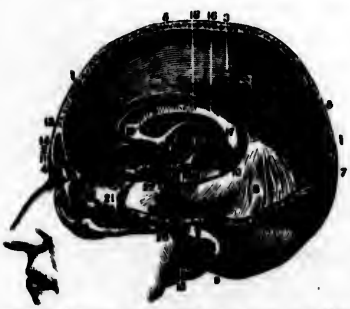
Dropsy of the Chest.

This may occur as the result of inflammation of the membrane covering the lungs, as has been described under the subject of *pleurisy*. It may also occur as a part of general dropsy, especially when this dropsy results from disease of the heart. Although the fluid itself contained in the chest is not poisonous nor otherwise injurious, yet its presence causes mechanically effects which may seriously incommode the patient. The effect results from the mechanical compression of the lung, whereby the breathing becomes labored. Evidences of this are to be found in the hurried acts of breathing, and in the sense of suffocation which occurs whenever the patient lies down; he is often compelled to sleep in the sitting posture, or with the head propped up by pillows. The face becomes swollen,

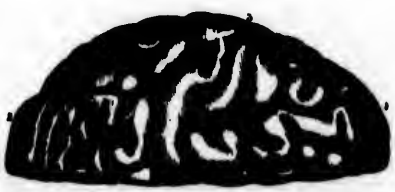
540.—A view of the course of the anterior columns of the Spinal Marrow to their termination in the Hemispherical Ganglia of the Cerebrum.

538.—A vertical section of the Corpus Callosum through its middle. The left internal side of the Cerebrum is also shown.

533.—A view of the base of the Cerebrum and Cerebellum, together with their nerves.



537.—A section of the Head to show the Falx Major, Tentorium, and other parts found under the median line of the Head.



532.—A view of the appearance of the convolutions of one side of the Cerebrum, as seen from above.

BRAIN.

Explanation of "Brain" Plate.

FIGURE No. 540.

1, 1, 1, 1. Motor area from the anterior columns of the spinal medulla to the hemispheric ganglion.
2. Corpus pyramidale.
3. Corpora olivaria.
4. Pons varolii.
5. Crura cerebri.
6. Corpus striatum.
7. Hemispheric ganglion.
8. Cerebellum.
9. Olfactory nerve.
10. Optic nerve.
11. Fourth pair of nerves.
12. Sensory root of the fifth pair.
13. The seventh and eighth pairs.
14. Anterior commissure.
15. Mamillary eminence.
16. Corpora geniculata.

FIGURE No. 538.

1. Section of the corpus callosum.
2. Septum lucidum.
3. Anterior column of the fornix.
4. Section anterior commissure.
5. Central substance of the thalamus opticum.
6. Aqueduct of Sylvius.
7. Pineal gland.
8. Velum interpositum, or medullary band leading from the pineal gland to the anterior commissure.
9. Section of the crura cerebri.
10. One of the corpora albicantia, or mamillary bodies.
11. The tuber cinereum.
12. Section of the commissure of the optic nerves.
13. Optic nerve after its commissure.
14. Olfactory nerve.
15. Anterior surface of the hemisphere.
16. Division between the posterior and middle lobes of the cerebrum.

FIGURE No. 533.

1. Anterior extremity of the commissure of the cerebrum.
2. Posterior extremity.
3. Anterior lobes of the cerebrum.
4. Middle lobe.
5. Fissure of Sylvius.
6. Posterior lobe.
7. Point of the infundibulum.
8. Its body.
9. The corpora albicantia, or mamillary bodies.
10. The corpus cinereum.
11. The crura cerebri.
12. Pons varolii.
13. Superior ridge of the medulla oblongata.
14. Posterior prolongation of the pons varolii.
15. Middle of cerebellum.
16. Anterior part do.
17. Posterior part do.
18. Superior part of the spinal medulla.
19. Median fissure of the medulla oblongata.
20. Pyramidal body.
21. Restiform body.
22. Olivary body.
23. Olfactory nerve.
24. Its bulb.
25. Its external root.
26. Its middle root.
27. Its internal root.
28. Optic nerve after its commissure.
29. The same before the commissure.
30. Optic motor of the third pair.
31. Pathetic nerves, or fourth pair.
32. Trigemini, or fifth pair.
33. External motors, or sixth pair.
34. Facial nerve.
35. Auditory nerve.
36, 37, 38. Eighth pair.

FIGURE No. 537.

1. Vertical section of the head.
2. Frontal sinus.
3. The major falx of the cerebrum.
4. Its origin in the crista galli.
5. Its union along the sagittal suture.
6. Inferior or concave ridge.
7. Continuation of the tentorium cerebelli.
8. Tentorium cerebelli.
9. Its union with the temporal bone.
10. Free ridge of the latter.
11. Tortuous eminences of the anterior right lobe of the cerebrum.
12. Anterior extremity of the corpus callosum.
13. Transparent partition.
14. Section of the anterior commissure.
15. Anterior crura of the fornix
16. The middle of the fornix
17. The posterior extremity.
18. Internal side of the thalamus.
19. Section of the corpora striata.
20. Lateral walls of the third ventricle.
21. The dura mater turned over.
22. Section of the internal carotid artery.

FIGURE No. 532.

1. Anterior lobe of the cerebrum.
2. Posterior lobe.
3. Middle lobe.

the lips and even the cheeks are livid. By the time that these symptoms have supervened there is usually swelling of the feet and legs.

The treatment is essentially that already recommended for the management of general dropsy, though if the dropsy be confined to the chest alone, it is much better to remove the liquid by tapping than to torment the patient with cathartics.

Dropsy of the Brain.

This condition, also called "water on the brain," is a symptom of an inflammation of the membrane covering the brain and lining the skull. Fluid may collect therefore between the brain and skull, in just the same way it collects in the chest from an inflammation of the membranes in the chest, and as it collects in the abdominal cavity as a result of the inflammation in this part of the body. This inflammation may be induced by any one of several causes, prominent among which are the various infectious diseases. But perhaps the most frequent of those causes which excite this inflammation is the condition known as *scrofula*. The effect of this constitutional taint is the induction of tubercular ***meningitis***, that is of an inflammation in the membrane of the brain accompanied by the formation of tubercles, just as consumption causes the formation of tubercles in the lungs In fact this form of dropsy occurs with especial frequency in the children of consumptive parents.

Symptoms.—The symptoms which indicate dropsy of the brain are usually preceded for months by a mild inflammation of the membranes covering this organ. This inflammation is indicated by impairment of health in the child; for the subject of the disease is usually a child; he becomes dull and moody, constantly drowsy, but usually sleeping less soundly than before; he suffers from headache and pains in the limbs; is apt to lay his head in his mother's lap without uttering any special complaint to account for his unusual depression of spirits; in many cases there will be sudden spells of vomiting without any especial feeling of nausea, and not to be accounted for by errors in diet.

When the inflammation has lasted a considerable time the water begins to collect around the brain, and additional symptoms become manifest. These consist in impairment in various muscles; the child's gait becomes uncertain and peculiar; he may drag one foot after him, stumbles over slight obstacles, and perhaps staggers while walking. Later, there may occur some impairment in the movements of the face, the child displaying an inclination to squint; finally there occurs a paralysis of certain parts of the body, stupor, delirium, convulsions, or other symptoms, which excite attention and alarm the friends. A fatal result is apt to follow soon after the manifestation of these symptoms.

In some cases the symptoms are confined to the brain and muscles, as indicated in the foregoing paragraph; at other times there is evident, also, some unnatural condition in the abdomen; the child's belly becomes swollen and tender to the touch; it may also be bloated, though in the majority of instances the abdomen is sunken; the bowels are usually constipated, though there may be some diarrhea at intervals.

Dropsy of the brain from this cause usually ends fatally, especially if it be undetected until the more serious symptoms such as paralysis and stupor occur. It not infrequently happens that several children of the same family die in succession during the early years of life from this cause.

Treatment. — The only hope of escape from the usually fatal result of this disease lies in the improvement of the general health. This can be best accomplished by a change of residence and of occupation, by the use of tonic remedies and nutritious food. The medicines which will prove most useful are iron, quinine, strychnine and cod liver oil, directions for administering which have been already given in discussing plumonary consumption. In addition, it may be well to give the *iodide of potassium* in doses adapted to the age of the patient. Thus, a child of three years may take two or three grains of this remedy three or four times a day. The following prescription may be administered:

Iodide of potassium, - -	One drachm and a half.
Tincture of nux vomica, -	Two drachms.
Syrup of tolu, - - -	An ounce and a half.
Water, - - - -	To make four ounces.

Mix; take a teaspoonful after meals.

Chronic Dropsy of the Brain.

This consists in the gradual accumulation of watery fluid in the cavities of the brain, and between the brain and the skull. This accumulation sometimes takes place to an enormous extent, so that the child's head becomes excessively large, weighing more, apparently, than the rest of his body. This process may begin before the birth of the child. In this case, the enlargement of the head may be so great as to render natural delivery impossible; the physician is compelled to puncture the head, and permit the water to escape before the child can be delivered. In other cases the enlargement is not so great as to prevent the birth of a living child, though the head will usually be found increased in size, its bones separated by broad channels, between which a soft fluctuating mass can be felt. Children whose heads have undergone this change before birth rarely survive many months.

In the majority of cases which come under the physician's notice, the dropsy of the brain, and the corresponding enlargement of the skull, begin during infancy or early childhood. In fact, this process may continue for some time before attracting the attention of the parent. It will be noticed that the child's temper is changed for the worse; that it becomes unusually peevish, dull, and drowsy; the child begins to walk unusually late, or it may fail to walk at all. The mental faculties, too, are not developed as in other children. The child is not so bright, nor so apt to acquire the power of speech; the utterance is indistinct; in the worst cases the child is idiotic. The senses of sight and hearing are usually impaired; in some cases, the eyes roll around aimlessly, or may exhibit a squint. As the child becomes older, the symptions become more marked. Whatever acquisitions the child may have made in the way of walking or speaking are lost, though cases occur in which the mental remain almost unimpared to the close of life. The digestive system becomes deranged, vomiting being a frequent occurrence, while the bowels are irregular. The head attains an enormous size, the bones being pressed far apart; the weight of the head is so great that the child is unable to stand, or even sit erect, and must therefore retain the recumbent posture. It is these cases of advanced dropsy of the brain which are exhibited now and then at cheap museums and

similar entertainments, where the child may pass a few weeks near the close of its life, helpless and unconscious of its surroundings.

Treatment.—There is no known means by which this affection can be cured, or even arrested. A few instances are, indeed, on record in which children have recovered from the early stages of the disease under treatment, but since the same treatment has been found ineffectual in numerous other cases, it is evident that the good result could be attributed not so much to the treatment as to the inherent vitality of the child.

DISEASES OF THE LIVER.

The liver is in the popular mind the scapegoat upon which is laid the responsibility for many of the ailments to which the body is liable. "Liver complaints" and "biliousness" are the banners with which any number of patent medicine vendors, "liver pad" makers, electric belt manufacturers, etc., assail the pockets of the credulous. The fact is, that in our climate affections of the liver which occasion appreciable symptoms are comparatively rare, except as complications of other complaints; primary disease of the liver itself, limited to the liver, is a by no means frequent occurrence.

Among the most common affections involving the liver is the catarrh of the stomach, small intestine and gall ducts, resulting in the group of symptoms known as "biliousness." The symptoms of this affection vary according as the stomach is involved to a greater or less degree; there is usually vomiting of a greenish or yellowish matter, constipation, pain in the head and over the stomach, a bitter taste in the mouth, possibly a little yellowness of the eyes or of the skin. Similar symptoms varying somewhat in details may be induced by

Acute Inflammation of the Liver.

This disease usually begins with shivering, perhaps with a pronounced chill, followed by fever, nausea and vomiting; the tongue is heavily coated, yellow or white; the bowels are consti-

pated; the urine is scanty, but often of a deep brown color; the patient complains of a bitter taste in the mouth; the matter vomited is usually yellow or greenish yellow. There is usually considerable pain over the liver, sometimes very sharp and increased by coughing, by deep breathing, or by pressure upon the affected part. There may be also jaundice and pain in the right shoulder, though these symptoms are not always present.

Treatment.—The disease, if devoid of complications, usually terminates in one or two weeks; the only treatment necessary is the employment of a light diet, and the use of some remedy which may promote the escape of the bile. For this latter purpose the most useful agent is blue mass, two grains of which may be given as a pill at bed-time, to be followed in the morning by the usual dose of citrate of magnesia; or one-fourth of a grain of *podophylline* may be taken morning and night for three days. If the fever be high, warm baths will be both beneficial and agreeable.

In warm climates, inflammation of the liver is more common than among us, and often results in the formation of an

Abscess of the Liver.

This may also be the termination of an acute inflammation of the liver in this climate, though such cases are far less frequent than in tropical countries.

Symptoms.—The formation of an abscess, *suppuration*, in the liver is indicated by a series of shiverings or chills at irregular intervals, followed by fever and profuse perspiration. The pain in the right side becomes sharper, and may be accompanied with a throbbing sensation. There may also occur a short, dry but annoying cough. While these symptoms are usually present, a certain number of cases occur without manifesting themselves in this way. In these cases the abscess may exist unsuspected until it breaks, and thus gives evidence of its existence.

Treatment.—The formation of the abscess cannot be prevented by any means at present known; but after once formed, it can oftentimes be emptied with safety to the patient. For, notwithstanding the delicate nature of the structures which surround

it, it has been found possible to pass fine needles into the liver and withdraw the matter. The same object has been attained by a surgical operation.

If no surgical measures be employed, the abscess is often apt to terminate in the death of the patient. This fatal result may occur in one of two ways: the abscess may break into the abdominal cavity, causing a general inflammation; or, the patient may be worn out by long-continued fever, vomiting and inability to digest his food.

Chronic Inflammation of the Liver.

This affection sometimes results from an acute inflammation, but is more commonly the result of other causes.

Symptoms.—One of the chief symptoms is pain over the region of the liver, that is, over the lower ribs on the right side and between the two sets of ribs in front. This pain is apt to be increased by active exercise of any sort, even by running up stairs. It is also aggravated by excesses in eating and drinking. Another prominent symptom is a short dry cough, which is so characteristic that it has received the name of "the liver cough." In many cases there is a distinct yellowish tinge of the skin and of the whites of the eyes. The stools are usually of an unnatural light color, like clay. The urine, on the other hand, is very dark, and usually deposits a heavy sediment.

Treatment.—The remedies which are used to act directly upon the liver when in a state of chronic inflammation have not been highly successful. The best results in the treatment of this affection have been obtained by strict attention to all those details which can improve the general health, including a judiciously selected diet, and the selection of an employment which will busy the individual largely in the open air. These measures are especially valuable for those who have been engaged in sedentary pursuits, and it is among such that the disease is especially frequent. Among the remedies used are the following:

Nitro muriatic acid, -	A drachm and a half.
Water, - - - -	Four ounces.

Mix. Take a teaspoonful in water before meals.

Bicarbonate of sodium, -	Four drachms.
Calomel, - - -	Twenty-four grains.

Make twelve powders. Take one morning and night. Or podophylline may be given in doses of one-fourth of a grain morning and night.

One form of chronic inflammation of the liver is especially frequent and especially important. In this form the liver becomes much harder than is natural, and gradually shrinks to but a fraction of its former size. This affection is known as

Gin Liver—(Cirrhosis of the Liver.)

From the fact that this condition often results from the abuse of alcoholic liquors, this condition is known as *gin liver*.

Symptoms.—Although this is a serious affection, which in fact usually results fatally, yet no definite symptoms occur until the abdomen begins to swell. This swelling is due simply to dropsy in the abdominal cavity, and this dropsy results from the inflammation in the liver, whereby the blood which enters that organ from the intestines is impeded and collects in the abdominal organs. In a certain proportion of cases the swelling of the abdomen is followed by a similar dropsical swelling in the feet and legs; yet this is not an invariable symptom of the disease, and, indeed, does not result directly from the affection of the liver, but usually from some coincident disease of the heart or kidneys.

The symptoms which precede this dropsy of the abdomen are not sufficiently definite to locate the source of the difficulty. There may be an impairment of the appetite, a sense of fullness after eating, perhaps vomiting, and sometimes an escape of blood from the stomach or bowels; yet even these symptoms may not appear until after the abdominal dropsy has become manifest. In some cases a yellowness of the skin is noticed, though this is rather the exception than the rule.

Cause.—Although the disease may possibly be induced by other causes, yet, in the vast majority of instances, it is traceable to the abuse of liquors. By this abuse is understood not necessarily the habit of habitual intoxication, but also the constant

indulgence, several times a day, in alcoholic beverages, as is so frequently done at table in certain classes of society. There can be no doubt that the habitual use of wines and liquors, as a part of the daily bill of fare, is responsible for a considerable number of fatal cases of this disease.

Treatment.—No means are known for arresting the progress of this disease; it is possible that its course sometimes stops spontaneously. All that can be done is to put the system in the best possible condition by diet, exercise, etc. If the impairment of indigestion be a troublesome symptom, some improvement may be obtained by the use of bitter tonics, such as a teaspoonful of the infusion of the gentian, or a half teaspoonful of the compound tincture of cinchona, half an hour before meals. If constipation be troublesome, some of the ordinary saline laxatives may be employed to advantage.

One of the results of the disease — the abdominal dropsy — usually requires treatment; this topic has been already discussed under the head of dropsy.

Hydatid Tumors of the Liver.

These consists of sacs, which may vary in size from that of a pea to the dimensions of a hen's egg, enclosing a clear watery fluid. These cysts may occur either individually or collected in groups. Microscopic examination of the contents of these sacs shows that they contain tape worms in an embryo state. So long as the animal remains thus imbedded in the different organs it undergoes no development; yet the fluid which surrounds it may become increased in quantity to an enormous extent.

These worms remain in this embryonic condition an indefinite time; sometimes they retain their vitality, at other times they die. In the latter case the sac usually collapses to some extent.

These sacs — the so-called hydatid cysts or tumors — may occur in various organs of the body, but are found with especial frequency in the liver. They may exist in different parts of this organ, either near the surface or deeply placed in its tissues; the location is a matter of considerable influence in enabling us to detect their existence.

Symptoms.—These cysts may exist for a considerable time without causing any appreciable symptoms; in fact, so long as the tumors remain small and do not encroach upon neighboring organs, there is no interference with the bodily functions which can attract attention to these cysts. In fact a positive diagnosis is possible only when the cyst has attained such size as to become perceptible through the abdominal wall. Previous to this time there may be certain indefinite symptoms which do not enable one to locate or recognize the source of the difficulty; thus pressure upon various organs in the abdomen may cause pain, vomiting, constipation and various other symptoms. If one or more of these cysts be located near the surface, they usually attract atteution sooner or later by causing a prominence at or below the margin of the ribs on the right side. There are, it is true, several other tumors which may appear in this location; and it would be out of our province to discuss the various means for distinguishing this variety from the others. In some cases it becomes possible to detect a distinct sense of fluctuation upon tapping the abdominal wall over the liver. If it be impossible to determine otherwise the exact nature of the tumor, decision can be attained by inserting a fine needle into the cyst and withdrawing some of the contents. If it be a hydatid tumor, there will be found in the fluid some of the hooklets characteristic of the worm.

A hydatid cyst of the liver is serious only because of its size and of the danger which may result if it burst. For it sometimes happens that the contents of the cyst will in consequence of some excessive bodily exertion, or from other cause, be discharged from the sac into some neighboring organ. The danger consequent upon this rupture of the sac depends upon the course of its contents. If these escape into the stomach or intestine, they may be expelled by vomiting or at stool, and recovery may occur. If, however, the contents of the sac escape into the abdominal cavity, or into the chest, or into some large blood vessel, death may usually be expected in a short time. Such an accident may happen suddenly in consequence of a blow or a fall; and instances are known in which death has resulted from this cause in cases where there had been no suspicion during life of the existence of a hydatid cyst.

Treatment.—Comparatively few hydatid cysts of the liver are recognized for treatment until they acquire very large size; at this period they usually require surgical treatment, either by *tap-*

ping, or by the injection of iodine or similar substances into them. No remedies are known which have any decided influence, either in arresting the growth of the cyst, or in destroying the contained parasite. Instances are recorded in which the entire cyst and its contents have been removed by a surgical operation.

In this country the disease is fortunately rare, and is probably never found except in advanced years. At any rate, the growth of these cysts is so slow, requiring many years for their development to a size which can be appreciated, that they are not discovered until the individual has passed middle life.

Jaundice.

Jaundice, like dropsy, is a *symptom*, and not a disease. It designates a yellow condition of the skin, which is also more or less evident in various of the mucous membranes, particularly in the eye.

Cause.—This yellowness is due to the presence of the *bile* or some of its constituents in the blood. The bile is formed in the liver and should pass out through the gall duct into the intestine. A failure on the part of the liver to form the bile, or the presence of some obstruction in the gall duct, which prevents the escape of bile into the intestine, is followed by the appearance of this yellow coloring matter in the blood and the consequent yellowness of the skin through which the blood circulates in large quantity.

The first of these causes, the failure of the liver to perform its functions properly and secrete the bile, usually occurs during some of the infectious diseases, or in consequence of a disease in the liver itself. Thus some of the diseases which follow surgical operations—septicæmia and pyæmia, for example—are not infrequently accompanied by a decided yellowness of the skin. Inflammation of the liver itself may be associated with the same symptom. It would seem also that the action of various agents directly upon the blood may cause jaundice, without affecting the liver itself. Thus this yellow color has been observed after the long continued inhalation of chloroform, from the bite of venomous serpents, from violent mental emotion, grief, fear or anger; and it sometimes occurs, without apparent cause, in those who have long resided in malarial districts.

But the most frequent and usual causes of jaundice are obstructions somewhere in the channels through which the bile flows in its passage to the intestines. The most frequent condition is probably a catarrh of the stomach and intestine, the condition described as "biliousness," whereby the gall duct becomes swollen and closed. Another frequent obstruction is the presence of gall stones, described on a previous page.

Symptoms.—The most prominent symptom is the yellow tinge which becomes visible first in the whites of the eyes, and then extends over the face, neck and chest. It is apt to be accompanied by an annoying itching or tingling sensation. The perspiration is usually tinged with it, and may therefore stain the body linen. The urine acquires a dark brown color, which may deepen almost to black if the jaundice be intense. In this case it usually deposits a heavy sediment. At times the stools are a slate color or almost white. The symptoms manifested by the alimentary canal vary in different cases according to the condition which causes the jaundice. In most cases there is a bitter taste in the mouth; the tongue is heavily coated, and there is apt to be a feeling of nasuea, perhaps even vomiting. There may be also decided depression of spirits and indisposition for exertion.

Jaundice may exist for a considerable time without giving rise to other than the symptoms already noted. In many cases the patient remains sufficiently strong and active to attend to his usual avocation. The duration and ultimate outcome depend, of course, upon the condition which induces the jaundice. If this be a catarrh of the stomach and intestine, as is often the case, the color usually disappears from the skin in from two to four weeks, the other symptoms subsiding even earlier. If the jaundice be due to the presence of a gall stone obstructing the gall duct, the duration of the discoloration may be much greater. Cases are known in which such obstruction of the gall duct and consequent jaundice have persisted for years without materially impairing the nutrition of the body. Yet in most instances the general health fails, the patient becomes emaciated, and death finally results.

Treatment.—In every case the object is, of course, to remove the cause of the jaundice. Hence the treatment must necessarily vary according to the supposed cause. In most cases a few doses of podophylline may be administered to advantage—a quarter of a

grain morning and night; or two grains of calomel in powder may be given at night, followed by ten or fifteen grains of the bicarbonate of soda in the morning. Yet no time should be lost in endeavoring to discover the source of the difficulty, and direct treatment to the removal of this source.

DISEASES OF THE KIDNEYS.

The kidneys are situated on either side of the spinal column, just at the region where the last ribs join the backbone; they lie, therefore, in the small of the back, though somewhat higher in the body than is popularly supposed. The kidneys cannot be felt, except by the employment of special measures, either from the back or from the abdominal surface of the body. Affections of the kidneys sometimes cause pain in the back, though in most instances kidney diseases are either accompanied by no pain at all in the neighborhood of the kidneys, or are associated with sharp pain running down the front of the body into the groins. It should be remembered, therefore, that pain in the small of the back is *rarely* a symptom of kidney disease; although the popular conception is inclined to attribute most painful sensations in this region to the kidneys. In the majority of instances it will be found that the pain is due to rheumatism of the loins, and has nothing whatever to do with disease of the kidneys.

The function of the kidneys is to drain off from the blood certain elements of that fluid which are no longer required in the animal economy. Many of these substances are products which are formed in the different organs of the body during the natural processes of life; these substances are produced during those chemical changes which are necessary for the performance of the vital functions; they may, therefore, be likened to the smoke and the ashes resulting from the combustion of fuel under the boiler of a locomotive; unless this smoke and these ashes be removed further combustion is of course impossible, the fire dies out and the machine ceases to run. So it is in regard to the human body; the fuel which is taken into the body through the stomach and the

lungs undergoes certain chemical processes which may be likened to combustion, and is transformed into certain waste products which we have likened to smoke and ashes. Unless these waste products be removed, further combustion and therefore further activity of the animal machine is impossible.

Several organs in the body are especially designed to secure the escape of these waste products out of the blood in which they circulate; these organs are the kidneys, the lungs, the skin, the intestines and the liver. All of these, however, except the kidneys, have also other duties to perform; the kidneys alone seem to accomplish no other work than the separation of waste materials from the blood. A large part of these waste products are, therefore, thus separated — or *excreted*, as it is technically termed — by the kidneys alone; and any serious interference in the performance of the functions of the kidneys is manifested within a short time by symptoms due to the retention of these waste products in the blood. These facts have been often demonstrated by experiments upon animals. If, for example, the channels which conduct the urine from the kidneys—the *ureters*—be tied, so that no urine can escape, the result is the death of the animal within a few days or even hours. This fatal result is preceded by symptoms which are due to the accumulation of certain substances in the blood; the same effects are observed if the kidneys be removed from the living animal. In either case the animal soon becomes restless; the skin exhales profuse perspiration, which has often an odor like that of urine; some hours later vomiting and diarrhea occur, the vomited matter also emitting an odor similar to that of urine. Meanwhile, the constitutional disturbance of the animal increases, symptoms of derangement of the mental functions become manifest, and finally convulsions, stupor and death occur.

The history of an animal after such an operation is valuable as showing the effects produced upon the animal body by the retention of materials which should be and usually are expelled from the body by the kidneys; and it is especially interesting because precisely similar symptoms, including the fatal result, occur in the human subject also when the excretion of the urine is arrested. Although the ureters are never tied intentionally in man, yet they are sometimes just as effectually obstructed by the presence of minute stones — *kidney stones* — which are occasionally formed in the kidneys. Instances are on record in which symptoms quite similar to those

produced by tying the ureters in an animal have been observed in human patients, whose ureters have been found upon examination after death to be obstructed by kidney stones. So, too, the removal of both kidneys from the human subject has never been performed; but very similar symptoms have been repeatedly observed in cases in which the kidneys were so disorganized by disease as to be incapable of doing their work, so that the individual was practically left without kidneys. In many cases *one* kidney has been removed from the human subject, the remaining kidney being usually competent to perform the work of both; but in a few remarkable instances the removal of one kidney has been followed by all the symptoms which occur in animals after the removal of *both* kidneys, and in these remarkable cases it has been found after death that, by a singular accident of formation, the individuals in question possessed originally only *one* kidney, the removal of which left the patient literally without any kidneys, and consequently resulted in death.

Another point of interest in the experiment upon animals, to which allusion has already been made, is the fact that when the kidneys fail to perform their functions their work is assumed, so far as may be, by the skin and the intestines. For it is observed in human patients as well as in animals, that when the kidneys are inactive, the perspiration is increased in quantity, emits a urinous odor, and actually contains some of the ingredients of the urine, while the secretions of the stomach, which are ejected by the act of vomiting, are found similarly supplied with certain constituents of the urine, as evinced by the characteristic odor.

The danger to be apprehended in disease of the kidneys is, therefore, such an interference with the separation of waste materials from the blood as will cause an accumulation of these materials in the system, notwithstanding the efforts of the skin and of the intestines to eliminate them; and the treatment of diseases of the kidney comprises, therefore, in general, *first*, the effort to restore the kidneys to the natural condition of activity; and, *second*, the attempt to excite the skin and alimentary canal to such temporary activity as will suffice to keep the system clear of these poisonous materials until the kidneys shall have had time to resume their usual work.

Inflammation of the Kidney—Bright's Disease.

This affection is termed Bright's disease, after an English physician, Dr. Bright, who sixty years ago discovered that the symptoms which characterized it were caused by inflammation of the kidney. It will be convenient to consider this inflammation under two heads —*Acute* and *Chronic* Bright's disease.

Acute Bright's Disease.

This usually occurs either as a sequel to some of the infectious diseases, or after exposure to cold, especially if the feet and legs be kept wet for a considerable time.

Symptoms.—The patient usually experiences a chilly sensation, which may be merely a slight shivering or may amount to a pronounced chill; this is followed by decided fever, nausea, vomiting, headache and pain in the small of the back. While these symptoms are well marked in many cases, they may be less pronounced in others; and, indeed, most of them are sometimes entirely absent. But close upon these follows a symptom which rarely fails to appear, namely, dropsy. This usually begins by puffiness under the eyes; in a few hours the entire face as well as the feet are perceptibly swollen; by this time there is often considerable difficulty in breathing, the respirations being short and hurried. In children, the disease not infrequently causes delirium and convulsions, though these are seldom present in adults, except in rapidly fatal cases; the skin is very dry, the face pale.

But the most characteristic symptoms, those indeed upon which the physician relies for a positive opinion, are found in the urine. This is usually much diminished in quantity; in severe cases, indeed, it is almost or quite suppressed. The urine which may be passed is of a very deep color, has usually a strong odor, and deposits, upon standing, a heavy sediment. If the case be severe, this sediment contains a large proportion of blood, which may be visible to the naked eye as a brick red or brown layer, and which gives to the urine a peculiar smoky appearance. Perhaps the best estimate of the gravity and danger of the case can be

obtained by the uninitiated from the quantity and appearance of the urine. In health, the average adult should pass in twenty-four hours about fifty ounces — three pints — of urine. In acute Bright's disease, the quantity may be diminished to thirty, twenty, ten or even less ounces.

In the majority of cases which occur "spontaneously," that is, without any connection with the infectious diseases, recovery may be expected. After one, two or three weeks the symptoms gradually subside, the urine increases in amount and resumes a more natural appearance, the swelling of the body disappears and the patient recovers his usual health. Yet this is by no means invariably the issue of the disease. In some cases death occurs; in others the patient recovers a certain degree of health, but does not regain his former strength; in still others there is an apparently perfect recovery, and the individual has no suspicion of any further difficulty until, perhaps years subsequently, it is discovered that the disease has assumed the *chronic* form, and is firmly fixed in his system.

If death occur, it is, in the majority of cases, the result of *uræmia*. By uræmia we mean the retention of urea in the blood. Urea is one of those substances which is produced in the various tissues of the body during the ordinary processes of life, and one of those substances which it is the especial duty of the kidney to separate from the blood and eliminate from the body with the urine. If the disorganization of the kidneys be extreme, that is, if the attack of Bright's disease be very severe, the kidneys fail to secrete much or any urine, and the urea, which is always produced so long as the individual lives, cannot, of course, escape from the body. Some of it, it is true, is ejected by the stomach during the acts of vomiting, which always accompany severe cases of the disease. Some of it also is expelled by the alimentary canal in a watery diarrhea, which is also apt to be one symptom of severe cases. But notwithstanding these efforts of nature to eliminate the urea, and thus to save the system from poisoning, the result is usually fatal if the action of the kidneys be nearly or quite suppressed; for the urea is a poisonous element if it accumulate in the blood, and the patient dies from urea poisoning, or *uræmia*.

Another mode of death which sometimes happens is from dropsy of the chest and of the lungs. In this case the danger is indicated by the short and hurried acts of breathing, as well as by

the blueness and lividity of the skin for some days before the fatal result.

The occurrence of uræmia is preceded by symptoms of mental derangement, at first amounting merely to depression of spirits, then proceeding to delirium, unconsciousness and convulsions. These are the evidences of the effects of urea on the brain. At times, too, impairments of vision and partial blindness are observed.

Treatment. — As already indicated, the objects of treatment are chiefly the restoration of the functions of the kidney, and the elimination of the urea and other constituents of the blood by the skin and intestines. To accomplish the latter the skin must be stimulated to activity by heat and moisture, in the shape of warm baths, or, better by hot air baths. These may be taken once or twice a day until the patient perspires freely; they must not be too often repeated, since they are somewhat exhausting, especially the hot water bath. The bowels may be excited to activity by cathartics, especially by the saline purgatives. For this purpose there may be given, morning and night, the following powder:

Jalap, - - - - - - -	Five grains
Cream of tartar, - - - - -	A teaspoonful.

A pleasant and almost as efficient purgative is the citrate of magnesia.

In order to promote the excretion of the urea and other poisonous materials, the patient should be permitted the free use of water, lemonade and other bland liquids for which he may express a desire.

In order to restore the function of the kidneys, but one object can be carried out—namely, to give these organs a rest. In order to accomplish this, the skin and the intestinal canal—which are really accessory kidneys, as it were—are stimulated to unusual activity by the baths and purgatives already mentioned. The same object can be promoted by the use of measures which will diminish the quantity of blood in the kidneys. The most effective means for this purpose is dry cupping over the loins. This can be imitated quite effectually in the household, either by the application of hot cloths over the loins, or by the use of a light poultice which has been sprinkled with a little mustard. These should be changed every hour or two so as to keep them hot. Dry cupping itself may

be successfully done by putting into a tumbler a piece of blotting paper two or three inches long and an inch wide, saturating this with alcohol, setting fire to the alcohol, and applying the mouth of the glass quickly to the skin at the small of the back. During the burning of the alcohol the air in the glass is heated, and upon cooling, the air contracts again and the skin is pressed slightly into the glass. In performing this little operation, care should be taken that the burning paper does not come in contact with the skin; this can be avoided if the patient assume a sitting posture, or lie upon the side.

It is quite important that the diet be judiciously selected during the disease, especially since the stomach is apt to be irritable. By employing chiefly milk and eggs we can, to a certain extent at least, diminish the work required by the kidneys.

Chronic Bright's Disease.

Under this name we understand a chronic inflammation of the kidney. Although the disease may begin quite differently in different cases, yet the later course follows one of two types; in other words there are two forms of chronic Bright's disease, which we shall describe separately.

The first one results oftentimes as a sequel of the acute form of Bright's disease; the second seems to occur from habitual excesses in eating and drinking. So frequently is this form of the disease found in those who are partial to the pleasures of the table, that this variety is often called the "gouty" form of Bright's disease, from its frequent occurrence in those who are subject to gout.

Symptoms.—That form of Bright's disease which we frequently see as the result of an acute attack, is developed somewhat insidiously. In a large number of cases the attention is first attracted to the possibility of organic disease by the occurrence of dropsy. This dropsy begins as slight swelling of the feet, noticed usually at first only at the close of the day, after the patient has been actively engaged upon his feet for several hours. In other cases the individual becomes aware of a slight though unmistakable failure of the health, which manifests itself by an impairment of strength and by an unusual degree of pallor. In still other cases

the first intimation of the disease comes in the shape of shortness of breath, noticed especially when the patient ascends stairs rapidly. In still other instances the vision becomes somewhat impaired; and in many cases the patient has no suspicion of disease elsewhere than in the eye, until he consults an oculist, who, upon examining the eye with a mirror, discovers certain changes which direct his attention to the condition of the kidneys.

In whatever way the disease begins, a certain group of symptoms manifest themselves after the lapse of a few months. First among these is *dropsy*. This begins, as has been stated, in the feet, and gradually proceeds up the limbs, until finally the entire body becomes swollen, sometimes to an enormous extent. The legs become so large that it seems impossible for the skin to hold them without bursting. After a time the body and limbs become so unmanageable from the dropsical swelling that the patient is unable to walk. By this time there are usually some sores on the legs, and the skin is the seat of intolerable itching. The patient looks almost bloodless, except in the face, which is sometimes of a dark color, because the breathing has become so impaired that the blood is imperfectly aerated.

In the course of time the digestive system also shows signs of derangement. The appetite becomes impaired, there is some indigestion and even dyspepsia; in many cases there is a constant tendency to diarrhea and the formation of gas in the intestine. Later in the disease vomiting often occurs in a peculiar violent and sudden way, which has led to the employment of the term "explosive vomiting." There are cases, indeed, in which these symptoms of impaired digestion occur before any other signs of kidney disease are apparent; in such cases the patient is sometimes treated for weeks or months for *dyspepsia* before the true source of the complaint is discovered.

The breathing, too, is impaired sooner or later in this disease; sometimes by the accumulation of watery fluid—that is dropsy—in the cavity of the chest. This is especially apt to be the case if, as often occurs, there is also disease of the heart. This dropsy of the lungs is at times suddenly developed, and may then prove to be the cause of death. Dropsy of the larynx is also an occasional symptom, and always a dangerous accident.

Among the symptoms, too, are some which must be referred to the nervous system. Among these is obstinate and frequently

recurring headache, attacks of dizziness, impairment of sight, and neuralgia in different parts of the body. These affections of the eyes frequently occur in the later stages of the disease. As the affection approaches a fatal termination, occasional transient delirium is not infrequently observed; and for some days before death the patient frequently lies in a state of stupor, interrupted perhaps by occasional convulsions. These appearances show that uræmia is occurring — that the kidneys have become so disorganized as to be incapable of performing their duty; hence the urea accumulates in the blood and exerts its poisonous effects upon the brain. Sometimes uræmia, stupor, convulsions and death occur suddenly before the other symptoms have become pronounced, and while the dropsy is still slight in quantity. In fact, there are instances, though not very numerous, in which the patient dies suddenly in convulsions, although no suspicion of kidney disease had been entertained. These cases occur more frequently in the other form of chronic Bright's disease, the "gouty" form, to be presently described.

The urine also exhibits characteristic changes during this form of Bright's disease; it becomes diminished in quantity and deposits a heavy sediment, as a rule. This urine contains albumen, and the sediment exhibits certain delicate structures derived from the kidney and termed *tube casts*. These are to be discovered only by the use of the microscope; indeed, it is impossible to make a positive diagnosis in the early stages of this disease without a careful chemical and microscopical examination of the urine. It should, however, be said, for the comfort and benefit of numerous individuals, that the presence of albumen alone in the urine does ***not***, necessarily, prove the existence of Bright's disease. This remark is emphasized, because the writer has been so often consulted by individuals in whose urine albumen has been discovered, and upon whom the dreadful sentence, "Bright's disease," had been pronounced. There are numerous other causes which may induce the presence of albumen in the urine; and until the symptoms have become pronounced, until the dropsy, emaciation and loss of strength are unmistakable, no one, not even a physician, can be sure of the existence of Bright's disease without a most careful microscopical examination of the urine.

It is the popular impression, that to be afflicted with Bright's disease is equivalent to receiving a sentence of death. It must be confessed that in most, perhaps all, of those cases in which the

symptoms above described are pronounced and of long standing; in which the dropsy has become extensive, and in which the symptoms of digestive disturbances and of nervous disorders are apparent—in such cases it is doubtless true that recovery rarely, if ever, occurs. But it must be remembered that Bright's disease is usually far advanced when it has resulted in the production of these symptoms. There is an earlier stage of the disease, lasting months at least, in which the affection is not fully recognized, nor perhaps even suspected; and it is equally certain that recovery does sometimes occur from this early stage. This is proven by the records of cases in which the disease has been detected at an early period by especially skillful physicians, and has been cured by them; and has been equally well demonstrated by post-mortem examinations of persons who, at the time of death, had no Bright's disease, and yet whose kidneys showed undisputable evidence that such disease had previously existed.

Treatment.—In the vast majority of cases the disease is not recognized until it is too late to expect recovery under any plan of treatment; yet the sufferings of the patient can be decidedly mitigated, and indeed his life prolonged, by attention to certain measures.

Among the most important of these is the observance of proper sanitary regulations. The patient should carefully avoid exposure to wet and cold; should not undergo physical or mental fatigue; should avoid excesses at the table or otherwise. The diet should contain but little meat, and may consist largely of milk, eggs, fruits and vegetables. The clothing may be warm, flannel being worn next to the skin.

Among medicines most good will be derived from *iron*, which may be given in that form that the patient finds most agreeable. Sometimes some little care and experimenting are necessary in order to discover the particular form of iron which can be best borne. In some cases the tincture of the chloride of iron in doses of from ten to fifteen drops, taken before meals, will agree with the patient's stomach. Others again will be best satisfied with the *citrate* of iron, five grains of which may be given three times a day; still other cases will be most benefited by the syrup of the iodide of iron, though the syrup in this preparation is apt to disagree with the stomach. Cod liver oil will also be found of use in strengthening the patient; few persons suffering from this disease

will be able to take the article in its crude form; it will generally be found necessary to give it in the shape of an emulsion, many of which can be found at the drug stores.

The dropsy usually requires treatment quite early in the disease. To reduce it, the bowels may be kept active by means of saline laxatives, with or without jalap powder, as described in discussing the subject of dropsy. But it must be repeated, that it is possible to exhaust the patient materially by the over-zealous use of cathartics for the purpose of reducing the dropsy. Another measure is the hot air bath, or the hot vapor bath, which may be used with less detriment to the patient. And finally cases occur in which the abdomen must be tapped to remove the water, and, perhaps, slight incisions made in the legs in order to permit the fluid to drain away.

The other form of chronic Bright's disease, that to which reference has already been made, under the name of the "gouty" variety, differs from that form just described in many essential particulars. It is one of the most insidious and gradual diseases with which we are acquainted. It has been known to exist in an individual for ten, fifteen or even twenty years before reaching a fatal termination.

Symptoms.—As to the symptoms which accompany the beginning of the disease, it is almost impossible to give any description, because the onset is so slow and insidious that it is rarely discovered until it has evidently existed for a considerable time.

In this form of the disease there is rarely any dropsy until within a very short period before death, and even then it occurs only in exceptional cases. The patient is usually led to seek medical advice for some symptom which has but little if any relation with the kidney. In one case the difficulty complained of will be impairment of vision; in another, obstinate and violent headache; in the third the patient will seem to suffer from dyspepsia; in others again there will be palpitation of the heart. In many cases attention is first drawn to the difficulty by the excessive secretion of urine, several quarts of which may be passed in twenty-four hours, compelling the patient to arise at night in order to evacuate his bladder.

The patient's general health may remain unimpaired for years, and he may in fact have no suspicion that serious organic disease exists. These are the cases which are so often discovered unex-

pectedly during examinations for life insurance, or upon other critical medical inspection, since such individuals often suppose themselves to be and really seem to be in perfect health.

As the disease advances, several troublesome symptoms are apt to occur. Foremost among these is the frequency of urination, for in this disease there is an excessive amount of urine passed. The patient is compelled to evacuate the bladder frequently, oftentimes by night as well as by day; yet the act is not accompanied by pain, but is natural in every respect. The urine passed is clear, often somewhat lighter colored than natural, but contains no sediment.

After the affection of the kidneys has endured for some time, there occurs in the majority of cases an enlargement of the heart. In fact, there are numerous instances in which this change in the heart seems to occur almost or quite as early as the disease in the kidney. This enlargement of the heart causes a feeling of weight and fullness in the chest, often accompanied by fits of palpitation; the pulse at the wrist becomes very hard, almost resembling an iron wire; there is apt to be painful throbbing of the vessels of the neck and head. This feature is a most important part of this form of chronic Bright's disease, because many of the symptoms characteristic of the disease, and many of the sudden deaths from so-called "apoplexy," are really due to the enlargement of the heart which accompanies this inflammation of the kidneys.

In the majority of cases this form of Bright's disease occurs in advanced life, and is especially frequent, though by no means confined to those who are especially prone to over-indulgence in eating and drinking. Many of the sudden deaths which occur in men of full habit, with thick necks and rotund forms, are due to apoplexy, that is to a bursting of blood vessels within the brain. Now this rupture of the vessels is in many cases due to the excessive force of the blood current, which is propelled by a heart of unusual size and power. In fact the immediate danger in these cases of Bright's disease is from a rupture of blood vessels, since the disease of the kidney itself rarely causes a fatal result except after several years of existence.

Another feature sometimes observed in this form of Bright's disease is a slow poisoning by the accumulation of urea in the blood — *chronic uræmia*, as it is technically called. The symptoms which indicate uræmia in acute Bright's disease have been

already described; these consist of violent and severe vomiting and purging, excessive perspiration, delirium, stupor and convulsions. In chronic uræmia similar symptoms may be present though in a less intense degree, so that in some instances no suspicion of the real cause of the difficulty exists. In these cases the patient is apt to have chilly sensations or even pronounced chills, followed by fever and perspirations; there may be some inclination to vomit and an obstinate diarrhea. Cases are recorded in which the patient had been treated for some time for malarial fever when he was really suffering from chronic uræmia and Bright's disease; the mistake arose from the occurrence of chills and fever every day or two, strongly suggestive of ague. In other instances again a chronic diarrhea of long standing has been found to be due to Bright's disease of the kidneys. In still other instances the attempt to eliminate the urea seems to fall largely upon the lungs, resulting in a persistent *bronchitis*, often associated with asthma.

In fact, after the attention of the physician has once been called to the diversity of symptoms by which this form of chronic Bright's disease may manifest itself, he is always watchful for its existence in middle-aged or elderly people, especially in those who are troubled with chronic affections of the alimentary canal, of the lungs, or of the heart. Yet while the majority of cases are detected in people who have attained or have passed middle age, the disease may occur in youth or even in childhood.

Treatment.—There is no plan or treatment known whereby this form of Bright's disease can be cured or even arrested. That recovery does sometimes occur admits of no question; yet it is by no means established that such recoveries are due to the treatment pursued and not to other influences of which we have no conception.

It seems quite certain that by avoiding those articles of food the consumption of which throws extra work upon the kidneys, we may, to a certain extent, give these organs a rest, and thus put them in the best possible condition for recovery. Such articles include, generally speaking, meats and animal food, and alcoholic stimulants. It is, therefore, advisable to restrict the diet of the patient with regard to these articles of food; he should be encouraged to live largely upon milk and eggs, indulging his appetite for fruits and vegetables, as he may please. Beyond this we cannot go in our efforts to improve the condition of the kidneys.

Yet there is often a considerable field for medicines in the treatment of this complaint. The safety and welfare of the patient depend upon the maintenance of an excessive secretion of urine; so long as the heart is sufficiently powerful to force the blood through the kidneys, the secretion continues. But there often occur times when the heart seems unable to accomplish this work without assistance; this assistance can be rendered by the use of *digitalis*.

Another important item is the avoidance of sudden and excessive physical effort or mental emotion. For it is frequently by some such effort or emotion that an attack of apoplexy is provoked. Care should be taken that there be no unnecessary exposure to cold or wet, since aggravations of the disease are thereby induced.

It is the fashion nowadays for patients with kidney disease to resort to mineral springs, many of which are well advertised as cures for Bright's disease, and in fact almost all complaints of the urinary organs. There can be no question of the benefit derived by many sufferers from Bright's disease from visits at these springs. It is equally certain that the benefit thus derived is not to be ascribed in the minutest degree to any virtues possessed by the waters, but is due wholly and entirely to the invigorating effect which follows the change of life and scenery and occupation incident to a residence at these watering places. There is absolutely no remedy, whether in the shape of drug or mineral water, which has ever been known to exert the slightest influence in arresting those changes in the kidney constituting Bright's disease. Yet this remark is not intended to decry in any way the value of a sojourn at one of these popular resorts; for everything which can contribute to the comfort and enjoyment of the patient has a beneficial effect, not by arresting the disease, but by invigorating the patient, so that he can resist its ravages with better effect and for a longer time.

In some forms of Bright's disease residence at one of these springs has an additional advantage, namely, that the patient is thereby induced to drink more water than he otherwise would. It is not to be laid down as a general principle that to drink an excess of water has a beneficial effect. It is the popular idea that impurities can be washed out of the human body by an abundance of water, just as filth can be "flushed" out of sewers by flooding these channels. Such a conception can of course exist only where the most child-

like innocence of human physiology prevails. Were the body merely a system of sewers, benefit might always be expected from rinsing the sewers with an abundance of water; but under the present construction of the human body the maintenance of health is a matter by no means so simple.

Gravel.

In a previous chapter we have described the formation and passage of gall-stones through the gall ducts, whereby paroxysms of agonizing pain are induced, causing the symptoms known as "liver colic." Similar paroxysms of pain are induced by the passage through the ureters of small stones formed in the kidney by the deposit of sediment from the urine. It will be remembered that the urine escapes from the kidney into a funnel-shaped sac called the *pelvis*, the lower end of which — the tube of the funnel — is prolonged as a membranous channel about as large as a goose-quill, which terminates below in the bladder. The urine escapes from the kidney into this funnel-shaped pelvis and runs through the quill-like channel until it reaches the bladder. The small size of the ureter renders it liable to be obstructed by small impediments; and some of these obstructions are often formed in the kidney in the shape of small stones. The urine consists of water which holds in solution a certain number of crystalline substances. So long as these substances remain dissolved they are of course readily passed through the ureter; but in various unhealthy conditions of the body these crystalline substances do not remain dissolved, but are deposited as a sediment in the pelvis of the kidney. Here they form little masses called kidney-stones. Many of these masses are small enough to pass through the ureter and are washed down into the bladder with the urine, forming here a nucleus for a bladder-stone in the bladder. But many of them are too large to pass readily through the ureter, and either remain in the funnel-shaped pelvis or become lodged in the ureter. If in the latter case they are finally forced onward, their passage through the ureter into the bladder occasions the most intense pain — paroxysms which are known as "renal colic," or a "fit of the gravel."

A paroxysm of kidney colic, or "a fit of the gravel," is usually developed somewhat suddenly, though in some cases it may be

preceded for hours or days by a dull pain in the back and groin. The paroxysm soon reaches the height of its intensity, the pain often being agonizing. The pain is usually felt in the region of the lowest rib on the side, radiating downward and forward into the groin, perhaps even to the thigh; in the male it is usually felt in the testicle, which may be drawn violently up toward the body. The patient may endeavor to secure relief by changing his position, walking about the room, and by compressing the abdomen with the hands. In fact, the symptoms resemble largely those of wind colic except in the location of the pain. The suffering continues without intermission, though not of uniform severity. There is a constant, or frequent, desire to pass water, though but little urine is secreted, and that which is passed is often bloody

Accompanying these symptoms of local difficulty are various evidences of constitutional disturbance — nausea and vomiting, profuse perspiration, pallor of the surface. After an interval which may last from fifteen minutes to one or more days, the symptoms suddenly cease, leaving the patient in an exhausted but comfortable condition. The sudden cessation of pain is usually followed by an abundant discharge of urine; the kidney-stone has evidently reached the bladder, and the urine which had been dammed up behind it during its passage through the ureter is now permitted to escape.

It sometimes happens that other renal stones follow the first down the ureter at short intervals, so that the patient has several fits of the gravel within a few consecutive days; in this case the succeeding ones are not usually so violent or painful as the first. Although these paroxysms are extremely painful, they are not immediately dangerous, and if the stone finally escape into the bladder the health is entirely restored; yet one attack is apt to be followed sooner or later by others.

Sometimes these fits of the gravel terminate in the discharge of a fine red sand, containing perhaps several larger masses, which collect in the bottom of the vessel containing the urine. In other cases the urine will be perfectly clear and free from gravel at the time of its passage, but will deposit a heavy sediment after standing a few hours. Sometimes a similar occurrence is witnessed for a few days before the attack begins.

Treatment.—During the paroxysm the object of treatment is of course relief of pain. This can be accomplished by a free use

of opium ; a quarter of a grain of morphine may be given to an adult and repeated in three or four hours if the pain be severe. If the stomach be very irritable, it will be better to administer the morphine by injection under the skin. In some cases, however, the pain is so severe and begins so suddenly that we cannot wait for the action of morphine; in these instances chloroform should be inhaled until the morphine, which should be given as early as possible, has had time to manifest its effects. Nothing can be done to promote the passage of the stone along the ureter beyond the inhalation of chloroform, which seems to relax the channel.

Much can, however, be done to prevent the recurrence of these attacks. For the formation of renal stones is, in the majority of cases, due to an excessive *acidity* of the urine; this is especially true in those cases in which a red sand is deposited. In these cases it may be possible to ward off future attacks by preventing the urine from becoming so acid. This may be accomplished by giving twenty to thirty grains of the bicarbonate of potash in water three times a day ; or by administering five grains of the carbonate of lithia, or by giving ten grains of benzoic acid. In other cases the kidney-stones are formed of materials which are deposited from *alkaline* urine ; an examination of the urine and of the sediment will at once determine which variety of kidney-stones is present in any given case. The *acid* condition of the urine is especially apt to occur in persons of full bodily habit, who are accustomed to partake largely of meat ; the *alkaline* condition is most frequent in nervous individuals, especially those of sedentary habits. Various mineral waters may be employed to render the urine acid or alkaline as required, though care must be taken in selecting the proper variety.

If the stones formed in the kidneys do not escape through the ureter, but remain permanently in the pelvis of the kidney, they cause an irritation and inflammation which is known as *pyelitis*. In this affection there is apt to be a dull pain in the loins, aggravated by violent motion. The urine usually contains a considerable sediment of pus. This disease is important, because it is so often mistaken for Bright's disease of the kidney ; in fact it is impossible to recognize it without the use of the microscope ; it will be, therefore, unnecessary to describe it here in detail.

In all cases where there is a disposition to the formation of gravel, it is a matter of importance to regulate the diet of the

patient. By this it is not meant that the patient should be starved, but that he should avoid those articles of diet which predispose to excessive acidity of the urine. It is, therefore, necessary that he abstain from excessive indulgence in meats, or at least employ at the same time a proper proportion of vegetable substances. Yet there are certain vegetables, rhubarb for example, which are especially likely to induce acidity of the urine.

Stone in the Bladder.

When these minute stones have escaped through the ureter into the bladder, the patient is relieved from the severe pain which attended its passage down the ureter, and is apt to regard the difficulty as finished. In some cases it is so; the stones escape from the bladder through the urethra, oftentimes without causing any pain, or even without attracting the patient's attention; this is particularly true in women, while in men, owing to the difference in the size and course of the urethra, the passage of the stone from the bladder to the external world is sometimes almost as painful as its passage from the kidney to the bladder. Sometimes, indeed, such a stone becomes lodged in the male urethra, requiring an operation for its removal before the patient is able to pass water.

In some instances however, these stones, which reach the bladder from the kidneys, do not pass out through the urethra, but remain in the bladder. So long as they are small they occasion no symptoms of sufficient moment to attract the patient's attention, but in course of time these stones become larger by the addition of new matter upon their exterior. This matter consists of crystalline substances which are deposited from the urine around the little kidney-stone. After a few months the stone may have attained many times its former bulk, and may now be as large as a hickory-nut or a walnut. Upon cutting it open, this stone is found to consist of numerous layers arranged around a common center, and presenting, therefore, something the appearance of an onion. The center is found to be the original kidney-stone.

Although this is the way in which most stones are formed in the bladder, yet any foreign body may serve as a nucleus around which layers of crystalline matter will be deposited, so as to form a

bladder-stone. Thus straws, hairpins, pipestems and similar objects which have been used by the patient in the unnatural gratification of the sexual appetite, sometimes slip into the bladder and remain there, constituting the nucleus around which a stone is subsequently formed. So, too, fragments of bone and bullets have been found in the interior of stones of the bladder in individuals who had suffered wounds in this portion of the body. At other times a simple clot of blood or mass of pus which has escaped into the bladder, may constitute the beginning of the stone. It has also happened that catheters have been broken off when inserted into the bladder, the broken ends constituting the nucleus for the future stone.

Symptoms.—The symptoms caused by the presence of a stone in the bladder are quite different in the male than those exhibited by the female. For evident reasons, stones are far more common in the male sex than among females, and the symptoms to be narrated are those observed in men. For a considerable time, while the stone remains small, no definite symptoms are observed; the patient may at times have an uneasy sensation in the vicinity of the bladder, especially at the time of making water. When the stone increases in size—a change which may occur rapidly in the course of a few months, or gradually, requiring years for its accomplishment—the symptoms become pronounced and characteristic. The patient has constantly a dull pain around the neck of the bladder; he is compelled to evacuate the urine at short intervals by day, though he may experience comparative comfort at night; he is apt to have a sharp pain at the close of the act of urination. The urine contains a sediment, at first slight and cloudy; subsequently thick and slimy; there is apt to be a little blood mixed with the urine, especially after exercise. At times there occurs a characteristic symptom, which is not, however, invariably present; this consists in the sudden stoppage of the stream during urination, the patient being unable to complete the act until he has changed his position. Considerable irritation, amounting oftentimes to acute pain, is felt along the course of the male organ, especially at the extremity. This constitutes one of the chief and most reliable symptoms in children who are too young to give accurate information as to the state of their feeling. Such boys are constantly fingering the parts, and frequently pull the foreskin, especially after making water.

Motion of the body, such as riding, driving or walking, railroad travel and the like, aggravates the sufferings of the patient, compels him to empty the bladder more frequently, and increases the amount of blood and slime which escapes with the urine. If permitted to go without treatment, the disease ultimately results in death, the patient being harassed and exhausted by the frequent and painful acts of urination. In the course of time, too, a serious inflammation of the bladder is induced, which may spread to the kidneys and cause a fatal result.

Treatment.—When it has been definitely ascertained that an individual is suffering from stone in the bladder, but one thing is to be done—to remove the stone. It is important that this fact be early recognized, since a failure to submit to an operation insures a fatal result, and, furthermore, the longer the matter is postponed, the greater is the danger attendant upon the operation.

Until recently stones were removed from the bladder by a cutting operation, called *lithotomy*, whereby the bladder was opened and the stone removed by a strong forceps—pincers. This was a serious operation, sometimes causing the death of the patient, and always confining him to the bed for several weeks. One of the greatest advances in modern surgery consists in the introduction of an operation whereby stones can be, in most cases, removed from the bladder without the use of the knife, and without injuring the parts concerned. This operation is called *lithotrity—stone crushing*—and is accomplished by the introduction of a pair of strong forceps into the bladder *through the urethra*. The stone is crushed as it lies in the bladder, and the fragments are washed out through a large catheter. A few years ago this operation was modified and improved by Dr. Bigelow, of Boston, Massachusetts, so that it has now become possible to crush and remove the entire stone at one operation. By this operation, the danger of a fatal result is much diminished, and the patient is confined to his bed for only a few days, if at all. This operation is especially valuable in case of elderly men, who suffer a far greater mortality from operation for the removal of stones than younger people. Owing to the small size of the parts in boys under puberty, it is rarely possible to employ lithotrity in these patients; this is, however, a matter of small consequence, since the cutting operation is rarely followed by a fatal result in boys. The danger increases, other things being equal,

with the age of the patient; yet if the kidneys and urinary organs generally are in good condition, stones may be removed even from aged men with perfect safety.

In women, stone in the bladder is a far less serious and dangerous complaint. Although the symptoms induced are quite similar to those exhibited by men, yet the removal of the stone is a far simpler matter, for the female urethra is not only very short, but is easily stretched to a large size, so that a stone can often be removed even without crushing.

Sugar in the Urine—(Diabetes).

This term is applied to two distinct affections, each of which is marked by an increased flow of urine; one of them—*diabetes insipidus*—is a comparatively unimportant affection which occurs as a complication of other diseases. The disease ordinarily meant when we speak of diabetes, is the so-called saccharine diabetes—*diabetes mellitus*—so called because the urine contains sugar. This is a serious, usually a fatal, affection.

Symptoms.—The subject of this disease is usually a sufferer from impaired health for some time before the true nature of the difficulty is ascertained or even suspected. The first symptoms are indigestion, constipation, loss of flesh and strength, thirst and capricious appetite, sometimes amounting to voracity. After a time the first suspicious symptom makes its appearance; the patient observes that the acts of urination are more frequent, and that the quantity of urine passed at a time is considerably greater than before. The urine is usually clear and pale, and it emits a sweetish odor. As time elapses the calls to urinate becomes so frequent as to constitute an annoying symptom; the patient's rest is seriously disturbed in consequence. In some cases the urine causes a stinging, hot sensation as it passes along the urethra, and soreness of the skin—eczema—is frequently induced around the genitals, especially in women. This complaint is aggravated, perhaps in part caused by the intense itching of the skin—a desire which is in itself a most annoying feature of the disease, especially to females.

The quantity of urine is sometimes increased to an enormous extent; instead of three pints, the average amount of a healthy

adult, ten, twenty, thirty, and even forty pints may be passed in the twenty-four hours. The urine contains sugar, as can be demonstrated by the proper chemical tests; not the ordinary table or cane sugar, but a substance which is identical with the sugar of grapes, and is hence termed grape sugar. The quantity of sugar passed in twenty-four hours may vary from half a pound to six or eight pounds.

Meanwhile other symptoms quite characteristic of the disease are developed. The skin becomes dry and harsh; the patient loses flesh and strength; the appetite is usually voracious — a feature which, coupled with the progressive loss of flesh, should alone arouse suspicions as to the nature of the disease. Thirst, too, is a prominent symptom, as can be readily understood when we consider the enormous quantities of water excreted in the twenty-four hours. Digestion usually remains good until the disease is far advanced; in exceptional cases obstinate vomiting occurs. The teeth are often loosened, and may fall out spontaneously; the gums are often soft and bleed readily upon pressure. This condition of the mouth is apt to make the breath unpleasant and fetid. In other cases there is a sweetish odor about the breath which is quite characteristic.

Sometimes, too, diabetic patients are troubled with a series of boils, which torment the individual for months at a time. In fact, one who is troubled by numerous and frequently recurring boils should submit his urine for examination, since this is occasionally one of the earliest manifestations of the disease. Various diseases of the skin, and sometimes ulcers of the lower limbs, are accompaniments of the disease.

The eyes, too, are the subject of serious difficulties in this disease. At times feebleness of vision and even complete blindness may occur without any apparent disease in the eye; in other cases a whitish opacity of the crystalline lens occurs, so that the pupil looks gray or white instead of black. This condition is known as *cataract*, and causes partial or complete loss of vision. The nervous system is also affected, as is shown by dull pains in various parts of the body, especially across the loins, by dizziness and headache, and by an irritable and morose condition of the mind which sometimes culminates in imbecility. In the female the menstrual flow gradually diminishes, and finally ceases entirely; in both sexes the sexual appetite is impaired or lost.

The progress of the disease is usually slow and gradual; it

has been known to exist for many years before terminating fatally, yet other cases occur in which death results after a few months; this fatal result at an early date is commonly due to some other affection which has been implanted upon the diabetic patient. It has been observed that such patients are not only especially prone to certain diseases, especially of the lungs, but also that they manifest but little power of resistance to disease. A diabetic patient who acquires pneumonia or consumption rapidly succumbs to the disease.

Cause.—Up to the present time, we are in ignorance as to what part of the body is at fault in this disease. We are accustomed to think of it among the diseases of the kidneys, though of course the kidneys are not at fault, since they are merely eliminating from the blood materials which cannot be used in the system. It seems extremely probable that the root of the disease lies in a fault of the brain, for it is well known that by injuring a certain part of the brain in an animal it is possible to induce a flow of sugary urine. Moreover, it has been repeatedly observed in post-mortem examinations of diabetic patients that this particular part of the brain was the subject of disease or injury.

As to what should cause this affection, we can as yet only speculate. It has been ascribed to exposure of the body to cold and wet, to the abuse of alcoholic liquors, to sexual excesses, to overwork, and to violent mental emotion. Doubtless these predispose to the development of diabetes, as well as to other diseases of the nervous system, yet that they are alone sufficient to cause the disease is not as yet established.

Diabetes usually results fatally, yet recoveries do undoubtedly occur. While we are not acquainted with any plan of treatment which can arrest the disease after it has endured for a considerable time, yet much can be done if treatment be begun in the early stage of the disease. Diabetes usually occurs between the ages of 30 and 50 years, and about twice as often in males as in females. With reference to the prospects for life, Dr. Roberts says, in this connection: "The younger the patient, the less hope of ultimate recovery. All the cases under 20 which I have seen have eventually succumbed. In persons advanced in years, the appearance and persistence of sugar in the urine is a far less serious affair; it may continue for many years, in oscillating quantity, with fair preservation of health. It is a curious circumstance that diabetes

in corpulent persons is very markedly less formidable than in those of spare habit. Saccharine urine, without excess in the quantity of urine, is far less serious than when the urine is abundant. Cases which can be traced to mental anxiety and to injuries, appear to be somewhat more hopeful than those for which no tangible cause can be assigned."

Treatment.—The treatment of diabetes must consist chiefly in such regulations of the diet as shall avoid the introduction into the system of articles containing sugar or starch. It has been shown by long experience that this is the only method which affords even partially satisfactory results. Among medicines nothing has as yet been found which can be relied upon to cure or even to arrest the disease. There are, it is true, several remedies which diminish quite markedly the amount of sugar passed with the urine; and on this account these remedies have been extolled as efficient agents in controlling the disease. Yet observation shows that although the amount of sugar may be diminished under the use of certain drugs, yet the disease, the steady decline of the patient's health, is not thereby materially retarded. The best standard for estimating the progress of the disease is found to be, not the quantity of sugar present in the urine, but the *weight of the patient*. So long as the patient's weight steadily decreases the disease is progressing, no matter what be the quantity of sugar passed in the urine.

Among the remedies which have found most favor the following prescriptions may be given:

Bicarbonate of soda,	20 grains.
Bromide of potassium,	15 "
Water,	1 ounce.

To be taken three times a day. If preferred, the powder may be taken dry without the water.

Salicylic acid, in doses of five to ten grains, and carbolic acid, in one drop doses taken in water, have also been employed.

Among the most frequently used remedies are *opium*, *ergot*, and *tannin*. These may be combined as follows:

Opium,	10 grains.
Tannic acid,	3 drachms.
Tincture of ergot,	6 ounces.

Mix, take a teaspoonful four times a day.

If this mixture be rejected by the stomach, the opium itself may

be administered alone in doses of one-half a grain three times a day, gradually increased to one or two grains at a dose. If no preparation of opium can be well taken, belladonna may be substituted. This may be given in the shape of the *tincture*, fifteen or twenty drops of which may be taken three times a day; or a pill may be given after the following formula :

Extract of belladonna, - - - -	8 grains.
Extract of nux vomica, - - -	6 "
Extract of ergot, - - - -	4 "

Mix, and make twenty-four pills; let one be taken before meals.

One of the troublesome symptoms which may require treatment is the *thirst*. This can sometimes be relieved by the use of lemonade, without sugar, or of citric acid; or fifteen drops of diluted phosphoric acid may be given in water as often as required.

The chief reliance in treatment is, however, upon the regulation of the diet. This regulation includes the exclusion of sugar and articles containing it, as well as the avoidance of starch; for during digestion starch is converted into sugar and enters the blood as such. The diet may, therefore, include meats of all kinds, excepting liver. Butter, cream, cheese and eggs may be given, but milk should be avoided. Among the vegetables, lettuce, cabbage, celery, onions and spinach may be taken, as they contain but a small amount of starch. Tea and coffee may be taken, though they should be sweetened not with sugar but with glycerine. If it be necessary to give wines or liquors, those should be preferred which contain the least sugar; these are claret, sherry and whisky. An important point in the diet of those patients is *variety*, both in the articles selected and in the mode of their preparation.

The stumbling block in prescribing a diet for diabetic patients consists in the want of *bread;* for no matter how great the variety of other food, the patient has a longing for bread which finally becomes irresistible. To supply this deficiency much ingenuity has been employed, and bread, or rather mixtures which are by courtesy called bread, have been made out of a variety of substances, even out of almonds. That which has secured the most favor among medical men is the bran bread, devised by Dr. Camplin, of London. This gentleman was himself a sufferer from diabetes, and ascribes his recovery for a period of ten or twelve years to the use of certain dietary measures, among them the use of this bread. His recipe is as

follows: "Take a quantity of wheat bran, boil it in two successive waters for a quarter of an hour, each time straining it through a sieve; wash it well with cold water on the sieve until the water runs off perfectly clear. Squeeze the washed bran in a cloth as dry as possible, then spread it thinly on a dish and place it in a slow oven. When it is perfectly dry and crisp it is fit for grinding into fine powder.

"The bran thus prepared is ground in the mill for the purpose, and must be sifted through a wire sieve of such fineness as to require the use of a brush to pass it through, and what remains on the sieve must be reground till it is sufficiently soft and fine.

"To prepare a cake from it, take of this bran powder three or four ounces, three new-laid eggs, one and a half or two ounces of butter and about half a pint of milk. Mix the eggs with a little of the milk and warm the butter with the remainder of the milk; stir the whole well together, adding a little nutmeg and ginger or any other spice that may be agreeable. Bake in small pans (patty pans, which must be well buttered) in a rather quick oven for about half an hour. The cakes, when baked, should be a little thicker than a captain's biscuit.

"These cakes may be eaten with meat or cheese for breakfast, dinner or supper, and require a free allowance of butter; and the cakes are more pleasant if placed in the oven a few minutes before being placed on the table.

"When economy is an object, when a change is required, or if the stomach cannot bear butter, the cakes may be prepared as follows:

"Take of the prepared bran four ounces, three eggs, about twelve ounces of milk, with a little spice and salt; to be mixed and put into a basin which has been previously well buttered. Bake it for about an hour; the loaf may be then cut into convenient slices and toasted when wanted; or, after slicing, it may be rebaked and kept in the form of rusks.

"Nothing has yet been discovered of equal utility to these bran cakes, combining as they do moderate cost with freedom from starch and sufficient pleasantness as an article of food."

Various other plans of diet have been proposed, but none of them seem entirely satisfactory. Thus, an exclusively animal diet has been observed in numerous cases with the effect of certainly diminishing rapidly the amount of sugar in the urine, but such a diet cannot be long endured; and, indeed, it is not reasonable to deprive

man of vegetable food. The same remarks apply to another exclusive diet which has been used apparently with success in several cases by a well-known British physician. This consists exclusively of *skim milk*, six, eight or ten pints of which may be given in twenty-four hours. If the patient is to be improved by this diet, the improvement will be manifest within a week. Others have substituted *kumyss* for the skim milk in this plan of treating diabetes.

One of the most important items in the treatment of this, as in most other diseases of the nervous system, is a complete change in the habits of life, whereby the body may be placed under the best possible conditions for health. Change of scene, including abundant amusement and recreation, have often improved these cases wonderfully, even without very rigid attention to the dietary laws above prescribed. An eminent French physician, Trousseau, has found the best results from residence in the country combined with a liberal diet of fruits and of those vegetables which do not contain much starch. He has even allowed such patients small quantities of bread, and believes that they derive benefit from its use notwithstanding the increase in the amount of sugar in the urine.

Diabetes Insipidus.

This affection presents some of the symptoms of diabetes mellitus, just described; but it is a far less serious affection.

Symptoms.—The premonitory symptoms may be essentially those of genuine diabetes; and the patient soon begins to pass excessive quantities of water, amounting even to ten or twenty pints daily. The thirst is intense, the skin becomes hot and dry; the patient gradually loses flesh and strength, the appetite becomes impaired, and in a certain number of cases a fatal result ensues. It occurs more frequently among males than among females, and usually begins in childhood or youth. It may last for many years, or even for a lifetime, sometimes ending spontaneously, and often cured by the occurrence of some acute disease.

Cause.—It has been supposed that disease of the brain, habitual drunkenness and injuries to the head are active agents in inducing this disease; though in some cases of it none of these causes can be reasonably supposed to exist.

Treatment.— It is sometimes possible to arrest the disease by the administration of *ergot*, a teaspoonful of the tincture being given three times a day, and gradually increased to two teaspoonfuls.

It is important to distinguish this disease from diabetes mellitus; not only for the sake of the patient's feelings, but also because the treatment need not be so rigorous as in the case of the latter disease, for in diabetes insipidus it is not necessary to withhold sugar and starch from the patient.

Addison's Disease.

This disease — so named after Dr. Addison, of London, who first described it in 1855 — is characterized by progressive emaciation and loss of strength, and by a peculiar bronze color of the skin. It occurs in both sexes, usually after middle life. It begins slowly and insidiously; the face becomes pale, the flesh soft and flabby; there is shortness of breath, and indisposition to exertion. Palpitation of the heart is not infrequent; the lips, gums and tongue become blanched; the muscular weakness is extreme. The most remarkable feature in the disease is a peculiar brownish discoloration of the skin, which commonly pervades the entire surface, though most marked on the face, neck and upper extremities. This color is sometimes so intense as to give the individual the appearance of a mulatto.

The disease invariably terminates fatally within four or five years, the average duration being eighteen months to two years. The patient may retain a considerable degree of flesh to the last, though the strength be almost entirely gone.

As to the treatment of Addison's disease, nothing is as yet decided to be beneficial. The objects of treatment are merely to support the flagging strength of the patient, though with the assurance that nothing more than slight prolongation of a wretched life can be hoped for.

The usual tonic remedies, quinine, iron and nux vomica, may be given in the following prescription:

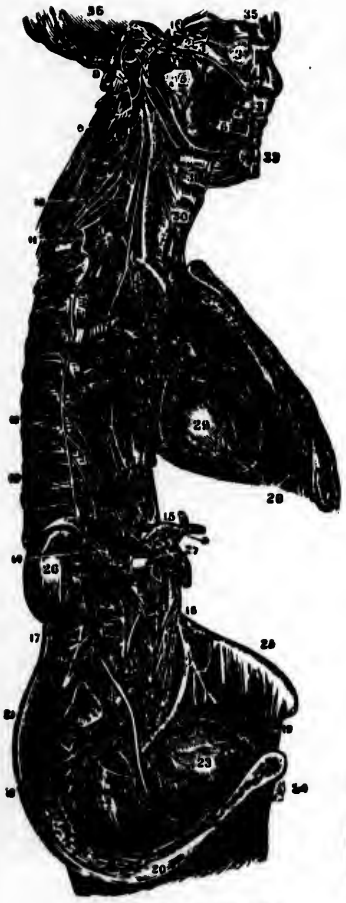
Quinine,	Forty grains.
Tincture of the chloride of iron,	Six drachms.
Tincture of nux vomica,	One ounce.
Orange flower water,	To make four ounces.

Mix and take a teaspoonful in water before meals.

Advantage has been asserted from the use of the following prescription:

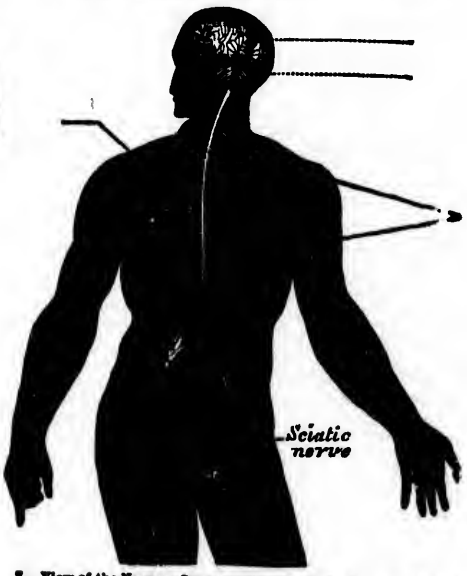
Tincture of iron,	One ounce.
Spirits of chloroform,	One ounce.
Glycerine,	Six ounces.

Mix and take a teaspoonful four times daily.

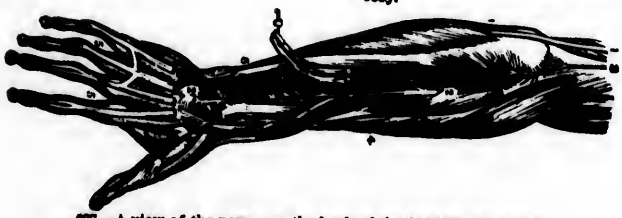


624.—The Great Sympathetic Nerve.

614.—A vertical section of the Head and Neck through the Mesial Line, in order to show the opening of the Eustachian Tube and its relations to the Pharynx.



7.—View of the Nervous System of Man, showing the nerve centres (brain and spinal cord) giving off nerves to supply the whole of the body.



627.—A view of the nerves on the back of the forearm and hand.

NERVES.

Explanation of "Nerve" Plate.

FIGURE No. 624.

1. Plexus or bundle of nerves of the carotid region.
2. Sixth external motor nerve.
3. First branch of the fifth ophthalmic nerve.
4. One branch above the partition of the nose, leading to the incisive foramen.
5. Recurrent branch of the vidian nerve, dividing into carotid and petrosal branches.
6. Posterior branches of the palate.
7. Lingual nerve, united with the tympanic chord.
8. The portio dura of the seventh pair, or facial nerve.
9. Superior cervical ganglion.
10. Middle cervical ganglion.
11. Inferior cervical ganglion.
12. Roots of the great splanchnic nerve.
13. Lesser splanchnic nerve.
14. Renal plexus.
15. Solar plexus.
16. Mesenteric plexus.
17. Lumbar ganglia.
18. Sacral ganglia.
19. Vesical plexus.
20. Rectal plexus.
21. Lumbar plexus.
22. The rectum.
23. The bladder.
24. The pubis.
25. Crest of the ilium.
26. The kidney.
27. The aorta.
28. The diaphragm.
29. The heart.
30. The larynx.
31. Sub-maxillary gland.
32. Incisor teeth.
33. Nasal partition.
34. Eye-ball.
35, 36. Cavity of the cranium.

FIGURE No. 614.

1. Section of the frontal bone.
2. Section of the occipital bone.
3. Muscles of the back of the neck.
4. Integuments on the chin.
5. Frontal sinus.
6. Middle turbinated bone.
7. Inferior turbinated bone.
8. Middle meatus of the nose.
9. Inferior meatus of the nose.
10. Thickness of the roof of the palate and floor of the nasal fossæ.
11. Mouth of the Eustachian tube. The catheter is within the fossa and is going to enter the Eustachian tube.
12. Cartilage of the nasal division.
13. Genio-hyo-glossus muscle.
14. Soft palate.

FIGURE No. 627.

1, 1. Cubital nerve.
2, 2. Ramus profundis dorsalis nerve
3. Extremity of the cutaneous nerve of the arm.
4. Branch of the radial nerve.
5, 5. Posterior view of the digital nerves.
6. Posterior branch of the cubital nerve.

DISEASES OF THE NERVOUS SYSTEM.

By the nervous system we understand ordinarily those nervous structures contained in the skull and spinal colum. These consist of the *brain* and the *spinal cord*. These constitute, however, but a portion of the entire nervous system. Man, like the other higher animals, is provided with two nervous systems intimately connected, and yet having many duties to perform independently of each other. The first of these, the so-called *sympathetic* or *ganglionic* system, comprises numerous masses or *ganglia* of nervous tissue which are scattered throughout the body, accompanying the blood vessels everywhere, and regulating the functions of the various organs — stomach, intestines, heart, lungs, etc.— which are concerned in the maintenance of the individual. The duties of this nervous system are therefore the regulation of the animal economy, the maintenance of equilibrium among the different parts of the organism. In some of the lower animals this is the only nervous system present. As we ascend the scale of animal life, the other system — the *cerebro-spinal* — appears at first in a very simple and rudimentary form, increasing in complexity as the structure and functions of the animal become more elaborate. This cerebro-spinal system presides over those portions of the animal which bring him in contact with the external world. The simplest animals, which are merely masses of jelly without any organs of sense or of locomotion, have no such nervous apparatus, while in the warm-blooded animals, which are provided with complicated organs of sense, the cerebro-spinal system is more elaborate than the sympathetic. As a natural result, the diseases of the brain and spinal cord, those parts of the nervous system which are concerned in the intercourse of the individual with the external world, are more easily recognizable, and have been far more thoroughly studied.

Inflammation of the Brain.

The popular conception of this disease applies rather to another disease, inflammation of the membranes covering the brain, or meningitis. For it should be remembered that the brain itself, composed of nervous tissues, is surrounded by membranes which are not nervous tissues, but are simply coverings for the protection of the delicate structures of the brain. These coverings or membranes may become inflamed without involving seriously the brain underneath.

For practical purposes, however, it is impossible to distinguish accurately between an inflammation of the brain and an inflammation of the membranous covering; in fact, in many instances the two are involved together.

The disease usually begins abruptly, perhaps with a chill; there is intense pain in the head, redness of the face and eyes, vomiting, roaring in the ears, an excited, distressed look, and extreme sensitiveness to light, sound and movement. The pain may be felt over the entire head, or chiefly in certain limited portions of it. The eyebrows are usually contracted, in order to shield the eyes from the light, and sometimes the patient keeps his face buried in the pillow for the same purpose. Movement of the body or of the bed is apt to occasion unpleasant sensations. There may be delirium and convulsions, the latter especially in young children. Sometimes the delirium becomes a prominent symptom so early in the disease that the patient is considered insane. There is intense fever. After a day or two there may be an exaggeration of the head symptoms, the patient becoming so furious that it is necessary to confine his limbs in order to prevent him from injuring himself or others. After some hours, perhaps two or three days, there ensues what has been called the "stage of oppression." This case occurs when an exudation has taken place from the membranes of the brain, whereby this organ is compressed. The result is impairment, or even abolition, of many of the functions of the brain; the pain in the head is decreased, or at least is not complained of; the extreme sensitiveness to light, sound and movement ceases; the delirium disappears, and instead of it the patient is often stupid, or even unconscious; paralysis of various parts of the body occurs; this may result in the production of squint; sometimes both pupils are con-

tracted, or both dilated, or they may be unevenly contracted, the one large and the other small; the respirations are slow and labored; one arm or leg, or perhaps half the body, may become limp and powerless. If the disease terminate in recovery, these symptoms gradually disappear; yet some of them are apt to persist for months, or even permanently. Thus there may be permanent impairment of vision or of hearing, or paralysis of various muscles. At other times the general bodily health may be recovered, but permanent impairment of the mind, even imbecility, may remain.

In the majority of cases, death occurs usually in eight or ten days, sometimes within thirty-six hours. In these cases which terminate fatally so early, the onset of the disease is not marked by the symptoms which have been described, for the patient seems to be overwhelmed as if by a large dose of opium. Almost from the first he lies stupid, almost unconscious, complaining little or not at all, and soon manifesting the signs of approaching dissolution.

Treatment.—One of the first objects of treatment is to keep the bowels active. If the condition of the patient permit, free purging with some saline, such as the citrate of magnesia, may be employed; but if, in consequence of delirium or obstinate vomiting it be not advisable to administer salts, a drop of croton oil may be placed upon the tongue. On the succeeding days smaller doses of the citrate of magnesia or half-drop doses of croton oil may be employed, so that the bowels may be kept free during the entire course of the disease.

The head should be closely shaved and pounded ice applied to the scalp, enclosed in a bladder or an india-rubber bag. Care should be taken that the influence of the cold be distributed evenly over the entire head, and not limited to a single spot. If ice cannot be procured, cloths should be wet in cold water and applied to the head. In this case care should be taken to change these cloths every five or ten minutes, since otherwise they become warm and useless.

There should also be used some means for causing the blood to circulate in the feet and limbs rather than in the head. For this purpose light mustard plasters may be applied to the soles of the feet and to the calves. Good results have indeed been obtained from immersion of the patient in a warm bath during the first two or three days of the disease.

Care should also be taken to keep the room dark, and to avoid all unnecessary annoyance in the way of noise or bustle. The diet should be bland, and consist entirely of liquids.

After the appearance of those signs which indicate that exudation has occurred in the brain — that is, after the patient becomes quiet and ceases to complain, the iodide of potassium may be given in doses of five grains three or four times a day in water. The scalp may also be painted with the tincture of iodine. During this stage it becomes necessary for the attendants to supply all the wants of the patient without waiting for him to express them. Thus he must be fed, and in most cases alcoholic stimulants are required to support the patient's exhausted powers. It is often also necessary to employ the catheter, since the patient will be unconscious of the necessity of evacuating the bladder.

Chronic Meningitis.

This affection is somewhat rare, and will seldom be recognized except by an experienced physician, since the symptoms are not characteristic of this affection, but may be caused also by other diseases. There is pain in the head, persistent vomiting, perhaps a little fever. A degree of mental dullness, sometimes amounting to stupidity, is also observed. In some cases paralysis occurs in various parts of the face and body.

Tuberculous Meningitis.

This is a form of inflammation of the brain which occurs especially in scrofulous individuals. It seems to be one of the manifestations of the hereditary taint acquired from tuberculous parents — a taint which sometimes appears as consumption, sometimes as disease of the joints, and sometimes as this inflammation of the brain.

This variety of meningitis occurs chiefly in children, though it has been known to affect adults also. Its development is not sudden, as is the case with accute inflammation of the brain, but comes on slowly and gradually. There is usually pain in the head, espe-

cially in the forehead. During this time the child becomes somewhat pale and emaciated, the appetite is impaired, the temper becomes irritable, and there is a loss of the usual disposition for amusement and exercise. An early symptom, sometimes a prominent one, is vomiting; there is usually some fever, though not sufficient to attract attention. The pain in the head is perhaps the most prominent symptom in children old enough to talk, who frequently complain of this symptom and carry the hands to the head. The child is unusually sensitive to light and sound, prefers the dark and quiet room. In consequence of the pain to the eyes from light, the child acquires a habit of frowning to avoid the light; the face is often flushed, and sometimes it may be noticed that the countenance becomes pale and flushed in rapid succession. In younger children convulsions are often observed.

Later in the disease the child becomes drowsy and stupid, there is less suffering from headache, the eyes and ears are less sensitive. The patient becomes quite stupid, answering questions reluctantly or not at all; any attempt at conversation is apt to be incoherent and imperfect. The pupils become larger and do not contract when exposed to a bright light as they do in health. Sometimes irregular movements of the eyes are observed and a squint is frequently developed; during sleep the child closes the eyes but partially. Sight may impaired or even lost; sometimes there is paralysis of one side of the face or of the entire body. The abdomen is sunken, the bowels usually constipated. Finally the patient becomes unconscious. Convulsions may occur at short intervals and a fatal result ensues.

The duration of the disease varies from one to four weeks, and it appears to be invariably fatal. Cases, it is true, have been reported in which recovery occurred; but it is probable that these were not instances of tuberculous meningitis but of some other similar affection. If there be no mistake in the diagnosis, treatment is futile; the most that can be done is to relieve the patient's suffering.

Spinal Meningitis.

This is an inflammation of the membranes which surround the spinal cord as it lies enclosed in the back bone. It is a rare disease, because an inflammation affecting the membranes in either

the skull or the back bone is not usually confined to the original location, but extends to the brain or to the spinal cord, as the case may be.

Symptoms.—There is pain along the entire length of the spinal column, radiating to the extremities, and aggravated by movements of the body; there is extreme sensitiveness of the entire surface of the body, so that the least touch or even the wave of air from a fan causes the patient to complain. It is impossible for him to endure the weight of the bedclothes. In a few days the muscles in different parts of the body become stiffened and rigid, and there may be spasmodic contractions of the limbs.

The disease runs a rapid course, rarely lasting more than a week, and usually terminating fatally. In the few cases that recover there are apt to remain distortions of the limbs.

Cerebro-Spinal Meningitis.

This affection, which is also known as *cerebro-spinal fever* and as *spotted fever*, occurs somewhat rarely as a sporadic affection, but almost always as an epidemic. As such it has caused great destruction in Europe as well as in America for three hundred years. It first appeared in the United States in 1806, in New England; thence it spread through the Middle States and finally reached the Southern and Western States. It consists of an inflammation of the membranes covering the brain and spinal cord, an inflammation from which the most characteristic features of the disease are derived.

Symptoms.—The onset of the disease is usually sudden, and includes a chill, nausea and vomiting, with intense pain in the head. This pain, which soon extends to the back of the neck and along the spine, seems simply agonizing, and soon renders the patient delirious. The pain is aggravated by light, sound, and movements of the body; so sensitive is the individual to the slightest disturbance, that it is almost impossible to stay in his vicinity without causing him annoyance. Notwithstanding the pain along the spine, there is frequently no tenderness in this region, pressure being borne without flinching; yet the pressure of the hand upon the stomach and abdomen, or upon the skin in different parts of the body, is

apt to be painful. As in the case of spinal meningitis, the skin is everywhere intensely sensitive, so that a slight touch or the pressure of the bed-clothes is sufficient to cause pain.

In most cases, delirium occurs in a few hours; this delirium varies considerably in intensity and in its character. At times several hours elapse before the friends become aware that the patient is not in his usual mental condition; at first he merely displays a difficulty in collecting his ideas and in answering questions; but after a time he becomes sullen and morose, making no response upon being addressed. In other cases, the delirium is from the first an active one, the patient shouting, singing, and attempting violence to others as well as to himself. In this variety of delirium the patient usually has calm intervals during the day, being violent at night. If there be no delirium the patient is extremely despondent and fearful, or becomes stupid and unconscious. Sight and hearing may be impaired; the face is hot and flushed.

The condition of the muscles affords valuable information as to the nature and progress of the disease. Violent contractions of different muscles are apt to occur in the limbs, but especially of the neck and back. The result of this rigidity of the muscles of the back and neck is a peculiar position of the head, which is drawn back forcibly, so that the neck and back are somewhat bow-shaped, the back of the head being buried in the pillow. Various other muscles may assume a similar state of contraction, so that the arms and legs, the hands and feet are twisted into unusual positions; and any effort to straighten them out occasions intense pain. The various changes in the position of the eyes, also, which have been described in connection with inflammation of the brain, may occur in this disease. Paralysis is a somewhat infrequent symptom.

Nausea and vomiting are usually among the first symptoms of the disease, and persist, sometimes, throughout the attack. The tongue is often large and flabby, and when protruded shows the indentations in the sides left by the teeth. The lips and teeth are frequently covered with dark material called *sordes*.

The fever is not so intense as might be expected from the severity of the disease; indeed, at the beginning of the illness the body heat is often lower than that of health, as ascertained by the thermometer. At no time in the disease is there marked fever, unless it be for a few hours just before death.

Another feature, from which the disease gets its name ***spotted fever***, consists of spots due to the escape of blood into the skin.

These may vary in size from that of a pin's head to a quarter or half an inch in diameter, and may appear on different parts of the body, particularly on the chest and abdomen. These spots are not always present, even in fatal cases of the disease.

The disease occurs with especially frequency among children, and is attended with the greatest mortality. Males more frequently die of it than females. Epidemics occur most frequently in cold weather, especially in winter, being next most frequent in the spring.

There is no evidence that this disease is contagious.

Treatment.—We are in ignorance as to the cause of this disease, and naturally ignorant as to the proper means for treating it. A large majority of the patients die, no matter what remedies or what kind of treatment be employed. In every case, therefore, the patient must be treated and not the disease, and it is impossible to lay down rules which shall apply to all cases. The application of ice to the head and to the spine, the administration of opium, and friction of the body with whisky may perhaps afford relief.

Apoplexy.

This term signifies a shock or stroke, and the condition designated by it is really a symptom rather than a disease. For a so-called "apoplectic stroke" may be the result of any one of several changes occurring in the brain or elsewhere.

In the majority of cases an apoplectic stroke occurs as the result of a hemorrhage within the skull. The escape of blood from the vessels causes, of course, a compression of the brain and an arrest of the functions of this organ. Now, since different parts of the brain have different functions to perform, the effect produced by a hemorrhage varies according to the part of the brain in which the escape of blood occurs. If the hemorrhage take place in those parts of the brain which are concerned in the state of *consciousness*, the effect will be to produce unconsciousness, as well as to interfere with other bodily functions, producing paralysis for example. In this case, although the individual be unconscious for a time, his breathing and the beating of his heart may not be interfered with; he may survive an indefinite time, may recover consciousness, and

indeed may finally recover the use of the paralyzed members. In other cases the hemorrhage may occur in such a part of the brain as to compress the portion which is necessary to continue the breathing and the beating of the heart. In this case death occurs immediately. It is such causes as these which result in the sudden death of individuals while quietly lying in bed, even during sleep.

In other cases there is no perceptible hemorrhage, in fact, post-mortem examination fails to show anything more than a congestion of the brain. In still other cases, an injury received months previously may suddenly cause death unexpectedly. Such was the case of Daniel Webster, who died six months after receiving an injury to the head. Shortly after this injury he addressed a public meeting in Boston without giving evidence of any unnatural condition of the brain. At the time of death a thick layer of fibrine was found covering a considerable part of his brain.

Symptoms.—In a great majority of cases the attack occurs without warning. In some it is preceded by a sense of weight and fullness in the head, dizziness, roaring in the ears and flushing of the face; the appearance of sparks or motes before the eyes, and perhaps an unusual sense of sleepiness. It seems that in many instances, however, the attack occurs at a moment when the individual feels unusually well.

The patient, if walking or standing, falls to the ground as if leveled by a blow; in other cases the loss of consciousness is not so sudden, the patient having time to seat himself, or at least recognize the necessity and make the attempt to do so. In such cases the patient is aware that something unusual has happened to him, as several seconds, or even minutes, may elapse before he has lost consciousness. If this loss of consciousness be complete, the patient cannot be aroused by any efforts, but lies with puffed and livid face, breathing slowly and loudly, and often frothing at the mouth. In these cases there are no voluntary movements; except for the movements of breathing, the patient lies as if dead. In other cases the patient may be unconscious and still endeavor to make aimless movements of the limbs; in the course of these movements it becomes apparent that some of the members are paralyzed; for it is generally observed that while the arm and leg of one side are readily moved, the corresponding members of the other side are motionless, except as they are stirred by movements of the trunk.

Another feature of apoplexy, which is important as enabling us to distinguish from certain conditions in which the patient is also unconscious, is exhibited by the pulse. The pulse is slow and very full, striking against the finger laid upon it with a great deal of force. The face is usually flushed and somewhat livid; the skin is often warm and moist. If the eyelids be raised it will be observed that the pupils are often contracted to very small sizes; and they are also of unequal diameter. The limbs which are paralyzed are oftentimes rigid so that they cannot be bent by the patient nor by others. Early in the attack the patient usually vomits.

The loss of consciousness varies extremely in its duration; it may pass away in a few minutes, or it may persist for hours and even days. Generally speaking, the severity of the attack, so far at least as danger to life is concerned, may be estimated by the time during which the patient remains unconscious. If consciousness be recovered in a few minutes, there is not usually immediate danger to life; but if unconsciousness persist for ten or twelve hours, without manifesting signs of improvement, the outlook for the patient's ultimate recovery is very doubtful.

It is important to be able to distinguish apoplexy from several other affections in which loss of consciousness is present. One of these, which, however, could rarely be mistaken for apoplexy, is the ordinary fainting fit. This, however, is marked by pallor of the face, and by unusual weakness of the heart's action, as shown by the pulse, and sometimes by almost complete suspension of the breathing.

A condition which presents a much greater resemblance to the symptoms of apoplexy is *epilepsy*, or the "falling sickness." After the epileptic patient has fallen to the ground, he lies in an unconscious state, breathing slowly and laboriously, his face swollen and livid, foam and blood issuing from his lips. In these symptoms there is an extreme resemblance to apoplexy, and from these alone it would be almost impossible to distinguish between them. Yet the attendant circumstances make the diagnosis easy, for the epileptic fit is usually preceded by convulsive movements, and frequently by a scream as the patient falls; apoplexy, on the other hand, occurs suddenly without the convulsive movements or a scream. Then again, in a very few moments after the patient has fallen in an epileptic paroxysm his limbs, which at first were rigid, become strongly convulsed; he executes jerking movements with

the arms and legs, and usually with the face ; his eyes roll, and the lividity of the countenance gradually decreases. These symptoms are not present in apoplexy. It is quite important to make the distinction, because the patient recovers from an epileptic paroxysm without treatment, and no alarm need be felt, while the apoplectic stroke is always a matter of peril and apprehension.

Another condition which may sometimes be mistaken for apoplexy is a hysterical convulsion. In these cases it is true the previous history of the individual, and her previous accomplishments in the same direction, render the diagnosis easy, even to the unprofessional friends. For a few moments the symptoms may simulate those of apoplexy with wonderful accuracy. There is however a point of difference which enables one to distinguish immediately between the two, and it is this : The apoplectic stroke is almost invariably accompanied by a loss of consciousness, and by the immobility of the face and eyes; during the hysterical fit, on the other hand, the consciousness is not lost, notwithstanding the apparent stupor of the patient, for if the cold douche be brought into requisition, or any other decidedly unpleasant application be employed, the patient indicates at once by serious remonstrances that she is quite aware of the attention bestowed upon her.

Another condition in which apoplexy is simulated, is profound alcoholic intoxication. This state must be carefully distinguished from apoplexy, since an error in either direction would be at least annoying, and might be the cause of serious results. The distinction is in most cases easy, if the possibility of error be remembered; for intoxication is revealed at once by the odor of the breath, and by the matter ejected from the stomach; moreover, the pulse is not slow and full, as in apoplexy, but rather rapid and weak. Then, again, the patient can be, by assiduous efforts, aroused to some manifestations of consciousness, if he be only drunk; but if he have received an apoplectic stroke, such efforts remain unsuccessful.

The duration of an attack of apoplexy varies considerably ; in some cases it results fatally in a few minutes; in others, the patient sinks gradually, and dies in a few days; in still others, consciousness returns, but the paralysis remains—sometimes permanently, at other times disappearing in the course of some months, partially or completely. It is impossible to predict what the result will be,

for instances have been known in which perfect recovery has occurred. Cases are known in which the bodily functions have been entirely recovered, while various impairments of the mind have persisted. Sometimes the patient is merely morose and irritable; at other times he is easily affected to displays of emotion, laughing and weeping at trifles. In some cases the patient loses the power of speech, not from inability to utter sounds, but from a loss of memory as to the meaning of words. This condition is called *aphasia*. Many of these cases are most interesting objects of study. They evidently think without being able to employ language. Sometimes the patient does not remember a single word; at other times they are able to employ a few words, though evidently quite ignorant of the meaning. Thus, some will say *yes* or *no*, in reply to every question, without regard to the significance of the words. It is still more interesting that many of these patients understand everything perfectly, and may even be able to write with some degree of accuracy. In a few cases, such patients have been successful in learning to talk over again, but in most instances all attempts to make this acquisition have failed.

This loss of speech in connection with apoplexy happens with especial frequency, if the right side of the body be paralyzed during the stroke.

Cause.—Apoplexy is generally a hemorrhage into the brain, and in most instances there is a disease of the arteries, whereby the escape of blood occurs more readily than in the healthy condition of the vessels. At other times the fault seems to lie largely in the heart, which has become unusually large and powerful, and hence forces the blood through the vessels with extreme power.

The disease of the vessels which renders the escape of blood so easy, is often the deposit of lime salts in the walls of the arteries —a condition known as *atheroma*. This condition occurs almost invariably after middle life, and attacks of apoplexy are known to happen also with especial frequency in elderly persons.

The enlargement of the heart is usually associated either with chronic Bright's disease, or with some organic disease of the heart. These patients, the subjects of heart disease and Bright's disease, are especially apt to have apoplexy.

But there are numerous cases of apoplectic stroke in which the kidney and the heart seem to be perfectly healthy, and indeed an

examination of the vessels of the brain after death shows that they too are healthy. It seems probable that in these cases the apoplexy is produced by over work of the body or mind, the latter especially. The popular idea that high living is a frequent cause of apoplexy does not seem to be in accord with the fact. It is the general impression that there is a so-called *apoplectic constitution*, consisting in a good deal of fat and a short thick neck, constituting what is known as a "full habit." But the examination of a considerable number of cases of apoplexy with regard to this very point, shows that the disease occurs more frequently in people of ordinary or even of rather spare habits, than in those addicted to corpulence.

The occurrence of one attack of apoplexy seems to predispose to subsequent ones; or to put it more correctly, the individual has acquired such a condition of the vessels as permits a hemorrhage upon even slight causes. There is a popular impression that the third stroke of apoplexy is invariably fatal. It can merely be said that the dangers increase with every attack, the patient's chances for recovery diminishing as the attacks recur.

Treatment.—The most important part of the treatment of apoplexy consists in sanitary regulations and precautions. After the blood has once escaped into the brain, but little can be done to remedy the disastrous effects. Immediately after the stroke the head may be kept raised and cold cloths should be applied to it. Mustard plasters may be applied to the feet and to the calves for the purpose of drawing the blood from the head.

A drop of croton oil may be placed upon the tongue in order to promote early and active discharges from the bowels. The paralysis which remains after apoplexy often persists in spite of all treatment. The best results are obtained of electricity and of *massage;* that is, rubbing and kneading with the hands.

Yet in many cases changes occur in the brain which cannot be altered by any means at our command; and in most cases there remains permanent impairment of either body or mind, or both. After suffering one attack of apoplexy the patient should take extreme care to avoid, so far as possible, a repetition of the disaster. On this point Dr. Flint says:

"The liability to a recurrence of apoplexy, after the recovery from the attack, renders it important to observe all possible precaution in the way of prevention. Placing the system in the best possible condition by means of a well regulated diet and regimen,

and avoiding exciting causes, will afford all the security which can be obtained. It is not probable that any protection is afforded by reducing the powers of the system, and other evils may thereby be induced. It is injudicious to adopt a diet which is insufficient for the wants of the system, or to resort to repeated blood-letting, cathartics or other lowering measures. In striving to avoid excesses and imprudences of all kinds, a care must be taken not to err in the opposite extreme. Mental occupation within certain limits is advisable.

"The liability to apoplexy, if an attack has never occurred, cannot be estimated with any degree of certainty. This is one of the affections which persons are apt to apprehend, and if certain cerebral symptoms be experienced, especially dizziness, the fear of apoplexy is often a source of much unhappiness. The suggestion by the physician that there is danger of this affection is an indiscretion which I have known to prove most calamitous. When apprehension is felt the physician is warranted in giving assurances that dizziness and other cerebral symptoms are sufficiently common without being followed by apoplexy, and that an apoplectic attack is rarely preceded by obvious premonitions. Needless uneasiness may oftentimes be removed by these assurances."

Falling Sickness—(Epilepsy).

This disease, also known as the "falling sickness," is one of the oldest known to medicine. It is further interesting from its association with several names noted in various departments of the world's history; Julius Cæsar, Mohammed and Napoleon Bonaparte are all known to have been sufferers from this disease.

Symptoms.— In the majority of cases a paroxysm occurs without any warning symptom; in others there is a certain amount of premonition. This warning usually consists in sensations which the patient describes somewhat vaguely, the descriptions varying considerably in different cases. In many there is headache, dizziness, ringing in the ears, irritability of temper and specks floating before the eyes before the attack. These sensations may be felt even a day or two before the convulsion occurs. In many there is no warning symptom until a few minutes before the fit begins. In

these cases there is a feeling of tingling or pain in one of the fingers or toes; sometimes this feeling is first experienced at the pit of the stomach. This feeling or tingling seems to rise through the body and up into the throat, when the patient falls unconscious. In other cases the patient describes the feeling as if a ball were rising from the stomach into the throat.

Yet, in majority of cases, there is no sensation of this sort; when the patient least expects it, perhaps when sitting quietly, or walking along the street, he suddenly utters a loud piercing cry, and falls unconscious. This shriek is loud, short, and from its unnatural character and suddenness, seems terrific. At the same time the face becomes extremely pale. So soon as the patient falls the convulsive movements begin. In some cases these movements seem to begin before the body falls to the ground; in this case violent and aimless jerking movements of the arms are observed, or the head is drawn around towards one of the shoulders. In the majority of cases the first intimation is the pallor of the face, followed almost instantly by the scream, the fall, and the convulsive movements. The person usually falls forward on the face, often injuring the head and face severely. Indeed, one of the greatest dangers of epilepsy is the possibility of serious, or even fatal injury from the falls, since individuals have been known to drop onto heated stoves, into an open fireplace, or to scald themselves fatally with boiling water. The onset of the attack is so sudden and unexpected in most instances, that the patient is utterly powerless to avoid injury, if circumstances permit it.

At first the entire body assumes a condition of extreme rigidity, the muscles of the head, trunk, arms and legs seem all strained to the uttermost, the body being bent sometimes in one direction, sometimes in another, but always as stiff as iron. Meanwhile the breathing is arrested, the face becomes swollen and purple; saliva issues from the mouth, often tinged with blood from injuries received by the tongue. It occasionally happens that the tongue is caught between the teeth and deeply lacerated as the jaws close upon it.

This state of rigidity lasts only from a few seconds to half a minute, and is followed by violent movements, which may involve the whole body, or may be limited to the extremities or to the head. The face is terribly distorted, the jaw opens and closes convulsively, deep violent efforts at respiration are made, the patient's

body is often thrown violently from side to side, sometimes sustaining severe bruises; sometimes, indeed, bones are dislocated, or even broken from the violence of the movements.

These convulsive movements last not more than two to four minutes; their violence then decreases, the respiration becomes more nearly natural, the face becomes less livid, and finally the patient draws a deep sigh, and the paroxysm is ended. The consciousness may be now regained at once; the patient, however, is not aware of what has happened. He experiences a sense of fatigue, and usually falls into a heavy sleep. In most cases, however, the individual remains unconscious for some time, even half an hour after the convulsions have ceased; during this time his breathing is heavy and labored, and his lips are puffed out during expiration. At times the patient passes from this state into one of delirium, talking incoherently, and even becoming maniacal. This, however, is but transient, the patient finally recovering consciousness completely. He appears confused and bewildered by his own condition, and is at a loss to understand how it came to pass. After the individual has long been subject to these attacks he becomes accustomed to the situation and manifests less surprise.

In most cases but one fit occurs at a time, the patient recovering consciousness completely. In other instances a second paroxysm occurs before the patient has recovered from the first; in fact, several fits may follow one another in rapid succession.

The paroxysms of epilepsy are sure to return after the patient has had one. The intervals that elapse after the first vary extremely. Sometimes months may elapse between the first and second; in these cases the intervals become shorter as time passes. In other cases the paroxysms occur at short intervals even from the first, and, after a few months, they may recur every day, or even several times a day. In some instances the fits come on at regular intervals. In females, the paroxysms at times occur regularly with the menstrual periods.

The general course of the disease is that the fits recur at constantly decreasing intervals; in other cases, however, the intervals become longer after a time, so that the disease seems to be wearing itself out. Yet spontaneous recovery does not occur, since sooner or later the paroxysms recur, usually with the same frequency as before.

The greatest diversity prevails as to the intervals which may

elapse in different cases. In some instances a year or more transpires; while in others, fifty or one hundred paroxysms occur in twenty-four hours. Dr. Flint mentions a case in which the fits occurred at intervals of a few moments during fourteen consecutive days, yet the patient recovered and remained free from the disease for several months. Sometimes paralysis, partial or complete, appears as a sequel to these series of attacks at short intervals; yet the paralysis is usually but temporary. Another feature which often occurs after the patient has had numerous fits in rapid succession, is a marked impairment of the mental faculties; the individual remains childish, or even imbecile, for some hours or days, but soon recovers his usual mental condition. Epileptic fits may occur any hour of the day or night, though in many instances, there seems to be an especial disposition to their occurrence at night. In some cases, indeed, they happen only at night for a considerable time; and inasmuch as the patient is unconscious of their occurrence, the disease may exist for a long period before it is discovered. It is further interesting that the attacks usually cease if the patient become afflicted with an acute disease. Thus during the course of typhoid fever, small-pox, pneumonia and the like, the individual usually remains free from epilepsy, which however, returns so soon as he recovers from the other disease.

Cause.—The disease seems to result, in many cases at least, from abuses of alcoholic stimulants as well as from sexual excesses. Yet it is highly probable that venereal excesses and habits of masturbation are not so frequently and so directly responsible for the manifestation of epilepsy as the popular impression supposes. Indeed, it is still an open question whether the disposition to sexual excesses and the epilepsy are not to be regarded as the results of the same cause.

Epilepsy has also been known to occur as the result of slow poisoning by lead, as well as by other metals; and instances have been known to occur in persons afflicted with tape-worms, and to cease when the worms were expelled.

As to what provokes a paroxysm in a person subject to epilepsy there is no definite information. In some cases it seems that unusual emotion or excitement acts as a cause in provoking a fit. Thus instances have been known in which a woman has experienced her first epileptic attack on the night of her marriage, and in which the fits have recurred with every subsequent sexual act. Yet in the

majority of cases no such exciting cause is discovered. In many cases the patient feels indisposed for some time before a fit occurs, and seems to be better after the paroxysm.

Hysteria seems also to exert a predisposing influence, or it may be more nearly correct to say that individuals subject to hysteria are prone to the manifestation of epilepsy. In such cases, epileptic fits are sometimes developed apparently as an act of mimicry. Thus it has been repeatedly observed that women subject to hysteria have, after association with people subject to epilepsy, become epileptic themselves. This same development of epilepsy by imitation has been witnessed also in a dog, after association with another dog already subject to the disease; for epilepsy is quite common among cats and dogs.

This disease is sometimes simulated with great success by individuals who seek thereby to obtain sympathy, to arouse attention, and sometimes for purposes of gain. Not long ago it was discovered that a certain noted pickpocket of New York was in the habit of picking pockets while apparently suffering a severe fit of epilepsy. His plan was to be attacked with a severe paroxysm of epilepsy while in the midst of a crowd, and then in the excitement and commotion aroused by his "fit," he managed to insert his fingers into the pockets of those bystanders who sympathizingly assisted and protected him. In this case the deception was easily detected when subjected to medical scrutiny; but another instance is known in which a most accomplished simulator of epilepsy deceived the medical inspector of a certain state prison, by whom he was, on account of his epilepsy, transferred from the prison to the hospital, from which he readily made his escape.

Epilepsy seems to be most frequently developed in childhood and youth, and to occur more frequently among females than among males. The disease, though presenting some of the most terrifying pictures, involves no immediate danger to life. It is extremely rare that a patient dies during a paroxysm, no matter how violent this may be.

Yet epilepsy conveys a certain amount of danger to the patient; danger that his mental powers will become impaired. For it is unquestioned that those who have been long subject to frequent attacks of epilepsy become, in many instances, weak of intellect, and even idiotic. This result may be, it is true, due somewhat to other causes than the epilepsy itself; thus those who in early life are sub-

ject to the disease, are not usually permitted to enjoy the same advantages of education and training as others.

The above description applies to the ordinary form of epilepsy; but there is another form less violent and not marked by such characteristic symptoms, which is, nevertheless, the same disease. The attack consists in a sudden loss of consciousness, lasting usually but a few seconds. The individual does not scream nor fall, nor do the convulsive movements occur such as have been described in connection with epilepsy. The individual's movements are suddenly arrested; if walking he stops, if conversing he suddenly becomes quiet, and remains apparently in deep abstraction. Almost before the attention of the bystanders is attracted, the patient resumes his former occupation, walking or conversing, taking up the subject where he had dropped it and proceeding as if nothing had happened. To him indeed nothing has happened. He has no knowledge of the occurrence, and it may be long before it dawns upon the friends that the individual is at the time unconscious and not simply lost in thought.

This mild form of epilepsy may last for an indefinite time without undergoing any essential modification; while in other cases it serves merely as an introduction to the severer form, in which the patient falls and his body becomes contorted by convulsive movements. In other cases the mild form of epilepsy occurs in the intervals between the severer attacks, the patient being subject to both varieties at the same time. Almost all degrees of severity between the two extremes narrated have been known to occur; in some cases there is loss of consciousness attended by convulsive movements of the jaws or of the face only; in other cases the patient falls to the ground but rises in a few seconds, no convulsive movements having occurred.

"In other epileptic attacks sudden delirium occurs, continues for a few seconds and passes off, leaving the mind in the condition in which it was at the instant of the seizure. The delirium is manifested in different ways. Trosseau cites a case in which the patient uttered a burst of laughter, and when asked why he laughed, he looked surprised, having no knowledge of what he had done." The same author relates instances in which individuals, who were engaged in conversation, have abruptly rushed into the street, bare-headed, as if struck by a happy thought, have walked about and then returned, and have finished the conversation, as if nothing had happened. "A female patient, quietly

standing in one of the wards of Bellevue hospital, suddenly uttered a cry and ran from one end of the ward to the other. The urine was at the same time expelled, leaving on the floor traces of her course. Having reached the end of the ward, she stopped, looked somewhat confused, and quietly returned. The following is another example: Some years ago a young man who had been subject to ordinary epilepsy for twelve years, came to see me, accompanied by his attending physician. On the previous evening, from time to time, he had paroxysms of jumping up and down with violence for a few seconds. In walking to my residence, he stopped now and then and performed these jumping movements in the street. After sitting down and replying quietly to my questions, he began to jump violently in the chair for a few seconds, and continued to do so at short intervals."—*Flint.*

Treatment. — During the paroxysm the treatment is quite simple; the patient should have plenty of air, and the bystanders, who are in the habit of crowding around out of curiosity or sympathy, should be kept back. The clothing around the neck may be loosened, and, if it can be done early, a pen-holder or a piece of cork may be inserted between the jaws, to prevent the patient from biting his tongue. It is quite unnecessary and undesirable to throw water upon the patient, or in any other way attempt to bring him to his senses; this result will follow spontaneously, and cannot be hastened by any such measures. It need scarcely be said that the patient should be placed so that he cannot, during his convulsive movements, do himself any damage; he should, therefore, be placed in an open space, in the middle of the floor, for example, or on a large bed.

To break up the paroxysm is, of course, the prime object of treatment. To accomplish this, an immense number of remedies have been employed, and success has been claimed for many of them. The largest number of cases have been benefited by the use of the *bromide of potassium*, with or without one of the other bromides. The following prescription has been used extensively:

Bromide of potassium,	One drachm.
Bromide of ammonia,	One-half drachm.
Iodide of potassium,	One drachm.
Bicarbonate of potassium,	Forty grains.
Infusion of columbo,	Six ounces.

Take a tablespoonful before meals, and two tablespoonfuls at bedtime.

In most cases better results will be obtained by the following prescription:

Iodide of potassium, - - -	One drachm.
Bromide of potassium, - -	One ounce.
Bromide of ammonium, - -	Four drachms.
Bicarbonate of potassium, - -	Forty grains.
Tincture of gentian, - - -	Six ounces.

A teaspoonful in water before meals, and three teaspoonfuls at bedtime.

The bromides should not be taken for a long time without the direction of a physician, because certain ill results may follow which can be avoided by varying the remedies used. After a certain time the bromide causes mental languor and a certain degree of stupidity. If the use of the bromide causes an eruption on the face and body, as it often will, it may be combined with three or four drops of *Fowler's solution* at each dose.

In every case the bromide should be tried first; if this fail, after a faithful trial for six or eight months, the following prescription may be employed:

Oxide of zinc, - - - - -	30 grains.
Bromide of zinc, - - - -	20 "
Extract of nux vomica, - - -	8 "

Make 30 pills; take one morning and night before meals.

An important part of the management of epilepsy is the observance of sanitary conditions. All excesses and unnecessary excitement must be avoided. Regularity in the evacuation of the bowels, the use of a nutritious diet and abundant exercise in the open air are extremely important.

Within the last few years the *nitrite of amyl* has been somewhat employed in order to cut short the paroxysms. It has been found that in those cases in which the patient has warning of the attack, by the sensations in the throat already described, the paroxysm can be often averted by the inhalation of a few drops of the nitrite of amyl. Two or three drops of this substance are placed upon the handkerchief and held to the nose. The immediate effect is a sense of dizziness, accompanied by flushing of the face. Yet this remedy is capable of causing serious effects and should not be used except under the direction of the physician.

While it is in almost every case possible to improve the patient's condition materially, so that the paroxysms shall recur

at much longer intervals and shall be less violent, yet it must be admitted that a permanent cure can be anticipated only in recent cases. Yet in every instance a faithful trial of the more important remedies, extending over two or three years if necessary, should be made. For it is to be remembered that the most disastrous feature in the disease is not the convulsions, but the deterioration of the intellect, which is almost sure to follow if the disease be allowed to progress without treatment; and that although it may not be possible to arrest wholly the occurrence of the paroxysms, that if they can be checked the prospect for preventing the impairment of the mental faculties is much improved.

Attention should be called to one other feature of the disease also, namely, that in some cases delirium lasting several hours or even days, succeeds a paroxysm of epilepsy; during this time the patient is not in his right mind, and therefore not responsible for his actions. Instances have been known in which patients in this condition have been guilty of acts of violence which would, under other circumstances, have rendered them liable to severe punishment at the hands of the law.

Catalepsy.

This appears to be one of the forms or manifestations of hysteria, or at least closely allied to this latter affection.

In this condition the patient appears to be entirely unconscious, his senses and will being for the time quite inactive. The individual remains motionless, preserving the position in which the body happens to be placed at the time when the attack began. Sometimes these positions are such as it would be impossible to maintain for any length of time in health, even by the strongest exertion of the will. Thus the arm may be held out from the body for an incredibly long time, or the individual may balance himself on the floor, in a sitting posture, with the fee, raised, so that the entire weight of the body rests upon the buttocks. Sometimes these positions are maintained for a few seconds only, sometimes for minutes or hours. The other functions of the body do not seem to be disturbed. The breathing and the action of the heart are uniform and natural, and if food be introduced into the patient's

stomach digestion is well performed. In some cases a single paroxysm occurs at a time, the patient being then free from the affection for months. In other instances paroxysms recur in rapid succession, just as they are known to do in epilepsy.

Cause.—This disease appears to be an affection of the nervous system, and is induced certainly in many cases by excessive emotion and violent excitement. It seems possible that the starting point of the disease in catalepsy, as well as in hysteria, may be some bodily affection, whereby irritation of the nervous system is produced. In the great majority of cases the disease occurs in hysterical individuals, and of course chiefly in females.

This affection is closely allied with the conditions known as trance, somnambulism and mesmerism.

St. Vitus' Dance—(Chorea).

This disease, also known as St. Vitus' dance, is characterized by irregular and aimless contractions of different muscles, without the agency of the will, in fact often in opposition to the desire of the individual. The muscles first affected are commonly located either in the arm and hand or in the face. The irregularity of movement may remain limited to a single extremity for a long time, or may rapidly progress so as to involve all of the extremities and even the trunk itself. The appearances presented by the subject of this affection are most ludicrous; the first impression derived by the spectator is that it is a voluntary performance designed for the amusement of the bystanders. More than a century ago Sydenham described chorea as "a species of convulsions, which for the most part attacks boys or girls from the tenth year to puberty. First it shows itself by a lameness, or rather instability of one of the legs, which the patient drags after him like a fool. Afterwards it appears in the hand of the same side, which he that is affected with the disease can by no means keep in the same posture for one moment. If it be brought to the breast or any other part, it will be distorted to another position or place by a convulsion, let the patient do what he can. If a cup of drink be put into his hand, he makes a thousand gestures, like jugglers, before he brings it to his mouth; for whereas he cannot carry it to his mouth in a right line,

his hand being drawn hither and thither by the convulsion, he turns it often about for some time, till at length, happily reaching his lips, he flings it suddenly into his mouth, and drinks it greedily, as if designing only to make sport."

The constant activity of the muscles causes exhaustion, so that the patient may be unable to perform the acts necessary to supply his bodily wants. He may even be unable to walk, not because his legs are too weak, but simply because they do not obey his will. In most cases the contortions become more violent as the patient's efforts to control his muscles become more vigorous.

The affection is not accompanied by fever, but the general health is usually somewhat impaired. In many instances there is decided pallor and often some emaciation. The mind becomes impaired. At times the power of speech is practically lost on account of the lack of control of the muscles whereby articulation is affected. In these cases the individual seems even more stupid and imbecile than is actually the case. The strength of the muscles which are affected by the disease is diminished, and in consequence there is apt to be general impairment of muscular strength. At times, also, the sense of touch is impaired, especially in that part of the body which is subject to the disease.

St. Vitus' dance may occur at any period of life, but is most frequent during the years preceding puberty; that is, from ten to fifteen. Girls are more frequently affected than boys, in the proportion of three to one.

The affection lasts ordinarily from two to four months; it may terminate earlier than this period, or may, on the other hand, last for many years. Cases are known, indeed, in which the individual has suffered from it during his entire life. It terminates usually in recovery; yet the disease may recur several times in the same individual, although finally disappearing permanently. These relapses occur after intervals of several months, or even one or two years.

As to the cause of chorea nothing definite is known. There are certain reasons for believing that in many cases at least the affection is a disease of the brain, consequent upon organic heart disease. Yet in the majority of cases there is apparently no disease of the heart, and it is impossible to ascribe the affection to this source. In other cases St. Vitus' dance commences immediately after a fit of excessive emotion, such as anger or terror. There is

a popular idea that this affection, like so many others, is to be ascribed to worms in the intestine; as to this, it can only be said that there is no evidence to this effect. It is quite possible that the irritation caused by the presence of worms may aggravate the condition, though it does not seem possible, in the light of our present experience, that the disease should ever be due entirely to them.

Acute Chorea.

In certain rare cases St. Vitus' dance appears in an entirely different guise. In these cases there is not merely a twitching of certain muscles, without constitutional disturbance, as in ordinary cases. In these instances the patient's entire body becomes suddenly affected with the most violent convulsive movements. He is unable to take food or drink, cannot speak coherently, and is tossed about violently in spite of all his efforts to remain quiet. It is usually necessary to restrain the movements of his body by tying the limbs to the bed, since otherwise the patient would suffer serious physical injury through his own involuntary movements. The patient is apt to be at first amused by the absurdity of his own situation, and laughs heartily at the violence of his own grotesque and aimless movements. Within twenty-four hours it becomes evident, however, that the affection is no laughing matter; the patient becomes exhausted by the violence of his own uncontrollable movements; high fever occurs; the patient must be nourished artificially. But in spite of all that can be done, in spite of morphine, chloral and chloroform, the patient continues the movements, and in from four to eight days dies exhausted. These cases are fortunately rare; but up to the present time all modes of treatment are alike hopeless.

Treatment.—In the majority of cases chorea terminates in recovery spontaneously. Hence it has happened that a vast number of remedies have acquired a reputation as specific cures for the disease, for the patient recovers no matter what remedy, provided it be harmless, be administered to him; hence every remedy which is thus used seems to cure the disease. It would be quite useless to name all the medicines which have been given for the treatment

of St. Vitus' dance with apparent success. Those most frequently used are the bromide of potassium and the valerianate of zinc. In most cases it becomes necessary to administer tonic medicines, for the children are evidently in need of some blood-making remedies. They are pallid and become more so as the disease progresses. It is therefore desirable to administer iron and cod liver oil. For this purpose one of the following prescriptions may be given:

Syrup of the iodide of iron, - Two ounces.

Take ten to fifteen drops in water after meals.

Citrate of iron and quinine, - One drachm.
Cod liver oil, - - -
Glycerine, - - - - Each two ounces.

Mix and take a teaspoonful after meals. This dose may be gradually increased if the stomach bear the oil well.

Arsenic, - - - - One-quarter of a grain.
Reduced iron, - - - Ten grains.
Extract of nux vomica, - Two grains and a half.
Sulphate of quinine, - Ten grains.

Mix and make twenty pills. Take one before meals.

In other cases Fowler's solution has been used with advantage, two or three drops being given before meals three times a day, and the dose gradually increased.

Whether these or other remedies be tried, there will be found cases which obstinately resist all treatment, at least by medicines alone; on the other hand, cases have recovered under strict attention to sanitary regulations after they had baffled almost all modes of treatment by drugs. This treatment consists of light and nourishing food and exercise. In some cases systematic gymnastics have been employed; but it may be laid down as a fact, that exercise is beneficial only when the mind is employed as well as the body; hence a residence in the country or at the seashore, or some other way of combining bodily exercise and mental recreation, is far preferable.

If the child is compelled to remain at home, the cold bath should be employed every morning; if possible a course of sea bathing will be found very beneficial.

Another point is that the child should receive the sympathy and attention of parents and friends, and should be protected from the thoughtless ridicule which is naturally excited among children by the grotesque movements that cannot be controlled.

In every case which proves at all obstinate, the patient should be submitted to the best medical advice.

Lock-jaw—(Tetanus).

This affection consists of a series of painful and violent contractions of the voluntary muscles, either of the jaw alone or of a considerable part of the body, while the intelligence and mental faculties remain unimpaired. In the majority of cases the disease occurs after a wound or injury, while in others there appears to be no exciting cause.

Symptoms.— The earliest symptom is usually a stiffness of the muscles about the neck and at the back of the head, which is commonly noticed first upon awakening in the morning. This stiffness extends or perhaps begins in the muscles of the lower jaw, while the throat becomes dry and somewhat painful. At first the pain and stiffness may not attract attention, since precisely similar symptoms may follow exposure to currents of air. But it soon becomes evident that this is something more than the stiffness following a cold, for the jaws are found to be firmly closed by the spasmodic contraction of the muscles; at first the patient opens his mouth with great difficulty and can swallow but imperfectly. It is from this feature of the affection that the disease derives its name of *locked jaw*. In some cases these contractions remain limited to the muscles about the neck and face. The mouth in many instances cannot be opened either by the patient himself or by the use of any force which it would be prudent to employ; nourishment can only be given through the spaces which naturally exist between the teeth. Sometimes the muscles of the face also are involved in these contractions, occasioning the most frightful contortions of the countenance. Sometimes the muscles of the throat are so much involved that swallowing becomes quite impossible.

If the muscles of the trunk also become involved, the movements of the chest necessary to breathing are embarrassed, so that the patient appears at times in danger of suffocation. The abdomen is drawn inward and becomes very hard and stiff. Sometimes the limbs too are similarly affected, so that they are held as firmly as

bars of iron. In such cases the entire body may be raised from a single limb or even by the head, as if it were a statue of marble.

In many cases when the limbs and trunk are involved in this rigidity the body rests not flat on the back but in the shape of a bow, the weight being supported by the head and heels. Sometimes the body is bowed in the opposite direction, so that the patient can be placed with his head and toes on the floor while the body is raised some inches. It may also happen that the body is bent toward one side or the other.

The sufferer from tetanus is a most pitiable object; the remarkable positions which the body assumes during the spasms, the fantastic and distorted countenance produced by spasm of the muscles of the face, the peculiar sardonic grin caused by the contraction of the muscles about the mouth, and withal the evident pain and distress of the individual, combine to render the sight an extremely painful one.

The muscles remain rigid continuously, but there occurs at intervals a spasm, whereby the force of their contraction is increased. It is during these spasms especially that the peculiar postures are assumed by the body. These paroxysms occur at intervals and vary extremely in their duration; they are attended also with extreme pain. These spasms seem to be excited by movements of the body and by mental emotion, and may even be induced by contact of external objects with the skin.

The mind remains unaffected; there is no delirium nor stupor in uncomplicated cases. The spasms are more apt to occur during the day than by night, presumably because the influences which can excite the patient are more abundant by day. There is, usually, some fever, and the skin is often moist with clammy perspiration.

The disease usually terminates fatally in from two days to two weeks. Sometimes death is caused by suffocation, the patient's chest being so convulsed that he is unable to draw his breath. At other times the patient's strength cannot be sustained in consequence of the difficulty of introducing nourishment into his mouth; and in many cases the fatal termination of the disease seems to be the result of exhaustion consequent upon the extreme muscular exertion performed by the patient. This exhaustion is increased by the fact that the patient is usually unable to sleep, being kept in constant wakefulness day and night by the muscular activity.

Tetanus, or locked jaw, occurs also in infants. In these cases there is usually no cause apparent for the difficulty; though it occurs almost entirely among the poorer classes, who live without any observance of the principles of hygiene. It usually appears within two weeks after birth, and commonly terminates fatally two or three days later. The paroxysms are provoked by the slightest causes, such as a flash of light, a breath of air, or a sudden noise.

Treatment.—It seems to be well established that tetanus can often be controlled and cured by the use of *calabar bean*, given in frequently repeated doses, if treatment be begun sufficiently early. Good results have also been obtained by the use of *curare*. But these remedies are too powerful and too dangerous to be used by any one except a physician. Other measures to be employed are opium, a grain of which may be given every two hours; chloral, twenty grains of which have been employed in the same way; bromide of potassium, and stimulants, especially brandy and whisky.

If the services of a physican cannot be at once procured, the following mode of treatment should be adopted until a medical man can arrive:

Ice should be applied to the spine, wrapped up in soft, thin cloths.

A grain of opium may be given in a tablespoonful of brandy or whisky, mixed with the same quantity of milk, every two hours.

The violence of the spasms may be controlled by permitting the patient to inhale chloroform.

The great difficulty attending success in the treatment of tetanus arises from the fact that the disease is not recognized until some time after its appearance, because the early symptoms of lock-jaw are not distingushed from the stiffness and soreness of the neck, such as occurs after simple exposure to cold. It should be remembered that if the patient has been wounded or injured in any way, if even his skin has been bruised, the possibility of tetanus must not be forgotten; and the appearance of stiffness in the jaws and of difficulty in swallowing must be regarded as the possible evidences of the onset of this disease.

Hydrophobia.

This affection, also called *rabies*, seems to be due to the action of a special poison, which is derived from the saliva of certain animals, particularly the cat, dog, wolf and fox. This poison appears to be present exclusively in the fluids of the mouth; the rest of the body seems incapable of communicating the disease. It seems also certain that the virus enters the body of a healthy animal only through a wound or abrasion in the skin. So long as the skin remains unhurt the poison cannot penetrate and does not cause any ill effects. It may even be taken into the stomach, like snake poison, without affecting the health of the animal.

The period which may elapse after an animal has been bitten, before the disease manifests itself, varies considerably. It is generally stated to be from thirty to forty days. There seem, however, to be instances in which several months have elapsed between the reception of the wound and the first manifestation of the disease; but it is not probable that the current stories, according to which several years may elapse, are well founded.

The fact is, that genuine cases of hydrophobia are very rare. It is a subject about which there is much popular misapprehension and misinformation. A large number of cases of so-called hydrophobia, in men as well as in animals, are really very different affections. It is a very common thing, for instance, to hear this name applied to an animal which acts strangely, and many a dog suffering from epilepsy has been destroyed as a "mad dog." Doubtless the disease does sometimes exist among dogs, and many people are apparently bitten by such animals; but the fact is, that unless the animal's teeth come into contact with an unprotected part of the skin, such as the hand or face, the saliva (and hence the virus) is not apt to reach the body of the individual, since in passing through the clothing the animal's teeth are wiped and cleansed from the adherent saliva.

The wound made by the teeth of a rabid animal heals in a few days in the usual way. In some cases the wound is said to reopen when the disease is manifested, or the scar becomes painful, swollen and red. Yet this is not necessarily the case, since hydrophobia may be manifested without any changes in the scar of the original wound.

The onset of the disease is usually gradual. For some days the patient is restless, agitated, wakeful, and perhaps tormented by frightful dreams; he may also suffer from nausea and vomiting. After a few days he may experience a slight chill, or at least a shivering, which is usually followed by fever.

The patient then suddenly discovers that it is extremely difficult for him to swallow; that there is some soreness and stiffness of the neck, perhaps associated with a sense of compression. The throat sometimes is the seat of violent spasms which seem to threaten to suffocate the individual. This difficulty in swallowing applies, of course, to all substances taken into the mouth; but it is almost always discovered in the effort to swallow water, because the patient is constantly calling for water in consequence of his feverish symptoms. After a few unsuccessful attempts to swallow, which may result in strangling and a sense of suffocation, the patient naturally acquires a dread of the effort to swallow. There is really no fear of *water*, as the word *hydro-phobia* (fear of water) implies; the patient fears merely the effort to *swallow*, because such efforts occasion violent spasms of the throat, resulting in partial suffocation. After several unsuccessful efforts to swallow water, the patient acquires a dread even of the sight of water; in some cases spasms of the throat are provoked even by looking at water. This is, however, not always the case, since some individuals suffer no annoyance from seeing or hearing the sound of water, so long as they are not called upon to swallow it. In some cases, too, although the patient is unable to swallow water from a goblet, he can take it without much inconvenience from a teaspoon. Sometimes, too, the individual finds no difficulty in swallowing other liquids, such as brandy and whisky, although he may be unable to accomplish the same feat with water. In some cases spasms of the throat occur even when the patient is not attempting to swallow anything; and a current of air may be sufficient to occasion the same result. Sometimes, indeed, any mental emotion, a loud sound or a bright light, induces violent spasms of the throat. In such patients the countenance constantly expresses anxiety, distress and terror, since they are tormented upon the slightest provocation by spasms which threaten to terminate their lives.

After some time these convulsive movements spread to other parts of the body, so that the entire person may be tossed about at every spasm.

An abundant secretion or thick mucus collects in the throat, and this, together with an increase in the quantity of saliva, causes frequent efforts at expectoration, a characteristic feature of the disease. The effort to raise this mucus from the throat and to expectorate it, often causes the production of certain harsh sounds which are likened by the terrified friends to the growling or barking of a dog. There is, however, no ground for the popular belief that the unfortunate patient assumes the character of the animal by which he was bitten, and attempts to bite the bystanders. It is true that he becomes delirious, talks wildly, and may even require forcible restraint. He may be possessed by certain delusions, but does not manifest the peculiarities of any particular animal.

Even at the height of the disease the patient can not resist the temptation to quench his fiery thirst with water, though conscious of the failure which has attended his previous efforts. He summons resolution, and by a violent effort raises the glass to his lips, but before he can swallow he suffers a violent spasm of the throat, the water spurts from his mouth and nose, and with a look of terror he relinquishes the vessel and the attempt.

There is no instance on record in which an undoubted case of hydrophobia has recovered. Death occurs usually on the second or third day, and always within six or seven days after the disease has become developed. Numerous cases have been recorded in which the affection continued for several weeks, but it is evident from their history that they were not cases of genuine hydrophobia.

And this leads us to the remark, that many cases of so-called hydrophobia seem to be merely the result of fear and anxiety. An individual who has at some time been bitten by an animal, even though there was at the time no suspicion that this animal was rabid, suddenly conceives a dread that he is about to become a victim of hydrophobia. This belief and fear lead to the production of certain symptoms of the disease, especially the dread of water, delirium, and an apparent disposition to bite others. If these symptoms be developed immediately after the reception of the bite, or, on the other hand, several years subsequently, it may be taken for granted that the affection is merely the result of mental excitement, perhaps of reading newspaper accounts of such cases. It will certainly not be the genuine disease, unless there be marked spasm of the larynx.

Treatment.— As has been said, no well-authenticated case of hydrophobia has ever been known to recover, although the greatest variety of medicines have been employed in the treatment of this disease. At present we know of no means of controlling it. The most that can be done is to palliate the dreadful sufferings which otherwise afflict the patient. For this purpose he should be kept under the influence of opium, and in some cases inhalations of chloroform seem to have diminished the violence of the spasms.

Although we are thus impotent to arrest the course of the disease when once established, it is quite possible to prevent its development by removing at once the poison from the wound. For this purpose the most efficient and only reliable means is to cut out the tissue around the wound made by the animal's teeth. This must be done thoroughly, a liberal piece of the surrounding tissue being removed with the edge of the wound. This somewhat severe measure can rarely be accomplished sufficiently early, since no one but a professional man will undertake it, and the physician can seldom reach the patient early enough to accomplish the object. But there is one measure which any one can do without delay, and this is to *suck the animal's saliva from the wound.* This may seem a repulsive task, but it is surely not too great a price to pay for a human life. If the wound be situated on a part of the body, such as the hand, where the patient himself can apply his lips to it, he may, of course, attempt to clease it with his own mouth; otherwise there should be no hesitation among the bystanders to perform this office for him. If there be no wound on the lips or in the mouth of the individual who performs this duty, he runs no risk of infection himself. He should, of course, immediately eject from his mouth the fluid which may be thus obtained. It may be well, also, for him to rinse his mouth thoroughly after accomplishing this benevolent work.

After the wound has been thus cleansed so far as possible, it may be cauterized with lunar caustic, or with a white hot iron, such as an iron wire, which can always be obtained and readily heated. If it be possible to thus remove from the body the poisonous fluids —and it is only possible within a few minutes after the infliction of the bite— the patient may rest without any anxiety as to his future.

It would be desirable in every case, for the comfort and welfare of the patient, to know whether or not the animal which has

inflicted the bite be really "mad." As has been already stated, dogs and cats are subject to epilepsy, and these paroxysms have been frequently regarded as evidences of hydrophobia. After the infliction of a bite, the animal suspected of hydrophobia should be, if possible, confined and kept for observation, and not killed. If he be really rabid, the animal becomes shy, sullen and irritable; he avoids the light, his former friends and canine associates, and may even snap at his master. He refuses food, but is apt to eat other articles, such as pieces of paper and straws. For some time he usually recognizes those whom he knew intimately, and may even fawn upon them; in fact, it is such individuals who are most likely to be bitten, since an animal in the first stages of the disease will, without manifesting any marked symptoms, suddenly change his demeanor and bite the hand which he licked but a moment before. After a day or two the animal's appearance is much changed; he looks haggard, his head and tail droop, the tongue hangs from the mouth, and there is an excessive flow of saliva; the eyes are red and watery. If he be permitted his liberty, he runs along panting, with the tongue hanging from his mouth. He is inclined to snap at every animal, human or otherwise, that he meets, and even bites pieces of wood, posts and stones on his way. But he rarely becomes aggressive, does not go out of his way to attack anybody — indeed, rather avoids a meeting. He does not bark, but utters a peculiar growl, which seems to be due, in part, to the effort to expel the mucus from his throat. At times he appears to be subject to delusions, and to give way to fits of fury, snapping at imaginary objects. Exhaustion and death occur within five days after the development of the disease.

Hydrophobia does not occur with especial frequency during the hot weather, but may be exhibited at any time during the year.

Alcoholism.

The habitual use of alcohol in excess is known to have deleterious effects upon nearly all the organs and tissues of the body. These effects are in part manifested in the symptoms of various affections, such as chronic inflammation of the liver, fatty degeneration of the liver, dyspepsia, abdominal dropsy, and Bright's disease

of the kidneys. The use of alcohol not only induces directly these and other diseases, but impairs the vital powers of the system so that the individual is less capable of resisting an attack of the acute diseases generally, and succumbs more readily than when he is in his natural state, to diseases and injuries in general.

The habitual use of alcohol in excess causes an impairment of the bodily functions generally; the digestion is weakened, the blood is impoverished, the general nutrition is impaired, the power of the muscles is diminished, and emaciation frequently occurs. The effects on the mental faculties are no less injurious and marked than on the physical powers; the mental and moral faculties are blunted and impaired, so that the individual finally drifts into a condition which has been called *dipsomania*, a form of derangement which is manifested by the patient's uncontrollable desire for drink.

Before this stage is reached, there are various symptoms indicating the decay of the nervous system; such are sleeplessness, headache, dizziness, tremblings of the muscles, occasional delusions, and a state of mental depression. Indeed, the impairment of the nervous system may be so pronounced that paralysis of movements or of the sense of feeling, or of both, occur, and finally there results unmistakable insanity. Other affections, such as epilepsy and imbecility, are occasional manifestations of the effects of alcohol.

This subject, the use and abuse of alcohol, has become one of the most important of the topics which medical men are called upon to treat and to consider, in most of the countries of the civilized world, and certainly in America. Although various forms of alcohol are used by preference in different countries of the world, yet the same general effects are manifested, since the injurious principle in all — alcohol — is the same. Yet it becomes a question whether the acquisition of the habit of drinking is not in some cases the result of previous disease of the brain; it seems quite possible that we are attributing too much evil to alcohol when we ascribe all mental and moral wrecks which occur in inebriates to the use of this substance alone. It seems unquestionable that in many cases there is a previous condition of the individual which predisposes him to the use of stimulants. And while the excessive use of alcohol can and undoubtedly does aggravate and hasten the mental disease, yet it must be regarded merely as an agent whereby the individual gratifies an unnatural craving. For in modern society there is a widespread yearning for unnatural stimulants, which finds gratification

not only in the abuse of alcohol, but also in the excessive use of opium, chloral and other narcotics.

Dr. Beard, who has devoted especial attention and study to this subject, remarks:

"I would specially insist on the significance of *civilization* as the great predisposing cause of chronic alcoholism. Alcohol alone, in quantities however great, seems to be powerless to produce this disorder unless it acts on the nervous system previously made susceptible by indoor life and nerve-exhausted influences, such as the printing press, the telegraph and the railways, that are peculiar to our modern civilization. It is not necessary that we should become excessively nervous, but that we should become considerably so, before alcohol can produce chronic alcoholism. In this view I am justified by the fact that we have no clear evidence from history that chronic alcoholism exists as a disease among the savage or semi-savage people who are the grossest abusers of alcoholic liquors; and it is far more frequent now than it was among our ancestors of but a few generations back, who indulged in intoxicating drinks to a degree that seems to us past belief. There never was a time in the recorded history of modern civilization when, in proportion to the numbers, there was so little use of alcoholic liquors among the respectable classes as now; and there never was a time probably when there was so much of chronic alcoholism among these very classes; indeed, it is but recently that attention has been called to this disease, and we may justly believe that its increase in frequency has compelled our scientists to give it attention. The Anglo-Saxons are by nature a race of gluttons and drunkards (although by grace and culture the better portion have become temperate and gentlemanly), and the climate in which the English, Americans and Scandinavians live is one specially calculated to foster the habit of inebriety; and yet the alphabet of drinking is something that we have yet to learn. There are tribes in Africa and in the islands of the Pacific, who are drunk almost from birth to death; their normal condition is to be drunk, as with us it is to be sober.

"We are all aware that a century or so ago it was the custom among our ancestors, especially in Scotland, to celebrate every distinctive or trifling event — births, funerals, weddings, barn-raisings, house-warmings, etc., to infinity — with profuse imbibing of strong liquors. Now, among certain savage tribes this custom still prevails

in most disgusting enormity. The East African drinks till he can no longer stand, lies down to sleep, and awakens to drink again. Reprove an Anglo-Negro for being drunk, and he will reply: 'Why, my mother is dead!' as if that were excuse enough. In our land the sight of a man who has been wounded and scarred in a drunken brawl is by no means common, save among the very lowest orders; but in certain regions of Africa there are whole tribes, nearly all of whose members are thus disfigured. The truth is, that this whole habit of intemperate drinking is a survival of savagery; it is a projection of barbarism into civilization, and, like other savage survivals, it is gradually disappearing among all those classes where civilization really prospers.

"It is true that all savages in cold or hot climates are not intemperate, but that is because they can get nothing to drink. The North American Indians are generally sober, but for the same reason that the inmates of Sing Sing are sober; they live under a rigid prohibitory law; but open a cask of rum before a hundred Indians, and in an hour you will have a hundred drunkards. And yet, notwithstanding this enormous excess of savages, there is no evidence that I can find that chronic alcoholism prevails among them; injured they must be by their prodigious potations, but probably not through any form of nervous disease. Among all barbarous people insanity, hysteria, neuralgia, insomnia and nervous, dyspepsia, and all other functional diseases are either rare or utterly unknown. Chronic alcoholism is one of a large number of diseases for which we have to thank the 19th century. It seems to increase as the habit of drinking diminishes. Formerly any amount of drinking would not cause it; now it may follow excesses comparatively slight.

"Granting that in the long lapse of ages, in the slow evolution of humanity, through we know not how many millions of centuries, race is a *result* of climate; yet in appreciable historic time, that is within the past three or four thousand years, race rises everywhere more or less superior to climate, and within certain limits prevails over it; and this habit of drinking is one of the features in which the dominance of race seems prominent. Most strikingly is this illustrated by the history of the Hebrews. This peculiar people have gone out through all the world, and their descendants to the very ends of it, under all climes and in the presence of all forms of

alcohol, and yet chronic alcoholism is very rare among them, if indeed it can be said to have with them any existence.

"They are not abstainers; they drank the wines of their native Palestine. They drink the beers and wines of Germany and America; there is no other race that so universally drink, there is no other race that is so universally sober—they drink, but are not drunkards; but there seems to be in their nervous system some subtle and never-failing transmissible force or quality, as much a part of their constitution as their physiognomy or avarice, which, mightier than climate and stronger than all temptation, enables them to take coals in their hands without being burned; which can always say to alcohol, under all its disguises, 'hitherto shalt thou come, but no further; and here shall your fiery power be staid.'

"There are no other people who have gone into all climates to the extent that the Jews have, and yet retain so successfully the habits of temperance. The Italians and Spaniards are much less disposed to chronic alcoholism than the more Northern nations. In recent times the disease seems to have been increasing in France, where formerly it was uncommon. But the race above all others predisposed to this disorder, is the Anglo-Saxon. It is indeed in England and America and among the Scandinavians that attention was first and most earnestly called to this disease.

"In regard to the influence of climate, independently of race, my researches seem to show that the disease is most frequent in temperate and cold climates. The habit of excessive drinking is not confined to any climate; it most abounds in the tropics and in the coldest regions of the North; but between the temperate and tropic regions there is what I have termed the temperate belt, which embraces the southern of the north temperate and the northern part of the torrid zone, and in which, all around the globe, there is less intemperance than in any other inhabited region, either north or south of it. This belt includes Spain, Italy, Southern France, Turkey, Syria, Persia, North Africa, Southern China, and Mexico. The excessive drinking of hot, or even of warm climates, induces diseases of the liver, but not chronic alcoholism, at least among the natives. The chosen home of this disease, so far as we know, is the belt including Sweden, Great Britain, and the United States. It is a noteworthy fact, that not only alcoholic liquors, but coffee, also, can be used more freely in warm than in cold climates. In a most interesting way this is illustrated in our own

country, where the Southerners of the respectable class drink far more freely than their Northern friends of the same class, and show it less. Moisture and dryness, and probably also atmospheric electricity and ozone, and especially the *alternations of heat and cold* in the northern part of the United States, are factors that give us a partial explanation of the unparalleled nervousness of the Americans, and also of the great prevalence of chronic alcoholism, in spite of the fact that in our better classes there is more of total abstinence than in any other civilized nation. The air of California is exceptionally dry, and nervous diseases are alarmingly frequent there, and the effects of inebriety are of the most serious character, even in the wine-producing districts."

Chronic alcoholism is regarded by many, as by the author just quoted, as essentially a disease of the nervous system, not produced by intoxication, but manifesting itself in such intoxication, and hastened by the abuse of alcoholic beverages.

Treatment.— The object of treatment is to restore the nervous system to a condition wherein the individual shall lose the desire for excessive stimulation, and at the same time lose the necessity for the use of intoxicating liquors. The treatment should therefore be essentially *tonic*. All those measures should be employed which can assist in toning up the deteriorated nervous system.

For this purpose the most important agents are quinine, strychnine, phosphorus and cod liver oil.

The following prescription may be given :

Pyrophosphate of iron, - - -	Forty grains.
Quinine, - - - - -	Twenty grains.
Extract of nux vomica, - - -	Five grains.

Mix and make twenty pills. Take one before meals.

In many cases the oxide of zinc has been found useful. Of this preparation one to two grains may be given three times a day, either dry in the form of powder or made up into pills.

The cod liver oil is a valuable tonic, and may be given first as teaspoonful doses after meals. As the patient becomes accustomed to it the quantity may be increased to one or two tablespoonfuls.

In some cases benefit has been derived from the use of electricity applied along the spine. This is a measure which can be

administered only by one thoroughly familiar with the method and well provided with electrical apparatus.

An incident in chronic alcoholism is

Delirium Tremens.

This affection occurs in habitual drinkers — sometimes after excesses, at other times from unusual abstinence. Thus it may happen in individuals who undertake to reform and to give up intemperate habits; and may also occur in those who are compelled by accident or disease to abstain for an unusual time from indulgence in their usual stimulants. It is therefore especially common among drunkards who are committed to prison, and is a frequent occurrence among patients admitted for severe injuries to hospitals. It may also follow a debauch, even in those who are accustomed to the free use of liquor.

Symptoms.—In some cases there occur certain warning signs of impending delirium. The patient is peevish and irritable; his sleep is disturbed, and he appears depressed. After a few days of this state, evidences of mental derangement become apparent. In other cases the symptoms are connected particularly with the stomach, there being nausea, perhaps vomiting; loss of appetite; the tongue is thickly coated.

The stage which precedes the appearance of delirium, lasting two or three days, is one of great mental depression; the patient is sometimes so despondent that he makes attempts to commit suicide. This condition is called by drunkards "the horrors."

The attack begins with the manifestation of active delirium. The countenance becomes wild; the eyes are widely opened and staring; the patient is in a state of constant activity, making quick nervous movements and talking constantly. His attention is diverted rapidly from one topic to another; he is apt to have delusions; he imagines himself engaged on important business, and is constantly desirous of going out. He must be, therefore, carefully watched. In addition to these delusions, he has various illusions of the senses; he sees around him disgusting and unpleasant objects, such as mice, lizards, snakes, etc.; he hears sounds made by imaginary men and animals, and is often possessed with the

idea that he is surrounded by enemies who threaten him with personal violence. At first these delusions occur merely occasionally, the patient meanwhile being in his sound mind and able to recognize the fact that these delusions are imaginary; but after a time they become real to him, and his sane intervals cease.

Meanwhile the hands, and perhaps the entire body, is in a state of tremor; this tremulousness is especially manifest in the tongue, whenever the patient attempts to put the tongue out of the mouth. He is generally weak, but is able when excited to manifest unusual muscular power.

After the delirium has become well established the patient is an object of terror to others and of danger to himself. For his delusions often inspire him to acts of violence against others, and to deeds which may result in serious injury or even death to himself. The patient has no conception of danger; is constantly trying to rise from his bed, and if he succeeds, endeavors to leave the room and the house; he often neglects to pass out of the room by the door, but springs from the window as the most convenient and quickest way of escape. If he be spoken to quietly there is rarely any difficulty in leading him back to bed; but if accosted roughly, or if attempts are made to force his movements, he is inclined to suspect mischief and to resist violently. When once aroused to forcible resistance, it is by no means easy to quiet and soothe him; he employs, in self-defense, any weapons that may be at hand, and must often be overpowered and secured by main force. In most instances the patient's safety can be secured only by confining him in a straight jacket, or by securing him in a room, the walls and floor of which are padded to prevent him from using violence upon himself. Under the influence of these delusions the patient is sometimes led to perform the most singular and ludicrous acts, while at other times he exhibits remarkable power of endurance and recklessness of danger. Thus a case has been known in which a patient laboring under delirium tremens, leaped from a window and ran, bare-footed and in his night clothes, fifteen miles over frozen ground, before he was overtaken by his pursuers, who were mounted on horseback.

One of the most serious features of such an attack is the wakefulness of the patient; he lies awake for days and nights consecutively, frequently falling into a doze, as frequently awakened in a short time by some frightful dream. The delirium is usually

worse at night, when the patient becomes loudest in his outcries and most violent in his movements. If he sleeps at all it is usually during the day.

The patient rarely complains of any pain, nor even of headache, although the head may be hot and the skin dry.

After two, three or four days of this state, the patient usually falls asleep. If he once begins to sleep soundly, the danger is usually over; for after profound slumber for several hours, the patient awakes in his right mind, although, of course, much exhausted. Sometimes he is still delirious after his first sleep, but soon falls asleep a second time and awakens in the possession of his faculties. For the first day or two the patient manifests a constant desire to sleep, and if the case be favorable, spends much of his time asleep.

If, however, the patient be unable to obtain refreshing sleep, by the termination of the fourth or fifth day of the attack, the disease is very apt to terminate fatally. In this case the sleeplessness persists, and the patient becomes profoundly exhausted. Yet even when thus prostrated, the delirium continues, and the individual continues his frequent efforts to get out of bed and to resist the imaginary attacks of the enemies or animals which he supposes to surround him. The last hours of life are commonly passed in a state of profound stupor.

The disease usually terminates in recovery. It is important to recognize its true nature, and not to mistake it for inflammation of the brain, or one of the forms of meningitis. It can be usually distinguished at once by the absence of pain, by the tremulousness of the patient, as well as by the previous habits of the individual. Yet in this connection it must be remembered that many people are in the habit of drinking secretly to an extent not suspected by their friends. Inflammation of the brain, it will be remembered, is accompanied by intense pain in the head, by extreme susceptibility to light and sound, and by high fever.

The use of alcohol sometimes causes a form of delirium which is not to be confounded with delirium tremens. In this case there is active delirium, accompanied sometimes by fits of violence. This is caused, however, not by habitual indulgence in liquor, but by excessive use of alcoholic beverages on a single occasion. It is, therefore, usually the effect of a debauch, and passes away within a few hours after the individual stops drinking. It is char-

acterized by headache and fever. This may occur in habitual drinkers, and be followed by an attack of delirium tremens.

Treatment.—The chief object in the treatment of delirium tremens is *to induce sleep*. For this purpose he must be carefully protected from the inquisitive gaze and questioning of friends and acquaintances. It is also necessary that he be confined in such a way as to prevent him from harming himself. In some cases it will be necessary only for a friend to stay in the room with him, and to judiciously soothe and quiet him during the more violent parts of his delirium; in other cases it will be necessary to put him in a straight jacket, or in a padded room. In general, no more violence should be used than is absolutely necessary to control him.

The following prescription may be ordered:

Bromide of potassium,	2	ounces.
Hydrate of chloral,	1	"
Syrup of orange peel,	2	"
Water,	2	"

Give a teaspoonful in water every two hours, until four doses have been taken, unless the patient becomes quiet. In using this mixture certain caution must be observed, especially after three or four doses have been given.

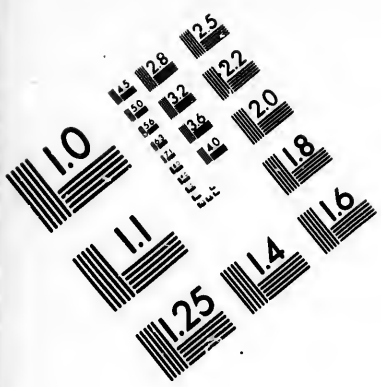
It will be advisable not to give opium or any of its preparations, which are apt to aggravate the patient's mental condition. So soon as the violence of the attack is over, measures should be taken to tone up the patient's nervous system. For this purpose the following mixture may be used:

Tincture of nux vomica,	6	drachms.
Tincture of digitalis,	6	"
Tincture of gentian,	6	"
Wine of pepsin to make four ounces.		

Mix, and take a teaspoonful before meals.

Much good has been observed from the application of a small mustard plaster over the pit of the stomach, especially those cases in which obstinate vomiting occurs.

One of the most important items in the treatment of delirium tremens is the employment of nutritious food in an easily digestible form. For this purpose, milk and eggs are the staple articles; they may be supplemented by soups and beef tea. These should be given in small quantities, at intervals of two or three hours.



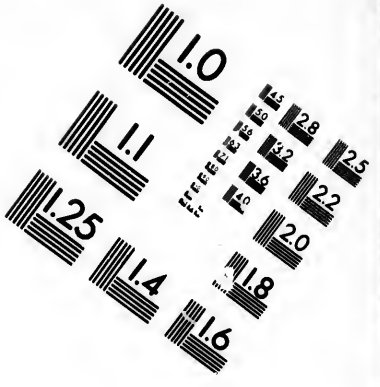
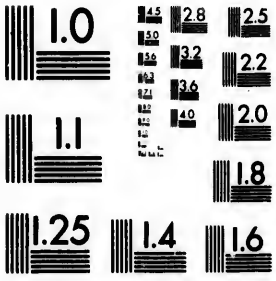
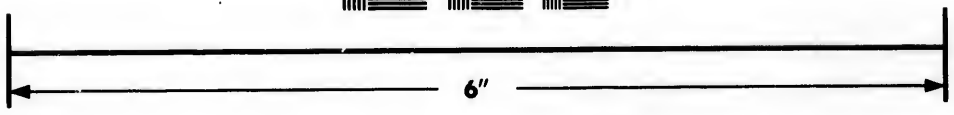
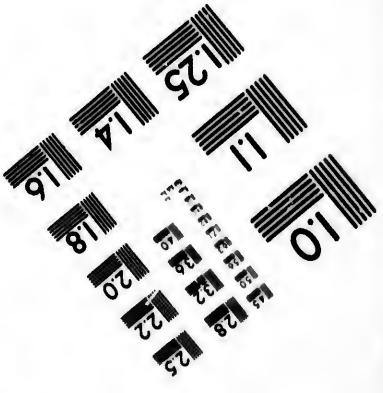


IMAGE EVALUATION TEST TARGET (MT-3)







Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

It must be remembered that delirium tremens is a disease of exhaustion; notwithstanding the patient's frenzy and frequent exhibition of strength, his nervous system is profoundly prostrated; hence all measures employed in the treatment of the disease should tend to build up the patient's exhausted powers.

Neuralgia.

Under this term is included a group of symptoms characterized by pain, but exhibiting no evidences of inflammation.

Neuralgia is of very frequent concurrence, and especially in this country afflicts almost every family. It would seem that neuralgias are becoming more frequent, but many of the affections now so-called, were formerly described as rheumatic or spasmodic.

Any part of the body which has sensitive nerves may become afflicted with neuralgia; the disease is most frequent in those parts of the body which are most abundantly supplied with these nerves.

Neuralgia may occur abruptly, but in the greater number of cases is preceded by certain premonitory symptoms. These consist chiefly in a feeling of weight, and a sense of heat or prickling in the part. After a time this sensation gives place to positive pain, which may occur continuously without much intermission, but is usually felt in paroxysms. During the intermission between these paroxysms, the patient is not entirely free from pain, since he suffers a dull, heavy pain all the time; but during the paroxysms the pain becomes sharp and intense. These paroxysms may last for a few seconds only, or for several hours; and the intermissions between them vary in the same degree. The pain usually shoots along the course of some nerve, so that the patient can map out accurately the path of these nerves by the sensations of pain which he experiences. In other cases, pain is felt chiefly at certain limited spots separated some distance from each other, and quite tender upon pressure.

This latter point is quite important in determining the nature of neuralgia. When the points of the fingers are first pressed upon these painful spots, the patient often flinches and cries out with pain; but if the pressure be continued for some little time, the

pain may cease entirely. This tenderness on pressure is most marked during the paroxysms of pain and may quite disappear in the intervals between.

Paroxysms of neuralgic pain may be provoked or increased by sudden or violent movements of those parts of the body in which the pain occurs; the same result follows a cough or a sneeze.

There is no fever nor general constitutional disturbance during neuralgia, though sometimes an increased secretion may take place in the mouth or in the eyes, if these parts be afflicted.

Neuralgia may last an indefinite time. Sometimes after persisting for months or years, it terminates spontaneously or under treatment, while in other cases the pain continues throughout life, in spite of all means that can be brought to bear upon it.

Sometimes the pain can be traced to a definite cause. Thus, the pressure of a tumor on a nerve is found to be the origin of the difficulty. That severe and agonizing form of neuralgia known as *anginia pectoris*, is often due to the pressure of an enlarged blood vessel—an *aneurism*. In other cases it is due to malarial influence. In this case the paroxysms may recur with the same regularity as the fever and chills of ague. Neuralgia may also be the result of lead poisoning.

An impoverished condition of the blood, often manifested by pallor and emaciation, is a frequent cause of neuralgia. This form of the disease occurs especially among women, particularly those who are afflicted with diseases of the womb. There is still another class of neuralgias which are dependent upon diseases of the brain or spinal cord. In these cases the difficulty is not to be sought in that part of the body which experiences the pain, but in the nerve centers themselves; for it is to be remembered, that a disease of a nerve center—that is a part of the brain or spinal cord—will cause pain in that part of the body to which the nerves running from this center proceed. Thus, a disease of the spinal cord, to be presently described, known as *locomotor ataxia*, is characterized by spasms of intense pain in the stomach and in the thighs—cases which are doubtless often considered to be neuralgia of the stomach; but in this disease the seat of the difficulty is not in the stomach, nor the thighs, but in the spinal cord.

There still remains a considerable number of cases the cause of which is unascertained. These are the obstinate cases which resist all method of treatment.

Neuralgia is most frequent between the ages of 20 and 45, and is very rare before the tenth year. Neuralgia affects certain parts of the body, the hip for example, in males more frequently than females, while the latter are more often subject than males to neuralgia in the face and in the chest.

Treatment.—Neuralgia is essentially *pain*, and as such is merely the symptom of a disease. In every case, therefore, treatment is to be preceded by an attempt to ascertain the seat of the difficulty. The promiscuous application of liniments and plasters to all parts of the body for pain is not a rational way of treating the disease.

In many cases neuralgia is easily curable. If the patient be living in a malarial district, it is quite probable that the pain is of malarial origin, and that three grains of quinine, administered four times a day, will cure the neuralgia. If the patient be pale and bloodless, and evidently in poor health, tonic medicines are required; for this purpose the following prescription may be given:

Tincture of the chloride of iron, -	One ounce.
Sulphate of quinine, - - -	One drachm.
Syrup of orange peel, - - -	Half an ounce.
Water to make four ounces.	

Mix and take a teaspoonful in water before meals. Such individuals should of course have good food and plenty of air, sunshine and exercise.

Neuralgia may be the result of some constitutional taint which has been inherited or acquired. Thus syphilis frequently causes intense pain, particularly in the legs and in the body; the various minerals, especially lead, may also cause severe neuralgia, as one of the symptoms of poisoning. In all these cases the treatment consists, in part, in the effort to remove the cause.

In every case the treatment must also aim at relieving the pain. For this purpose various measures have been employed, all of them with advantage in certain cases. The tincture of aconite may be rubbed upon the skin every hour (and this simple measure sometimes suffices to relieve the pain), or the following ointment may be used:

Veratria, - - - - -	Fifteen grains.
Pure lard, - - - - -	One ounce.

Mix and apply to the skin. If the pain be severe, relief can be

obtained immediately by the inhalation of chloroform; meanwhile a quarter of a grain of morphine may be given, either dropped dry upon the tongue or dissolved in a little water, or the following combination may be employed:

Tincture of gelsemium, - -	
Tincture of belladonna, - -	Each two ounces.

Take fifteen drops every two hours, increasing the dose gradually to thirty drops, if required; or the following may be found useful:

Chloroform, - - - -	Four drachms.
Muriate of morphia, - - -	Five grains.
Ether, - - - - -	Two drachms.
Oil of peppermint, - - -	Eight drops.
Dilute hydrocyanic acid, - -	Two drachms.
Tincture of capsicum, - - -	Six drachms.
Gum arabic, - - - -	Two drachms.
Water and molasses, - - -	To make five ounces.

Mix and take a teaspoonful every two hours.

In some cases of neuralgia, relief has been obtained by the application of blisters along the course of the nerve, and in severe cases a grain of morphine may be applied to the raw surface after the blister is removed.

After other remedies have failed, relief can often be obtained by the simple application of cloths wrung out in hot water, or by a hot bath. Electricity, when properly applied, is a valuable agent in many cases of neuralgia, and seems, indeed, sometimes to exercise a curative influence.

Nearly all cases of obstinate neuralgia are benefited by the use of iron. In females particularly the following prescription can be employed with advantage:

Carbonate of iron, - - -	Forty grains.
Sulphate of quinine, - - -	Thirty grains.
Extract of belladonna, - -	Five grains.

Mix and make twenty pills. Take one before eating.

Many cases of obstinate neuralgia *in the face* are relieved by *croton chloral hydrate;* five grains of the drug may be given in a teaspoonful of syrup, and repeated until five doses have been taken or relief afforded.

After this discussion of neuralgia in general, we may dismiss

with a few words the special neuralgia affecting particular parts of the body. These may be named as follows:

Neuralgia of the face (*trifacial*).
Neuralgia of the neck and head (*cervico-occipital*).
Neuralgia of the neck and arm (*cervico-brachial*).
Neuralgia of the side (*intercostal*).
Neuralgia of the loins (*lumbo-abdominal*).
Neuralgia of the groin (*crural*).
Neuralgia of the thigh (*sciatica*).

In *facial* neuralgia the pain seems to be located in the large sensitive nerve of the face, which physicians call the fifth or *trifacial* nerve. The pain may follow particular branches of this nerve, and hence be felt only in certain small parts on one side of the face, or the entire nerve may be involved, and the pain be felt over half of the face from brow to chin. There are certain points which are almost always very tender when pressed upon; one at the inner side of the eyebrow, and another just below the angle of the eye, near the nose. These are the points where the nerve comes through the bone.

There is usually pain in and around the eye, which may be extremely sensitive to light, unusually red, and produce an increased discharge of tears. Hence this affection may be mistaken for an inflammation of the eye. There may be also increased heat of the nostril on the same side, and an unusual discharge of mucus from the nose. In some cases there occur also spasmodic contractions of the muscles on that side of the face which is affected with pain; from this feature the disease used to be called *tic-douloureux*. In most cases the neuralgia is felt on one side of the face only.

In every case of facial neuralgia attention should be directed to the teeth. For cases do occur, though not perhaps very frequently, in which the trouble originates in decayed teeth. It is, however, far more frequently the case that a number of teeth are sacrificed and extracted with the hope of relieving the pain. It must not be supposed that simple tenderness of the teeth when pressed upon is sufficient proof that the pain originates in the teeth; for the fact is, that in every case of facial neuralgia involving the jaw, the teeth are more or less tender upon pressure. If the cause of the pain be actually disease of the tooth, pressure upon this tooth will provoke a paroxysm of pain which will extend over a considerable part of the face.

Facial neuralgia is generally curable; not necessarily by liniments, but by proper attention to the health of the individual and by the use of tonics, as has been already directed in discussing neuralgia in general. In recent years much success has been attained by the use of croton chloral hydrate, as already mentioned.

As a last resort the nerve has been divided, and pieces of it cut out by a surgical operation. These are obstinate cases, in which the seat of the disease appears to be in the brain and not in the face. This operation has been followed by relief from pain for months or even years, although the trouble usually returns ultimately.

Intercostal Neuralgia.

Is pain in the chest wall, which is sometimes mistaken for pleurisy or pneumonia. In this affection there is acute pain between the ribs, sometimes seeming to spread over the entire side of the chest. This pain is especially severe upon deep breathing, in which respect it resembles pleurisy. There may also be a dry cough.

It is almost always possible to find three painful points, one just beside the spinal column, another about half way around the chest, and the third near the breast bone. These three points will all be found between the same pair of ribs, between the seventh and eighth for example, or between the fifth and sixth ribs. This form of neuralgia occurs more frequently on the left than on the right side, and oftener in females than in males. It seems to be more frequent, too, among the poorer classes than among those who are comfortably situated.

Treatment.—In nearly all cases of intercostal neuralgia the patient requires tonics, especially iron and quinine, which may be ordered in one of the prescriptions given in the discussion of neuralgia in general. Chloroform liniment, or the tincture of aconite, may be applied to the skin where pain is felt. In obstinate cases it may be necessary to use blisters, which may be applied over the most painful points.

Sciatica.

Sciatica is the name usually applied to neuralgia in the large nerve called the *sciatic*. This nerve runs along the back of the hip,

and passes down the posterior side of the thigh, and it is in the longest course that the pain is especially felt.

In some instances, sciatica is caused by pregnancy and by tumors in the pelvis, which press upon the nerve; but in the majority of cases it appears to be a functional disease.

The pain may be so intense that the patient refuses to move the affected limb, and feels compelled to keep the bed. Indeed, any movement of the leg is apt to be painful. In other cases the patient can walk, though with difficulty, and he experiences pain, especially when the weight of the body comes upon the affected leg. Sometimes the pain diminishes, or even ceases, after the patient has walked a little, being severe only at the beginning of the exertion.

It is important to distinguish sciatica from certain other diseases which occasion pain in and around the hip joint.

Sciatica occurs more frequently in males than in females, and is oftener observed in advanced life than among the young; practically, it never occurs before the age of twenty.

Headache.

Headache is the symptom of numerous affections; in most instances the cause of the difficulty is to be found not in the head, but in various organs of the body. If, for any reason, the different functions of the body are not properly performed, so that the waste materials are not carried off as they should be, there is apt to occur, among other symptoms, a headache. Thus in Bright's disease of the kidneys, headache is often a prominent symptom; in habitual constipation of the bowels the same symptom is apt to occur; irregular menstruation may be also accompanied by it; most of the acute diseases are ushered in by headache among other symptoms. In fact, almost any derangement of the body or its functions may be accompanied by a pain in the head.

There is undoubtedly a certain predisposition among many individuals to the occurrence of headache; since the same exposure to cold which will induce severe headache in one individual has no such effect upon another. This predisposition to headache probably arises from certain peculiarities in the performance of the

bodily functions. In some cases the pain in the head seems to be of neuralgic character.

There are, therefore, almost as many causes for headache as there are diseased conditions of the body; it is impossible to refer to them all in detail, and we shall be content with describing two conditions accompanied with headache, which are especially common, and therefore especially important. These are *sick headache* and *nervous headache*.

By sick headache is understood that frequent form of pain in the head accompanied with nausea. In many cases this sick headache can be traced directly to a derangement of the digestive organs, and is then usually one of the symptoms of *biliousness*.

There is usually impairment of the appetite, an uneasy feeling in the region of the stomach, a bitter taste in the mouth; the tongue becomes coated and the breath may be offensive. There is pain in front of the head especially, and a general indisposition for exertion.

In other cases sick headache appears to be a form of neuralgia; it occurs without perceptible cause, and seems to run in families; it is frequently the case that some member of the family will be afflicted with some nervous disorder, such as epilepsy or hysteria, while other members suffer particularly from sick headache. Various mental derangements, such as melancholy and insanity, seem also to occur with especial frequency in individuals who have been subject to sick headache. In many persons, especially females, this form of headache recurs at regular intervals, sometimes associated with the menstrual periods, though at times quite independent of them.

The constitutional disturbance which accompanies the headache indicates that the nervous system generally is at fault, for the depression and languor which are present during the attack are far more pronounced than those which accompany an attack of neuralgia in other parts of the body, no matter how severe.

After a variable duration, the attack passes off usually with free vomiting or purging. After recovery the patient often feels much brighter and in better spirits than before, as if the system had been relieved of a burden.

In some cases the attack occurs, as has been said, without any perceptible cause. At other times it is the direct result of excessive

emotion, bodily fatigue, exhaustion, the consumption of indigestible food, exposure to cold and over-heating.

Treatment.—Until the cause and seat of the difficulty can be accurately located, attempts at treatment must be necessarily somewhat experimental in character. There are numerous remedies which have been used to relieve this affection, and it is quite certain that many individuals can be completely cured of the difficulty. Yet it is impossible to say in advance just what plan of treatment will be adapted to a particular case. We shall, therefore, mention several plans, which may be tried in succession.

In many instances, particularly those associated with biliousness, a mercurial laxative will secure relief. For this purpose, take—

Calomel, - - - - - -	5 grains.
Bicarbonate of sodium, - -	10 grains.

Where there is no evident disturbance of digestion to account for the difficulty, and where the individual is "nervous," the following prescription may be given:

Extract of guarana, - - - -	40 grains.
Extract of cannabis indica, - -	30 grains.
Citrate of caffeine, - - - -	60 grains.

Mix, and make forty pills; take one pill, and repeat the dose after two hours, if not relieved.

In many cases, thirty or forty grains of the bromide of potassium, taken in half a glass of water, will secure relief.

In other cases, three grains of the *monobromated camphor*, in the shape of a pill, will be efficient.

One to two teaspoonfuls of the *fluid extract of guarana* have occasionally relieved sick headache after other measures had failed.

One or two grains of the *citrate of caffeine* may be placed upon the tongue dry and swallowed. This has proven efficient in many cases where the ordinary remedies had been used without success.

In obstinate cases relief can often be secured by the hypodermic injection of the following:

Sulphate of morphia, -	One-twelfth of a grain.
Sulphate of atropia, -	One one-hundredth of a grain.
Distilled water, - - -	Ten drops.

This can be administered only by an experienced hand; indeed these remedies are too powerful to be entrusted to any other.

Nervous headache is the term used to designate essentially the same condition as sick headache, except that the nausea and vomiting are lacking. It does not seem to be associated with biliousness, but is almost always the result of exhaustion, physical or mental. It is especially apt to occur in females who are subject to diseases of the womb.

Whenever it is possible to trace this headache to a definite cause, measures should, of course, be taken to remove this cause. Aside from such measures the treatment will be the use of one or more of the remedies already mentioned in connection with sick headache.

Dizziness—(Vertigo).

Dizziness is usually merely a symptom of disorder in various parts of the body, especially of the digestive organs. Yet attacks of it often occur under circumstances which do not point to derangement of the stomach as the cause of the difficulty.

It sometimes happens that an individual in good health suddenly becomes dizzy and reels like a drunken man. This sensation is often accompanied by considerable prostration of the nervous system, and perhaps by nausea and vomiting. Yet the nausea appears to be under these circumstances a result rather than a cause of the difficulty.

These attacks may last but a few moments, but are apt to be repeated at intervals of a few days or weeks. They are of but little importance, except that the individual almost always is very apprehensive of serious disease. There is a popular impression that attacks of dizziness precede for some time serious diseases of the brain, such as apoplexy, paralysis and epilepsy. As a matter of fact these diseases are not to be suspected when the patient is subject to dizziness, for those who become victims to grave diseases of the brain are *rarely* troubled in advance by these dizzy fits. The fits of apoplexy, it is true, often *begin* with dizziness, but are not preceded for any considerable period by this feeling.

Dizziness is sometimes a symptom of heart disease; in these cases it is very apt to be associated with palpitation of the heart. An examination of the heart itself will decide at once whether or not this condition exists.

In other cases dizziness appears to be caused by dyspepsia. In the majority of instances individuals are over-worked; it is especially common among those persons whose pursuits are sedentary. Among such, fits of dizziness may be brought on by study; in some, even a slight mental effort, such as reading a book, is followed by an attack of vertigo.

In every case the treatment is to be regulated by the cause. It will usually be necessary for the patient to work less and devote more time to recreation; most obstinate cases have been cured by complete relaxation from business, even without medicine.

It is believed by some physicians that excessive smoking and venery are responsible for many cases of the disease. At any rate a patient who is addicted to either of these practices and suffers from habitual dizziness, should discontinue the practice. In every case benefit is derived from the assurance that the dizziness is not the forerunner of any serious affection of the brain.

Locomotor Ataxia.

This disease, which was for a long time confounded with paralysis, is characterized by inability of the patient to control the voluntary muscles, especially those of the lower extremities, so as to execute the requirements of his will.

Symptoms.— For a long time prior to the manifestations of these symptoms, the patient is afflicted with various indefinite ailments, which are usually referred to other causes than the disease in question.

Among these is *neuralgia of the stomach*. This occurs in paroxysms, at intervals of a few weeks or months, for years. It may be, before the impairment of motion becomes manifest, these attacks consist of excruciating pain, felt chiefly in the region of the stomach and often extending into the abdomen. They may be accompanied by nausea and vomiting. Unless there be other symptoms which point to locomotor ataxia as the cause of the difficulty, these attacks are usually supposed to be due to the passage of gall-stones, or to some other local difficulty; their true nature is not suspected. It may be several years before other symptoms are manifested which direct the physician's suspicions to the nervous system as the source of the pain.

Another symptom which may exist for some time before the true nature of the disease is recognized, is impairment of vision. The sight may fail to a marked degree, or even be lost entirely, before the other manifestations of the disease render the diagnosis possible. In addition to these symptoms, wandering pains in different parts of the body, which are supposed to be neuralgic or rheumatic in character. In men, too, an early symptom is sometimes loss of the sexual appetite, accompanied by an impairment of sexual power.

After these symptoms have existed for a certain time, perhaps years, symptoms occur which direct attention to the true nature of the disease. The patient notices that he is not so steady upon his feet as formerly. He does not walk with the same confidence in the dark, and if he closes his eyes he staggers and would fall, if not prevented by others. He is especially apt to have his attention called to this by observing that he does not stand firmly in performing his morning ablutions, during which the eyes are closed. Soon after this it will be noticed by his friends that the patient's gait is peculiar; he raises his feet from the ground more than is natural, and brings them down so that the heel strikes the floor with unusual force. The movements of the legs are apt to be jerky and uncertain; they are thrown forward, apparently without any definite idea as to their destination. The body sways from side to side, and the arms are thrown out to maintain the equilibrium, like those of a person who is walking a tight rope. In many cases the patient is unable to rise from the chair without falling to the floor; but if placed upon his feet by others, he is able to walk. In advanced cases the patient loses altogether the ability to walk.

Notwithstanding the difficulty experienced in maintaining the body, there is no loss of power in the limbs; the patient who can not walk without aid of a cane to steady himself, can nevertheless exert the usual force with the legs. This may readily be shown by attempting to bend the patient's leg, requesting him at the same time to resist the effort. It will be found that the strength of the limb is by no means impaired.

The patient's explanation of his difficulty in walking is usually that he "cannot feel the floor" with his feet; he is compelled to keep his eyes fixed upon the ground, in order to walk at all, since he is otherwise incapable of placing the feet as they should be. So

soon as he looks away from the ground, his gait becomes unsteady.

Sooner or later the arms also become similarly affected. There is no loss of muscular power; the patient's grip may remain as firm as ever, but he is unable to unbutton his vest, for example, unless he keeps his eyes fixed upon the spot. Another characteristic feature is the fact, that when his eyes are closed the patient cannot place his finger accurately on the end of his nose; in the effort to do so the hand wanders about the face, or is placed at some other part than on the object sought. In the later stages of the disease the patient may be unable to feed himself, because he cannot control his hands sufficiently.

After a time the speech becomes impaired, since the muscles engaged in articulation, like those of the limbs, are no longer under control of the will.

In a considerable number of cases the sensibility of the skin is impaired; pins may be stuck into the patient's flesh without causing him any particular annoyance. Sometimes the patients suffer serious injury merely from their inability to recognize painful sensations. After a time the patient loses to a certain extent control over the bladder and rectum, so that the contents of these organs are evacuated without the exercise of his will.

Cause.—The disease appears to be the result of over-exertion; it occurs especially often in those who are compelled to stand many hours a day at their work. It is supposed to be brought on also by sexual excesses, though we have no foundation for such a belief in actual observations. In the last few years many facts have been brought forward which seem to indicate that this disease is especially frequent in those individuals who have previously suffered from syphilis.

Certain it is, that locomotor ataxia occurs far more frequently among males than among females, and that it is pre-eminently a disease of adult life.

Treatment.—There are as yet no well authenticated instances in which recovery has occurred from this disease; the cases that are reported to have recovered seem somewhat doubtful examples of locomotor ataxia. The best results—that is, the postponement of the advanced stage of the disease—appear to have been secured first by *rest;* and, second, by the *iodide of potassium*. The patient

should keep the recumbent posture as much as possible, and avoid all violent or long-continued bodily exercise. He should take also the following prescription:

Iodide of potassium, - - -	Five drachms.
Tincture of ergot, - - -	One ounce.
Syrup of sarsaparilla, - - -	Three ounces.

Mix; take a teaspoonful four times a day.

In addition to these measures, it may be necessary to employ agents which shall relieve the neuralgic pains in different parts of the body. For this purpose, it is almost always necessary to use opium; for since the difficulty is situated in the spinal cord, and not in the skin or muscles, liniments and plasters are of no avail.

The disease is always of long duration, and rarely terminates fatally in less than three or four years; yet a fatal result must always be expected.

Wasting Palsy.

This disease, also known as *progressive muscular atrophy*, consists in a gradual loss of flesh, especially in certain muscles, and accompanied by a corresponding loss of strength. This wasting of the muscles is termed *atrophy*.

The atrophy usually begins in one of the upper extremities, more frequently in the right than in the left; in numerous cases some of the muscles of the hand are the first to be affected, especially those constituting the ball of the thumb. In other instances the wasting begins in the shoulder or in the arm. The affection gradually extends to other muscles, being first manifested in the corresponding muscles of the opposite arm. Sometimes those muscles by which breathing is affected become involved, and death results simply from inability to breathe.

The appearance of the affected parts is very characteristic; thus, one entire arm may seem shriveled, while the rest of the body is well developed; or the arm below the elbow is shrunken and emaciated, while above the elbow it is of the usual size.

The wasting of the muscles is accompanied with corresponding weakness; and there may be some pain, though this is usually not

severe. In some instances, twitchings or quiverings of the muscles are observed; these movements take place quite independently of the will.

The progress of the disease is slow, though in most cases sure. After lasting for years the patient dies, perhaps from some other disease, or sometimes from the wasting of certain muscles which are necessary to life. In the most favorable cases the wasting stops after a certain number of muscles have become affected. Thus, it may cease after the ball of the thumb in one hand has completely disappeared. Yet such a favorable termination cannot be expected; the disease usually continues until death results. It has been known to last for twenty-three years.

This is essentially a disease of the spinal cord; as to its cause we are as yet quite ignorant. Males are more frequently afflicted with it than females, and it has been known to occur in several members of the same family.

Treatment.—The best results have been obtained from the use of electricity, which must be applied regularly and persistently for months. In addition, strychnine may be given in the following prescription:

Sulphate of quinine, - -	Thirty grains.
Extract of nux vomica, - -	
Extract of belladonna, - -	Each five grains.

Mix, and make twenty pills. Take one before meals.

Paralysis.

By paralysis we ordinarily understand a loss of the power of movement. The term, however, is used in medicine also to embrace a loss of the sensibility of a part. In this discussion we shall employ the word in the popular sense, namely, as designating an impairment in the power of motion.

In order to understand the conditions which cause paralysis, we must remember the conditions which must exist in order that a part of the body can be moved at will. Movement is, of course, performed by the contraction of muscle; but this muscle does not contract of itself. Under natural conditions a contraction of the voluntary muscles occurs only under the influence of nervous force.

This originates in the nerve centers — especially in the brain and spinal cord — and is conducted along the nerve, just as electricity passes along the wire. When this nervous force reaches the muscle, contraction occurs and the part is moved. In order, therefore, that a voluntary movement shall occur, it is necessary that the nervous force shall be manufactured; that is, that the brain or spinal cord must be in a healthy condition. Secondly, it is essential that the nerve leading from the brain to the muscle shall be sound; if this be injured in any way, the force which is produced in the brain is interrupted in its passage along the nerve, just as the electric current is interrupted if the conducting wire be cut; and finally, the muscle itself must be in a condition to respond to the influence of this nervous force.

It is evident, therefore, that paralysis — that is, loss of motion — may result from any one of three causes: first, disease or injury of the brain or spinal cord; second, disease or injury of the nerve; third, disease or injury of the muscle.

In various diseases we have illustrations of these different causes of paralysis; thus, in apoplexy a portion of the brain is destroyed and a portion of the patient's body is paralyzed, though the muscles and the nerves of the paralyzed part remain uninjured. In certain cases a nerve of the arm for instance is cut or injured by a wound, paralysis of the muscles to which this nerve runs is a consequence, although the brain and the muscle itself are uninjured. Then, again, the muscle itself sometimes becomes incapable of contracting, as in the disease known as wasting palsy, which has just been described. In this case there is paralysis, although the brain and the nerve remain intact.

Whenever therefore a patient is paralyzed, it becomes necessary to ascertain what part of the apparatus is at fault; whether the paralysis results from disease of the brain, so that no nervous force is generated; or whether the nerve going to the part is injured, so that the nervous force cannot be conveyed to the muscle; or whether finally the muscle itself is diseased, so that it fails to respond to the nervous influence. Paralysis therefore is a *symptom* of a disease rather than a disease itself.

As to the paralysis of *sensation*, it will not be necessary to enter into any detailed discussion. Sensation, like motion, may be lost in any one of three ways: injury to the brain, injury to the nerve, injury to the skin of the part affected. In many cases sen-

sation and motion are transmitted by different nerves; that is to say, there may be paralysis of motion in consequence of injury to a given nerve, while the sensibility of the part remains unimpaired; in the same way the sensibility may be lost while the part can be moved without difficulty.

Paralysis receives different names according to the part of the body which is paralyzed, and according to the nerve which is injured. It sometimes happens that an entire half of the body — one side of the face, one arm, one side of the body, and one leg — will be paralyzed, while the other side remains intact. This condition is technically termed —

Hemiplegia.

The causes of this condition are various, but almost invariably there is some disease inside of the skull. In many cases the difficulty is apoplexy; that is, an escape of blood into one side of the brain arrests the action of this organ, so that the part of the body which is moved by nervous influence from this side of the brain is paralyzed. It is an interesting fact that the paralysis occurs on the side of the body opposite to that on which the brain is injured; thus, an injury to the right side of the brain causes paralysis on the left side of the body. The reason for this lies in the fact that the nerves running from the right side of the brain proceed to the left side of the body, and *vice versa;* so, too, injuries to one side of the head may cause paralysis on the opposite side of the body, and tumors growing in the skull may also cause paralysis.

Symptoms.— Hemiplegia is easily recognized; one arm an one leg lie limp and powerless, in spite of the patient's efforts to move them.

The expression of the face is quite striking and peculiar. The eyelids on the affected side are usually partially closed, but the patient is unable to open the eye, and sometimes to close it. The result is that the patient winks only on the sound side. Moreover, the features are drawn over toward the sound side, so that the symmetry of the face is lost. This results from the fact that each side of the face is provided with a set of muscles which ordinarily balance each other, and thus keep the movable parts of the

face in equilibrium. In hemiplegia, however, the muscles of one side of the face are paralyzed, so that those on the other side have nothing to oppose them, and consequently draw the lips and chin toward the ear of the same side. The wrinkles, too, which are caused largely by the action of muscles, disappear on the affected side; hence it sometimes happens that one side of the face of an aged person presents the usual wrinkles incident to age, while the other side is as smooth and plump as that of youth. Sometimes, too, the corner of the mouth on the paralyzed side cannot be closed, and the saliva consequently dribbles away.

When the patient protrudes the tongue, the tip of this organ is usually pointed toward the paralyzed side. When food or drink is taken into the mouth, it escapes from the corner, or collects between the teeth and the cheek on the same side. It will be seen, upon opening the mouth and depressing the tongue, that the projection from the soft palate, technically termed the *uvula*, is also directed toward one side.

The subsequent history of a patient afflicted with hemiplegia varies much in different patients. It is impossible to predict what will happen; we cannot say how long the paralysis will endure nor how much improvement will be manifested. In some cases death occurs within a few hours; in others improvement may take place within a week and entire recovery in a few weeks. These are the extremes; in many instances a slow improvement begins a considerable time after the occurrence of the hemiplegia and progresses gradually up to a certain point. The improvement is usually first manifested in the face, and next in the lower extremity. It sometimes happens that the patient can walk again without much difficulty, while the arm still remains paralyzed. In the great majority of cases the recovery is never perfect; there always remains a weakness of the paralyzed limbs, which may be so great as to seriously impair the functions of these limbs. In the course of time it usually becomes evident that the limbs which have been paralyzed are softer and less bulky than the sound ones. It sometimes happens, too, that the muscles are not restored to a uniform degree; those on the back of the arm, for instance, will not acquire so much strength as those on the front. The result of this is permanent deformity, since the hand is bent somewhat into the shape of a bird's claw.

In some cases of hemiplegia the mind is not at all affected; in

the majority of instances, however, there is evidently some impairment of the mental faculties. The individuals are more easily moved to a display of emotion, and are usually fretful and irritable.

An occasional incident is the loss of speech. This has been already discussed in describing apoplexy; and some cases of hemiplegia are merely instances of apoplexy. Yet this loss of speech may also occur in other instances.

The subsequent history and ultimate outcome of these cases depend upon the cause of the difficulty; and it is sometimes impossible even for the physician to ascertain what that condition is.

Paraplegia.

This term is used to indicate paralysis of the lower part of the body, including both lower extremities and the muscles of the trunk below the waist. It occurs often as the result of an injury to the back, and frequently in consequence of disease of the spinal cord.

Symptoms.—The most typical examples of this affection occur in cases in which the spinal cord has been injured. It will be found that the legs are completely paralyzed, and that the patient has lost control of the bladder and of the rectum. In some instances there is unusual sensitiveness of the skin in the paralyzed parts.

The outcome of the disease depends upon the extent and nature of the injury. In some cases the patient is permanently paralyzed, and may never recover complete control of the bladder and of the rectum. In these cases the bowels are evacuated without the influence of the will, in fact often without the patient's knowledge, and the catheter must be constantly used to draw the urine. In most cases a severe inflammation of the bladder occurs, and may shorten the patient's wretched existence.

Most of the cases of paraplegia which result from disease are due to an inflammation of the spinal cord. In these cases the patient usually notices for some time before the paralysis becomes evident, that he is not so steady upon his feet as formerly; and he is especially apt to trip and stumble while walking. After a time

he experiences a sense of constriction around the waist, as if a band were bound tightly around his body. Subsequently he notices that the power of the legs is impaired, and often perceives that the sensibility of the skin is also less acute.

A most troublesome and severe symptom of this complaint is the occurrence of *bed sores*. These may be formed on any projecting part of the paralyzed limb, and occur with especial frequency on the buttocks and over the hip bones. They are apt to begin with a simple reddening of the skin, which soon gives place to a deep ulcer. This ulcer increases rapidly in size as the flesh mortifies, and may become as large as the palm of the hand. The bottom and sides of these ulcers are covered with gray, decaying flesh, and the odor emitted by the patient is overpowering.

Recovery from this affection rarely, if ever, occurs; in the majority of cases a fatal result ensues within a few months.

Sometimes the paralysis is limited to a single nerve, and the symptoms depend, of course, upon the nerve thus affected. Among the most commonly affected nerves are those which supply the eyelids and those which run to the face.

Paralysis of the nerve supplying the eyelids causes a drooping of the upper lid, and usually a squint. If the paralysis be caused by cold or by nervous exhaustion, it may disappear spontaneously after a time, and usually yields readily to treatment.

Facial Paralysis

Is a frequent occurrence. It often results from exposure to cold, after a person has slept by an open window.

Symptoms.—This condition is at once indicated by the appearance of the face, some of the symptoms of which have been already described in speaking of hemiplegia. The mouth is drawn toward the sound side of the face; the patient is usually unable to close the eye or to wink; the tears escape over the lids and roll down the cheek; the wrinkles are smoothed out of the forehead. The cheek is usually puffed out during efforts to speak, and may be caught between the teeth in chewing.

In most cases recovery occurs in the course of a few weeks; but if the disease originate in some difficulty within the skull, it may be permanent.

Infantile Paralysis.

This affection as the name implies occurs with especial frequency in infancy, though it may also happen during later childhood. It is essentially a disease of the spinal cord.

Almost the first symptoms noticed when the patient is an infant, is a loss of movement in the affected limb, usually a leg. This may be accompanied by evidences of severe pain, and by fever. The acute symptoms subside within a few weeks, but as the child grows, it is noticed that the affected limb does not keep pace with its fellow; it remains smaller, shorter, and weaker. When the individual attains maturity, the leg is usually considerably shorter than the other, so that that the patient is compelled to wear a shoe especially made for it, having a high heel and a thick sole.

General Paralysis of the Insane,

Is a form of paralysis affecting the entire body, and accompanied by symptoms of insanity. It will be described under this topic.

Shaking Palsy

Technically known as *paralysis agitans*, is a name applied to that form of muscular debility which is found especially in the aged. It affects the hands, which cannot be held quiet unless the patient's attention is especially directed to the accomplishment of some object. It often happens that if the patient extends the hand to grasp an object, the tremor ceases. Sometimes the lower limbs, also, are so tremulous that the patient can scarcely walk.

While this affection is most common in elderly people, it may occur in the young and middle-aged as the result of excesses in drink or in sexual indulgence ; in fact, any long-continued excessive demand upon the nervous system, of whatever nature — worry, anxiety, excitement, fatigue — may be followed by this form of paralysis.

Writers' Cramp

Is a form of paralysis usually limited to certain muscles of the hand. As the name indicates, the affection is especially common among those whose occupation compels them to hold the pen many hours a day. It may be indicated by actual paralysis, so that the finger and thumb cannot be brought together with the usual power; in other cases, the muscles controlling the fingers are firmly contracted, so that the thumb and fingers cannot be moved or are moved irregularly. Unlike most of the forms of paralysis, this affection can usually be cured by rest and treatment.

Persons engaged in other occupations than writing, who are compelled to use the same muscles constantly for many hours daily, are often similarly affected. Tailors and sewing-girls, for example, may lose the power of holding and guiding the needle; and women who are compelled to work a sewing machine may have a similar affection of the feet and legs.

Treatment of Paralysis.— In every case the first object is to ascertain the *cause*. In many cases careful investigation will show that the cause can be removed and the paralysis relieved. Thus paralysis affecting various parts of the body, even an entire half, as in hemiplegia, may be due to *syphilis*, for an individual who has had this disease is liable to inflammations in the brain which may paralyze his muscles. These are the most favorable cases for treatment, since, if taken early, they may be readily cured by the following prescription:

Iodine, - - - - - -	Eight grains.
Iodide of potassium, - - -	Ten drachms.
Syrup of sarsaparilla, - - -	Eight ounces.

Mix, and take a teaspoonful after meals; the dose may be gradually increased to two or even three teaspoonfuls.

In other cases paralysis results from slow poisoning of some of the metals, such as lead and mercury. These forms of paralysis are, of course, found with especial frequency in those who are compelled to handle and work with these metals. Lead poisoning may occur, too, among women who employ cosmetics containing the article, and from the use of drinking-waters which pass through imperfectly constructed pipes. In these cases relief may be obtained by

the use of the following in connection with the measures to be presently mentioned:

Iodide of potassium, - -	Five drachms.
Water, - - - -	Four ounces.

Take a teaspoonful four times a day.

In addition to this the sulphate of magnesia may be given in doses sufficient to keep the bowels active; for this purpose it may be necessary to give from a teaspoonful to a tablespoonful of this laxative every day.

It would be impossible to follow out in detail all the different measures which may be at times useful in the treatment of paralysis; for every case must be studied and treated separately; it has been already stated that paralysis is a symptom and not a disease.

Yet there are certain measures which will be found useful in almost all cases, and which may be therefore mentioned here. Prominent among these is *electricity*. Physicians have come to rely upon this agent as furnishing excellent results, though it must not be expected that a cure can always be effected. When, for example, paralysis results from an inflammation or hemorrhage in the brain, the application of electricity to the arm or to the leg can be of no service.

Another most valuable agent is *massage*. This process, which is now extensively employed by physicians, is performed as follows: the patient is stripped, or at least as much of the body is laid bare as is required for treatment; an attendant then kneads, pinches, pulls and rubs the flesh until a gentle glow and feeling of warmth are excited. This process may seem at first somewhat rough, and may leave a slight soreness, but in a short time these symptoms no longer occur and evident benefit results. Considerable practice is required for the skillful performance of massage, but much benefit can be conferred even by an inexperienced person who will persevere in the effort.

It is highly important that those afflicted with paralysis should have the benefit of fresh air and of such exercise as they are capable of taking; for this purpose it may be necessary to furnish them with the assistance of perambulators, easy chairs, and other mechanical contrivances.

Among the remedies which may be employed with advantage

in certain cases of paralysis, are strychnine and phosphorus. The former may be given in the following prescription:

Sulphate of strychnia, - -	Half a grain.
Reduced iron, - - -	Thirty grains.
Extract of belladonna, - -	Eight grains.

Mix and make thirty pills. Take one morning and night.

Phosphorus can be best given dissolved in almond oil; one-fourth of a grain of phosphorus may be dissolved in two ounces of the oil, and a teaspoonful of this may be taken morning and night.

Nervous Exhaustion.

This term designates a condition which is known by physicians as *neurasthenia*. It may be defined in short as a lack of nervous force. It often exists in pallid, bloodless people, and disappears when the patient's general condition is so improved that the blood-producing organs again perform their functions properly, and the individual acquires again the ruddy glow of health. Yet it often happens that nervous exhaustion exists in individuals whose general appearance would not lead any one to suspect any serious disease; the person may be stout and of full habit, may have a good appetite and digest the food well, and yet may be and feel quite incapable of performing those duties which he had previously fulfilled without difficulty.

The affection seems usually to proceed from an improper degree of activity of some part of the nervous system, more especially in the exercise of the mental faculties. It seems also to be subject to certain hereditary influences; the children of parents who have suffered from chronic diseases of the nervous system, such as epilepsy, hysteria and insanity, are especially prone to the manifestation of nervous exhaustion.

Physicians, especially those who practice in large cities, are often consulted by individuals who, although manifesting no well-defined disease, are evidently not in good health. It is possible that these cases do not receive as much attention from friends of the person, or even from the physician himself, as they deserve; for the tendency to complain, to exaggerate slight indisposition, is so common, that unless there is some definite and tangible derangement

of the body, the tendency is to ignore and make light of the symptoms presented. In nervous exhaustion, moreover, the indications of the difficulty are of a subjective rather than of an objective character; that is, they are symptoms which the patient can himself feel, but which no one else can perceive.

The subjects of nervous exhaustion complain of lassitude, a want of buoyant feeling, an indisposition for exertion, mental depression, and sometimes wandering pains and aches are felt in various parts of the body. Such individuals are wakeful at night, and arise with a sense of fatigue and a feeling that their sleep has not refreshed them. When stimulated by some unusual excitement they are capable of the usual exertion, but when the excitement has subsided they feel exhausted. Such patients usually fancy that they have some serious disease, and often become melancholy at the thought that their powers are being undermined and that they are "in a decline."

A careful examination of the different organs usually fails to disclose any evidence of disease. The heart, lungs, kidneys, etc., are healthy. The physician is apt to regard such patients as the victims of their own imagination.

Yet this condition is in many cases real, not imaginary. By a little inquiry it becomes manifest that such patients have been usually long harassed by the cares and responsibilities of business, by excessive devotion to study, or by some similar strain on the nervous system. In many cases this over-work is combined with carelessness and neglect in diet and habits of life.

This disease is essentially and pre-eminently an affection of modern society, and is found in its most aggravated type in the United States. For the causes that stimulate the mind to excessive exertion are especially active in this country. The inducements to active effort are so great, that the business of life is assumed here at an unusually early age and with extreme zeal.

This condition of nervous exhaustion is by itself a serious affection, and may indirectly induce or aggravate numerous other ills; for it favors the development of diseases to which the patient may be predisposed, and aggravates the effects of such ailments as he may acquire.

It would be impossible to detail all the symptoms which may be caused by this condition of nervous exhaustion. Some of the more important ones will be, however, briefly discussed.

Spinal irritation is a manifestation of nervous exhaustion which afflicts many of those engaged in active mental effort, and is especially common among women who are subject to diseases of the womb. In this condition there is extreme tenderness all along the spine; there are usually flying pains, especially in the chest and abdomen; and the occurrence of hysteria as well as of convulsive spasms of the limbs is a frequent symptom.

This condition of spinal irritation is usually periodical, and is especially apt to occur after over-exertion or excessive emotion. In nervous women it occurs particularly during the period of menstruation.

There are also conditions which seem essentially the same as spinal irritation, though there is no tenderness on pressure along the back bone. The condition is manifested by unpleasant and annoying sensations in different parts of the body. Some individuals suffer from neuralgic pains in the limbs; others have throbbing sensations in the chest and in the head. Another symptom is itching, which may occur in any part of the body without apparent cause, and may be quite intense and persistent.

One of the most distressing symptoms is the wakefulness of such patients. They lie awake and toss about for hours and perhaps fall into a heavy sleep toward morning, from which they awake without feeling much refreshed. This condition is obstinate and may not yield even to the bromide of potassium or to chloral, unless taken in excessive doses.

Another manifestation of nervous exhaustion is dyspepsia, which is rarely so distressing as those forms of dyspepsia which result from organic disease of the stomach, but is nevertheless a source of much annoyance and uneasiness to the patient.

The special senses are also liable to derangements. Among the most common of these are specks before the eyes, which appear especially when the individual feels exhausted. Another occurrence is noise in the ears, which sometimes takes the form of a continual humming, and sometimes appears as sudden and loud noise.

One of the symptoms of nervous exhaustion, which is brought to the notice of the physician with especial frequency, is derangement of the sexual functions. This may take the form of *impotence*, partial or complete. This is often manifested by a loss of sexual power before the appetite disappears. Under these circumstances

the patient is extremely depressed and despondent, as a result of which the symptoms are aggravated. Sometimes this sexual weakness takes the form of seminal emissions. These are of course natural and in perfect accord with health and those who are continent; but in conditions of nervous exhaustion these emissions are apt to occur with far more frequency than in health. These emissions when excessive are of themselves somewhat exhausting, but they are especially important as indications of nervous prostration. The popular idea ascribes to seminal losses the symptoms which occur to the individual at the time; in other words the emissions are assumed to be the *cause* of the patient's prostration. As a matter of fact they are the *result* rather than the cause of the condition, and the patient's despondency should be relieved by the assurance that when his general health shall be improved, this symptom will disappear, provided there be no organic disease of the sexual organs.

In females nervous exhaustion is manifested by pain and unusual prostration at the time of the menstrual epochs. Here also the menstrual disorders are the result rather than the cause of the nervous prostration accompanying them.

There may be in various parts of the body derangements of motion and of sensation which are to be explained simply by the general condition of the patient, and not by any local disease. Thus it may happen that certain portions of the skin become quite numb, and remain so for hours or days at a time; in other cases certain parts, such as a finger or toe, an arm or a leg, become extremely sensitive both to pain and to changes of temperature. At times too there may occur what seems to be a genuine paralysis; the patient loses control of fingers, of thumbs, or even of the entire hand or fore-arm. In other instances twitchings of the muscles are constantly observed; this is especially frequent in the muscles of the eyelids. Such patients are annoyed by the consciousness that they are constantly winking, and yet they are unable to control the eyelid.

Occasionally such patients are troubled also with unusual diffidence, and even timidity, which sometimes manifests itself by an aversion to society; this is particularly apt to occur in those whose nervous exhaustion takes the form of sexual incapacity.

This entire subject has been admirably summarized by a recent writer on the subject, Dr. Beard, as follows:

"In regard to the above symptoms, it may be remarked that

they are not imaginary, but real; not trifling, but serious, although not usually dangerous. The interchangeableness of these symptoms is also noteworthy. In nervous exhaustion, nothing is constant except inconstancy. The symptoms chase each other like the shadow of summer clouds across the landscape. The moment one leaves, another and several stand ready to take its place. In a single day one may go through the whole gamut of all these notes of disease.

"The periodical and rhythmical character of some of these symptoms is of much interest. I once had under treatment a young man who had attacks of nervous depression every day about noon; they lasted but for a short time, but were as periodic as chills and fever, and, like chills, passed through definite stages.

"Nervous exhaustion is compatible with the appearance of perfect health. For this reason, as well as on account of the slippery, fleeting and vague return of their symptoms, patients of this class get but trifling sympathy. Sometimes they are fat and hearty, and have a ruddy, vigorous strength, suggestive bearing; sometimes, also, they grow fatter as they grow worse. Noticeably the disappearance of symptoms in the stomach, and the appearance in their stead of symptoms in the brain and spinal cord, is followed by increase in weight that deceives the friend, the physician, and even the patient himself. Thus it happens that patients get the least sympathy when they most need it.

"Nervous exhaustion is a modern disease, and pre-eminently an American disease, and in this country is chiefly found in the North and East. This disease must therefore be studied here; we cannot, as in so many other diseases, look to Germany for light and information, for in Germany this condition is comparatively unknown, and in France and England is far more rare than with us.

"The diagnosis of nervous exhaustion is sometimes entirely clear, and again is quite difficult. If a patient complains of general malaise (indisposition), debility of all the functions, poor appetite, abiding weakness in the back and spine, fugitive neuralgic pains, hysteria, sleeplessness, disinclination for consecutive mental labor, severe and weakening attacks of sick headache, and other analogous symptoms, and at the same time gives no evidence of anæmia or of any organic disease, we have reason to suspect that the general nervous system is mainly at fault, and that we are dealing with a typical case of nervous exhaustion.

"Chronic nervous exhaustion — of which form I am chiefly speaking — may result in paraplegia, in general paralysis, in neuralgia, in uterine disturbances, in dyspepsia, in chorea, in hysteria and in actual insanity; or under proper treatment it may go on to perfect recovery.

"Chronic neurasthenia sometimes proves directly fatal without causing organic disease; but such a termination is not usual. It is a chronic condition, and patients afflicted with it may last for half a century."

Treatment.—Nervous exhaustion usually requires, first of all, complete relief from care, anxiety and exertion. It is not desirable that the patient should entirely relinquish his occupation; but a respite for a certain period seems absolutely necessary.

Not less important is the avoidance of errors in the habits of life. The inordinate use of stimulants, excesses of any kind, etc., are of course to be avoided. The best sanitary regulations also should be observed, and one of the most efficient remedies that can be employed is a course of sea bathing. If this cannot be procured, the cold bath in the morning at least, or morning and night if the patient can bear it, is a good substitute.

The diet should be generous and varied, even though the patient may already seem to have an abundance of flesh. Among the remedies to be employed, two are especially valuable — electricity and massage. Exercise should be provided for, but not taken in excess, since exercise of the body requires exertion on the part of the nervous system. In some cases severe measures have been employed to relieve spinal irritation; small blisters and even the white-hot iron have been applied along the spine. Such measures must, of course, be used only under the advice of the physician, since in every case it is the *patient* and not the *disease* that is under treatment. The drugs that are to be used vary in different cases. In most cases strychnine, arsenic and quinine, with or without iron, will be useful. These may be given in the following prescription:

Sulphate of quinine, - -	Forty grains.
Arsenious acid, - - -	One-third of a grain.
Reduced iron, - - -	Twenty grains.
Extract of nux vomica, -	Four grains.
Extract of cannabis indica, -	Five grains.

Mix, and make twenty pills. Take one before meals.

If there be symptoms of dyspepsia it will be advisable to use in addition to the above pepsin and extract of malt, as in the following prescription:

Extract of malt, - - - -	Three ounces.
Wine of pepsin, - - - -	Three ounces.

Mix, and take a teaspoonful after meals.

If the patient be troubled with sleeplessness, the following may be administered at night:

Bromide of potassium, - - -	Two ounces.
Hydrate of choral, - - - -	One ounce.
Syrup of orange peel, - - -	Two ounces.
Water, - - - - - -	Four ounces.

Mix, and take a teaspoonful before retiring. The dose may be repeated in an hour if needed.

Sunstroke.

The term sunstroke is applied to a condition of nervous prostration induced by excessive heat. Although this condition may result from the heat of the sun, it may just as well follow exposure to heat without sunlight; indeed, cases of sunstroke occur in individuals who are working in the shade, or even at night—the condition might be better termed *heat-stroke* than sunstroke.

In a certain proportion of cases the condition seems to be one closely resembling apoplexy. In many other cases the bodily state may be likened to that which exists in a severe fainting spell.

There may be no premonitory symptoms to warn the patient of an approaching attack; he is suddenly seized with a severe pain in the head, a sense of fullness of the stomach, followed by nausea and vomiting, dizziness, dimness of vision and sometimes ringing in the ears; immediately he becomes very weak, especially in the lower limbs, and unless speedily supported falls to the ground. In a very few moments after the beginning of the attack the patient is unconscious; the general symptoms are, in severe cases, those of apoplexy, except that the patient is not paralyzed. The breathing is slow and snoring, and may be occasionally accompanied by a moaning sound. Convulsions frequently occur.

This condition may last but a few minutes and be terminated by death. It sometimes happens that the patient expires even before assistance can reach him. In other cases, after this state has lasted for from twenty minutes to four hours, the patient gradually recovers consciousness, and in a few days is convalescent.

The most notable feature in these cases, and one which demands particular attention in the treatment, is the excessive temperature of the body. While the body heat, during health, ranges from 98 to 99 degrees, it may rise during an attack of sunstroke to 108 degrees, 110, or even 112 degrees. The surface of the body is usually, though not always, quite warm.

The most important agent in the induction of sunstroke is undoubtedly excessive heat. Yet there are certain influences which predispose the individual to the effect of the heat. Excessive exertion, especially muscular effort, seems to favor the development of sunstroke; many cases occur in those who are engaged in manual labor, yet this is not invariably the case. It has been noticed that a considerable number of cases occur in individuals who have just completed a hearty meal.

Cases of sunstroke are more common in tropical than in other climates, notwithstanding the assumed power of the natives to withstand excessive heat.

About one-half of all individuals attacked with sunstroke die of the affection. The occurrence of convulsions, of deep and loud breathing, and of persistent unconsciousness, indicate that the attack will prove fatal. Perhaps the best index to the patient's condition and prospects is to be found in the pulse; if this be very rapid and feeble, so that it can scarcely be felt or counted, the condition is most grave.

In other cases the patient does not lose consciousness completely, or if he does, his condition resembles profound sleep rather than the stupor of apoplexy. In these cases the pulse is usually quite perceptible, though it may be quite rapid and feeble.

Treatment.—In the treatment of sunstroke, it is important to remember that there are two different types of the affection, and two different modes of treatment adapted to each.

For those cases in which *the skin is cool, the pulse so feeble as to be almost imperceptible, the breathing easy and natural*, the patient must be *stimulated*, and that as soon as possible. The

clothing should be loosened, especially from the neck; the patient's head should be kept low, the air allowed to circulate around the body; half a tablespoonful of whisky or brandy may be administered every fifteen minutes until six doses have been taken; hartshorn should be applied to the nostrils. If there be any vomiting, the whisky or brandy may be administered as an injection into the rectum. In this case, an ounce (two tablespoonfuls) may be given for each dose.

It is highly important that such a patient be not moved nor agitated; he should not, therefore, be taken home nor to a hospital, unless the distance be short, but should be treated at once at the nearest convenient place.

The skin may be rubbed thoroughly with whisky and water. But in this form of the affection no cathartics should be given.

In those cases of sunstroke that resemble apoplexy, another line of treatment is required. In these cases the patient is usually unconscious, the pulse is slow and full, the breathing is slow and snoring. In these cases the patient should be *packed in ice;* these are the cases in which the body heat runs very high, and constitutes the chief element of danger. The object of treatment is, therefore, to cool the body as rapidly and as early as possible. For this purpose, lumps of ice wrapped in coarse cloths, may be laid entirely around the body of the patient, especially around the head; if an ice cap can be procured—a rubber bag made to cover the entire head—it should be used.

If it be impossible to procure ice immediately, the patient may be laid in a bath of cold water, and a stream of water poured upon his head and neck. In short, without going further into details, it will suffice to repeat that the chief object is to *lower the temperature* of the body; the means to be employed may vary with the circumstances of the case.

In every case, one or two drops of croton oil should be placed upon the tongue; and if it can be arranged, light mustard plasters should be applied to the soles of the feet and to the calves.

Under such treatment, patients usually recover from sunstroke if they can be promptly subjected to the measures described.

Whooping-cough.

This affection is by many classed among nervous diseases, notwithstanding the apparently infectious nature of the complaint. The symptoms of whooping-cough are so familiar that no description is necessary.

Treatment.—The paroxysms can usually be shortened by the use of emetics, which not only provoke vomiting but also loosen the phlegm. For this purpose, we may give a full dose of ipecac or squills.

Aside from this measure, but little treatment seems beneficial. In fact the mild cases do best without medicine, if care be taken to avoid exposure to the cold and to wrap the body well in flannel under-clothing.

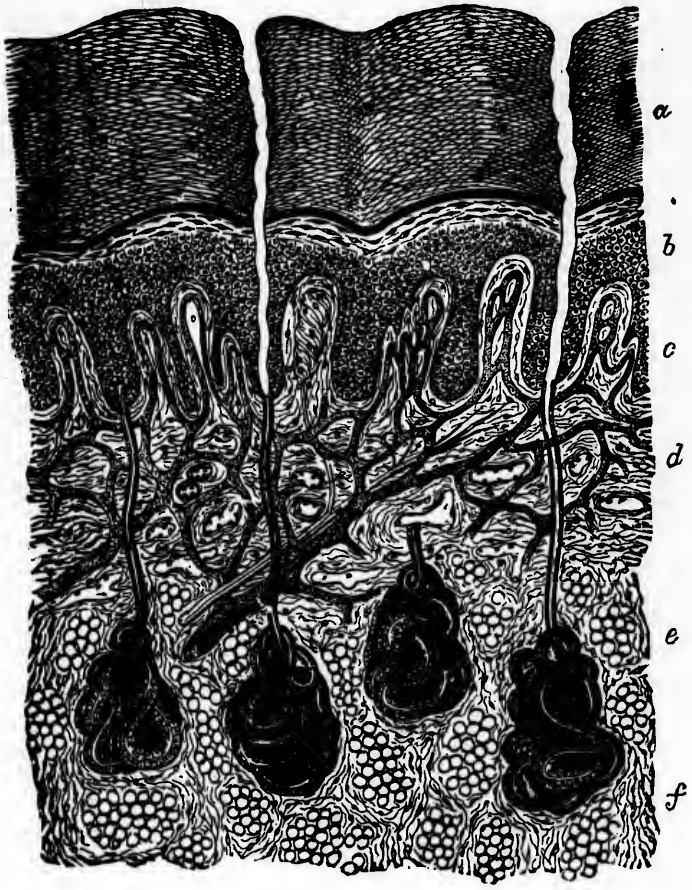
To cut short the disease, a great many remedies have been administered; the fact that these remedies are so numerous, indicates that no one of them can be relied upon for all cases. Good results have been reported from the use of belladonna. The following mixture will be found of service:

Extract of belladonna, - - -	One grain.
Mucilage of gum arabic, - - -	Two ounces.

Give twenty or thirty drops of this every three hours. We may also use to advantage the following prescription:

Fluid extract of hyoscyamus, - -	Half a drachm.
Orange flower water, - - - - -	Four ounces.

Mix and give a tablespoonful every three hours. This dose is suited to a child of 12 years, and must be correspondingly reduced for a younger child.



SKIN.

DISEASES OF THE SKIN.

The skin is not only a covering for the body, but also an important organ for the elimination of certain materials from the blood. In this respect the skin ranks with the kidneys, the lungs and the intestines; it is an organ of *excretion* — that is, its function is to separate and throw off certain materials which are no longer required in the animal economy.

The skin, therefore, is liable to derangements of function as a result of constitutional disturbance, just as are the kidneys, the lungs and the bowels; and in addition, its exposure to the weather and to external influences of various kinds makes it especially often the seat of disease.

The diseases to which the skin is liable are accordingly divided into two general classes:

First. Those that proceed from within the body,— affections of the blood, and of the different organs — which may, therefore, be called *internal* causes.

Second. Those which act from without, and may hence be called *external* causes.

The influences which act from within the system upon the skin are various; among them may be mentioned:

1. *Blood poisoning.* This might also be called *impurities* of the blood; yet there is an objection to the use of this term because of the popular errors in regard to its significance. For in the popular mind an impurity of the blood means usually that something external to the body has been taken into the blood, and that this impure substance is the cause of a rash upon the skin. By impurities of the blood, however, the physician understands not necessarily that there has been any entrance of poisonous matter into the body, but merely that the different organs — the kidneys, lungs, liver. etc. — do not remove from the blood those materials which

have been consumed during the vital processes, and which must therefore be thrown out from the body. Properly speaking, therefore, the blood of every individual is impure whenever he suffers from Bright's disease, or liver complaint, or dyspepsia; though in these cases there is not usually any rash upon the skin. There are, it is true, certain impurities in the blood — such as the contagious principle of *syphilis* — which, at certain periods of the disease, usually cause a rash upon the skin; yet, it is equally true, that the individual's blood may be loaded with the impurity of syphilis for years at a time without showing any rash upon the skin.

It is evident, therefore, that the prevalent idea as to the connection between a skin disease and "bad blood," is wholly erroneous; since, in the first place, skin disease often exists in individuals who are otherwise perfectly healthy, and whose blood is in consequence, perfectly pure; while in the second place, the skin is often free from disease in individuals who are sinks of the foulest corruption.

If this fact be appreciated, it becomes apparent that the popular notions about "purifying the blood" are erroneous.

Thousands of gallons of "blood purifiers" are sold annually, and used by individuals who imagine that a rash on the skin means that some impurity of the blood is "breaking out" of the body. Such persons are thoroughly well pleased when, after taking a few pint bottles of some patent medicine for purifying the blood, they see pimples appear on the face, chest and back. They regard these pimples as proof that the blood contained some impurity and that the patent medicine has caused this impurity to work out through the "pores of the skin." After using the medicine for a few weeks, until they are satisfied that the impurities are driven out of the system, they stop taking the mixture and the rash disappears. The physiology of this whole matter is so simple and plain, that the individual probably never doubts for a moment that he has really caused some impurities to escape from the system through the skin. The fact is, that these blood purifiers so-called are constructed essentially on the simple principle that certain drugs, when taken into the system, cause a rash of pimples to appear on the skin. It is well known to the general public as well as to the profession, that mercury, when used to excess, causes an excessive flow of saliva and other symptoms constituting the condition known as "salivation." It is equally well known to medical men, that the iodide

of potassium, or the bromide of potassium, when taken for a long time or in large quantities, causes an eruption of pimples on the face; indeed, if the drug be taken in sufficient quantity, the pimples can be made to appear over the entire skin. The so-called blood purifiers, which are so popular with the public, contain large quantities of one of these or similar drugs; their effect is, therefore, to cause a rash to appear upon the skin, which they will do when taken by any person no matter how pure the blood may be. The rash does indeed indicate that there is an impurity in the blood, but this impurity was taken into the blood in the shape of the blood purifier.

It should be said once for all, that no rash on the skin is ever a means whereby the body is relieved of impurities; nor is there any remedy known by which impurities of the blood can be made to escape from the body in the shape of a rash.

Closely allied with this superstition, is the idea so prevalent, among women especially, that it is dangerous to "drive in" a rash on the skin. The idea prevails that some poisonous material is seeking to find its way out of the body through the pimples or other eruptions which may be present; and that to do anything which could remove the rash would drive this supposed poisonous matter back into the body and perhaps cause a fatal result; the rash, in other words, "strikes in," and does harm. Indeed friends often object strongly to any treatment which could have in view the cure of a skin disease, especially if this disease has lasted for some time; and if the disease be nevertheless cured, any ailment which may befall the patient in the succeeding months is sure to be ascribed to the "striking in" of the skin disease.

This notion, too, is one of the exploded fancies which have been left to us from medieval medicine; and it may be emphatically stated that no instance is known in which any disease of the skin has "struck in" and done injury.

Yet that the presence in the blood of various infectious materials which may perhaps be called "impurities," is abundantly shown by the different eruptive diseases. It is well established that there is a specific virus or poison whereby scarlet fever, for example, is induced; and it is also evident that the effect of this poison is among other things to produce a rash on the skin. Yet there is no reason for believing that the poison is located in the skin; in fact many cases of scarlet fever occur in which no rash can

be distinguished. The different eruptions — scarlet fever, measles, small-pox and the like — are merely due to the derangement in the action of the skin, just as the vomiting of small-pox and scarlet fever is due to the deranged action of the stomach, and as the delirium and convulsions are due to the deranged action of the brain.

2. *Hereditary influence* is another of the internal causes which are active in the production of skin diseases. Certain eruptions on the skin, such as psoriasis and eczema, appear more frequently in the children of parents who have suffered from these diseases than in others.

3. *Nervous disturbance* is another of the internal influences which predispose to the formation of rashes on the skin, and at times indeed seem quite responsible for the entire eruption; thus, excessive emotion has been known to cause the appearance of nettle-rash.

Among the external causes which induce, or tend to induce diseases of the skin, are those which act directly, such as irritating substances. Familiar examples of these causes are the occurrences of eruptions on the hands of bakers, washerwomen and bricklayers, who are often afflicted with diseases of the skin caused by the contact of the irritating substances which they are compelled to handle. In this class too belongs the itch, which is caused by the mechanical irritation of a microscopic animal; and it is a familiar observation that certain other small animals, not microscopic, frequently cause eruptions.

Various other external influences act indirectly in causing skin eruptions. Among these may be mentioned want of cleanliness and the contact of irritating materials used for clothing.

In this connection it should be remarked that the popular idea as to the relation between cleanliness and skin diseases is largely incorrect. Many people believe that the appearance of a rash on the skin indicates a neglect of cleanliness on the part of the individual. There are, it is true, certain rashes which affect limited parts of the skin if cleanliness be neglected; but these are parts of the skin which are not usually exposed to the public gaze. It may be safely stated that no disease of the face or hands is ever caused by neglect of cleanliness; furthermore, a want of attention to personal cleanliness is by no means sufficient of itself to cause a rash on the skin. There must be a predisposition of the skin to the formation of the

rash, in order that the eruption shall appear, even if the person be filthy.

The antiquated belief as to the relations between skin eruptions and "impurities of the blood," accounts also for the fact that a disease of the skin is regarded as far more objectionable and mortifying than a disease of the internal organs. The gout is somewhat aristocratic; dyspepsia is usually fashionable; consumption lends a certain air of melancholy interest; Bright's disease enrolls the sufferer among the martyrs; but salt rheum, or any other rash on the skin, is devoid of all such charms, and is the source of mortification to the patient and of disgust to others.

Some of the diseases which afflict the skin could be avoided by careful attention to the requirements of the body. This attention includes not only the care of the skin, but also the regulation of the general health.

One of the first requisites in the care of the skin itself is of course cleanliness. The scales which compose the outer part of the skin are constantly being thrown off, or at least becoming loosened so that they can be readily removed; and thousands of glands — the sweat glands, so-called — pour out upon the surface of the skin a considerable amount of watery liquid; this perspiration takes place all the time, by night and by day, in winter as well as in summer, though varying of course in quantity. In addition to these glands there are also numerous little pockets in the skin, called *sebaceous* glands, which secrete and throw out upon the skin an oily material. The result is that there is constantly accumulating on the surface of the skin a quantity of material made up of the dried scales composing the outer part of the skin, and of the liquids which are discharged upon its surface; these materials must be removed in order to permit the free action of the various glands; since otherwise the openings of these glands — the "pores" of the skin — become stopped up, and the result of this stoppage may be an inflammation.

For the removal of this material there is required as a general rule only soap and water. As to the selection of soap there are certain popular impressions which are not altogether correct. There are several requisites for a good soap: first the fat from which it is made must be sweet, that is not rancid, for no matter what the other excellencies of the article may be, the presence of rancid fat in it is very apt to cause roughness and itching of the skin, which

may even proceed to eczema or "salt rheum." The second requisite is that the soap shall not contain too much potash or other alkali. The alkali or "lye" in the soap is intended first to combine with the fat used in making the soap, and second to combine with the fatty matters on the skin so as to facilitate their removal by the water. An excess of potash makes the soap extremely irritating, and may readily provoke diseased action in the skin; we are all familiar with the irritating effects of even short contact with "soft soft," which differs from the hard soap chiefly in the large amount of lye which it contains. The third requisite is that the soap shall contain no substances capable of inducing disease of the skin. This may seem an entirely unnecessary remark, but experience shows that the commoner varieties of soap frequently contain refuse matters from the animals from which the fat used in making the the soap was procured.

A fourth essential for a good soap is that it should contain no other ingredients than the fat and the alkali. Many soaps are intentionally adulterated with various foreign matters, especially varieties of clay; and numerous others are colored green, red, etc., and are scented with questionable perfumes. We are familiar with the fact that the dyes used in coloring candies, wall paper, stockings, etc., are often productive of disease in those using them; and we may readily appreciate the fact, which has been established by experience, that the coloring matters used in tinting soaps are frequently as injurious as the dyes used in coloring stockings. The perfumes, also, are usually of the cheaper sort, many of them manufactured from petroleum; these may retain the irritating properties of the substance from which they are made.

It has become quite popular in recent years to use so-called "medicated" soaps, which are supposed not only to keep the skin in excellent condition, but also to guard and protect it against the numerous diseases to which it is liable. Thus we are flooded with innumerable varieties of sulphur soaps, tar soaps, glycerine soaps, carbolic acid soaps, etc., without mentioning the numerous articles supposed to contain honey, lettuce, celery, etc. Of all these, it may be said their use is advantageous only to the manufacturer and the dealer. It is evident, upon the slightest consideration, that even if these soaps were impregnated with materials which could benefit the skin, no particular advantage would be derived from such brief contact as is ordinarily given to a soap. But the

fact is, first, that these soaps do not contain enough of a remedial agent to accomplish any good; and, second, that most of the substances employed for this purpose possess no curative value for skin diseases; indeed, some of them are decidedly injurious to the skin, and serve by constant irritation to provoke an inflammation. Furthermore, the healthy skin requires no other care than simple cleanliness. If this be secured, and if it be protected from contact with irritating substances, the skin remains healthy, unless there be some impairment of the general health. It may be, therefore, in general stated, that the so-called medicated soaps are in no case better than a good unmedicated soap, and are often times worse, because positively injurious.

It may be said that physicians often prescribe medicated soaps in private practice in the treatment of skin diseases. This is undoubtedly true. There are several so-called soaps which are made for the purpose and are not intended to cleanse the skin, but merely to serve as a convenient means for applying remedies to the skin. It is also true that physicians often prescribe some variety of tar soap, but this is done in some cases merely to be certain that the patient employs no injurious article, and in other cases largely for its moral effect. People in general are far too much addicted to taking medicine. A patient is apt to feel that he does not get his money's worth upon consulting a physician, unless some medicine is prescribed. Hence it sometimes becomes necessary to order bread pills and colored water just for the patient's satisfaction, and in the same way it is often the part of discretion to order tar soap in the treatment of skin diseases.

But it must be remembered that diseases of the skin vary much in their nature, and therefore in the treatment adapted to them. Hence a remedy which may be useful in one is quite out of place, and even injurious, in another. This fact alone demonstrates that the use of any soap as a panacea for all diseases of the skin is of necessity an absurdity. Physicians themselves derive much benefit from this promiscuous use of medicated soaps, since these articles are responsible for many cases of eczema, and of some other skin diseases.

It would be out of place in this work to specify by name any particular brands of soap which can be recommended; it will suffice to say that white castile soap, when properly made, is one of the most satisfactory. This is made of soda and olive oil, and is free from all injurious constituents.

Among certain classes, the idea prevails that while soap should be used on other parts of the body, it should be carefully kept from the face. This, of course, is a mistaken impression; the skin of the face does not differ in any essential particular from that of the rest of the body, and there is no reason why it should not be cleansed as thoroughly as the remainder of the skin. In fact, it seems probable that certain rashes which are limited to the face are sometimes caused by the neglect to use soap upon the face, and the consequent accumulation of materials which should be removed.

As to the water best adapted for cleansing purposes, it is generally understood that the purest water is the best; in other words, that the so-called "soft water,"—that is, that which does not contain salts in solution is most advantageous. As to the temperature it may be said in general that the patient should be guided by his own sensations, both during and after the application of the water to the skin.

"Pimples"—(Acne).

This is one of the commonest affections of the skin, and occurs most frequently during youth. There are several affections which are regarded as varieties of the same disease; only two of these need especial mention here—acne *simplex* and acne *rosacea*.

Acne simplex, or simple acne, is the affection commonly known as pimples, black heads or flesh worms. It is, perhaps, the most frequent of all the affections of the skin; indeed, few people attain the age of 30 years without having suffered—in mind if not in body—from the occurrence of this annoying affection. It is especially aggravating, from the fact that it usually flourishes most during the very years when the individual is most sensitive as to his personal appearance and condition, and from the further fact that if these pimples occur anywhere on the body, they are almost sure to appear on the face, where they cannot be concealed.

It is a curious and familiar fact that the disease never makes its appearance before puberty; that it is most luxuriant during the ten years following this period, and that it subsides spontaneously in early manhood, usually by the thirtieth year. This occurrence during these particular years of life has led to the popular impression that there is some intimate connection between the

presence of this disease and the sexual function. Various ideas prevail as to the reasons for the occurrence of pimples upon the face. Some people ascribe them to a repression of the sexual instinct, and are firmly convinced that marriage would be a sovereign remedy, while others regard the occurrence of acne as evidence of improper excitation of the genital organs. Long observation by medical men has failed to reveal the slightest foundation for either of these beliefs, and both are certainly extremely unjust to a great many young men and young women.

Acne is essentially a disease of the *sebaceous* glands. The mouths of these glands become stopped up, so that the material which is secreted in the little sac cannot escape. It will be remembered that these sebaceous glands secrete a certain oily material, which is in the natural condition poured out upon the skin, and serves to keep the surface smooth and flexible. This oily matter should be constantly poured out upon the skin, since it is constantly being secreted in the interior of the sac or gland. When from any cause it fails to escape, either because there is some mechanical obstruction, or because the secretion itself becomes so thick that it cannot pass out of the little orifice or "pore," there results an accumulation of this oily material in the sac. This sac is therefore gradually distended, and becomes large enough to make a little elevation on the skin. Meanwhile the oily matter located in the pore of the skin has usually absorbed enough dust and dirt to become black, whence the name "black heads." In some individuals these distended sacs remain for a considerable time without undergoing further change; in others the matter accumulates constantly, until finally a considerable lump appears, which is known as a *wen*. This happens with especial frequency when the sebaceous glands of the scalp become stopped up. But in the majority of cases the pressure of the distended sac on the tissues around it causes an inflammation. This manifests itself by redness and by swelling; in this way the familiar "pimple" is developed. Sometimes there occurs nothing more than a red swelling, but in the majority of cases the inflammation proceeds until matter is formed around the distended sebaceous sac, making the pustule which so often disfigures the face of the unfortunate patient.

If the contents of the sac be pressed out before the inflammation has proceeded to this extent, there appears a white, spiral-shaped body, resembling a worm somewhat in shape. From this

appearance there is derived the popular notion that the disease is due to the presence of worms in the skin. These white bodies are, however, not worms, but merely the accumulated secretion of the gland; their form is simply that of the distended sac. There is sometimes found in the contents of these glands a microscopic parasite, which is not, however, a worm. There is no reason for believing that these parasites have anything to do in causing the disease, since they are not found in all the pimples, but simply in comparatively few.

Cause.—Acne is essentially a disease of the sebaceous glands; yet there must evidently be some cause affecting the system whereby this diseased action of the glands is induced. For it seems certain that the starting point of the whole difficulty is the change in the nature of the secretion, so that the oily matter no longer flows out of the gland but remains in a hardened condition.

It is also established by experience that this affection of the skin can be and is often induced by derangements affecting other parts of the body. There is a well-established relation between the diet and the occurrence of this disease. Thus in many persons a crop of acne pustules is sure to appear after eating buckwheat cakes or mince pie; in other individuals cheese, nuts, raisins and pastry induce the same effect. In some cases acne can be traced directly to the abuse of alcoholic beverages; indeed, this is frequently the case in those instances of acne which occur in elderly people.

The condition of the bowels also seems to have a direct connection with the appearance of these pimples upon the face; many individuals who suffer from acne are troubled with habitual constipation, and procure relief from the skin eruption only after the bowels are regulated. In other cases there is evidently imperfect activity of the liver. Sometimes the appearance of these pimples is a regular sequel to over-indulgence in the pleasures of the table.

Another form of acne occurs particularly in poorly nourished individuals, especially in those who are commonly termed "scrofulous." This form, however, is apt to appear more particularly on the breast and on the limbs; it is not so troublesome as a deformity in the face.

It should be mentioned in this connection that a rash quite similar to acne is produced by the use of certain drugs. Thus, if tar be painted upon the skin for several days in succession, a rash quite similar to acne appears; and this rash is often noticed on the

persons of those who have to use tar constantly in their work. The same effect is produced by the long continued use of the iodide of potassium or by the bromide of potassium; and may also follow the application of petroleum to the skin. It has sometimes been observed in those who have to oil machinery, presumably from the irritating effects of the rancid oil.

Treatment.—The treatment of acne is one of the most troublesome undertakings which the physician is ever called upon to perform. This difficulty arises doubtless from the fact that it is often impossible to locate the source of the disease. For, as has been said, the starting point of the affection may be found in derangements of the various digestive organs; while on the other hand the individual gives absolutely no other signs of disease than are manifest on his face. In general it is necessary to secure regular evacuations of the bowels. This may be accomplished in the way indicated while speaking of constipation: the use of a glass or two of mineral water, or of a wineglassful of the liquid citrate of potassium, will be one of the preparatory steps in the treatment of the disease.

The diet, too, must be regulated so as to avoid those particular articles which are found, by the experience of the patient himself as well as others, to provoke the formation of pimples. In general it may be observed that whatever causes marked flushing of the face will be apt to favor the production of acne pustules. The use of alcoholic beverages, of hot drinks, pastry, buckwheat cakes, etc., should be carefully avoided in case it is found that pimples appear in unusual number after indulgence in these articles.

The local treatment of acne must vary somewhat with the general condition of the patient, as well as with the assumed cause of the disease. The patient's inclinations lead him to remove the unsightly black spots on the face. This may be done, but should be done with care; if the skin be merely compressed between the fingers, there is apt to result much redness and swelling, which is far more unsightly than the object whose removal is sought. It is generally recommended that a watch key be employed for the purpose, being pressed firmly against the skin around the black spot. A still better article is a small silver tube which is made for the purpose. Even this procedure is apt to be followed by considerable redness and swelling, hence it is advisable to employ this measure

only at night. The irritation may be somewhat lessened by bathing the face with hot water or with bay rum.

Numerous lotions and ointments are recommended and sold for the cure of acne; yet none of these can be relied upon, unless proper measures are taken to remove the condition of the stomach, bowels, liver, etc., upon which the difficulty depends. Among the best of these are the following:

Flowers of sulphur, - - -	Two drachms.
Tincture of camphor, - - -	Three drachms.
Glycerine, - - - - -	One ounce.
Rose water, - . - -	Four ounces.

This may be applied over the affected spots, and may be rubbed gently on those parts of the skin affected with the disease two or three times daily.

Borax, - - - - -	One drachm.
Carbonate of soda, - - -	One drachm.
Glycerine, - - - - -	Four drachms.
Tincture of camphor, - - -	One ounce.
Distilled water, - - - -	To make six ounces.

This may be applied in the same way.

Precipitated sulphur, - - -	Half an ounce.
Carbonate of potash, - - -	Four drachms.
Glycerine, - - - - -	Two ounces.
Sulphuric ether, - - - -	One ounce.
Alcohol, - - - -	One ounce.

This mixture should be carefully applied to the pimples and to those parts of the skin that seem liable to exhibit an eruption. In all these cases no more friction should be employed than is necessary to apply the lotion.

In all cases success can be hoped for only after persevering use of the remedies, both those for application to the skin and those which are designed to improve the condition of the digestive organs. Cases are found which seem to resist almost all measures of treatment; such individuals have at least the consolation that the affection will yield to time, even if all medicines prove unavailing.

Dandruff.

This affection may be naturally introduced here, since it also depends upon a disorder of the sebaceous glands. In this affection the secretion of these glands is not so hard as in the case of acne, but shows itself in the form of yellowish or whitish scales. The affection is exhibited in the most marked degree on the scalp, since here the secretion is not removed so often nor so completely as on the rest of the skin. In some cases these scales become scattered through the mass of the hair, and are so plentiful as to keep falling upon the shoulders. In other cases these scales remain matted together in consequence of the large amount of oily secretion which accompanies them.

Dandruff is not only annoying, but is also important, because if allowed to continue without treatment, it almost always results in a thinning, if not complete loss of the hair. This baldness is not, properly speaking, a result of the dandruff; but both result from the affection of the sebaceous glands. For the secretion of the oil is a natural and necessary provision for the hair, without which it is ultimately destroyed.

Treatment.— For the removal of dandruff it is necessary not only to keep the scales brushed out of the hair, but also to correct, if possible, the unhealthy action of the sebaceous glands. The hair may be gently brushed with a soft brush, and then washed with a little soap and water. After this, the yolks of two eggs may be applied to and thoroughly rubbed into the scalp. The repetition of this process daily is often of itself sufficient to remove the difficulty. If the scales still form, there may be substituted for the eggs the following prescription:

Tannic acid, - - - -	One drachm.
Simple ointment, - - - -	One ounce.

Mix and rub thoroughly into the scalp.

Another valuable remedy is the following:

Hydrate of chloral, - - -	Two drachms.
Water, - - - - -	Four ounces.

If there be much oily matter in the hair, the following prescription may be used:

Aromatic spirits of ammonia, - -	Four drachms.
Glycerine, - - - - -	Half an ounce.
Rosemary water, - - - -	Four ounces.

Itch—(Scabies).

The itch is a disease caused by the burrowing of a microscopic parasite in the skin. The disease seems to have been known for many centuries, and notwithstanding the minute size of the insect which causes it, the animal was discovered at least as early as the fourteenth century. The itch seems to be a cosmopolitan disease, scattered all over the world, and not subject to any laws of climate or soil.

Until the nature of the disease was discovered, the itch was one of the most troublesome and dreaded of all the affections to which flesh is heir. In former times the patient was an object of loathing to others, and of torment to himself, for months and even years at a time; and although the disease does not affect the vital organs directly, yet the dreadful scratching caused indirectly serious impairment of the health. After the parasitic nature of the disease was discovered, and a certain means for its cure came into use, the spread of the disease was much restricted. At the present day the itch is comparatively rare in the United States, though still very common in many of the European countries. In the skin departments of the large hospitals in London, Paris and Vienna, for instance, about one patient in five is afflicted with this disease.

The itch parasite, or itch mite, is a microscopic insect called the *acarus* or *sarcoptes scabiei*. It is a round, somewhat turtle-shaped animal, provided with eight legs and with horny jaws; with these they burrow into the upper layers of the skin and crawl gradually along just under the surface. The female lays her eggs closely together in the burrow as she proceeds; the track of the insect and the row of eggs can usually be perceived as a black line, from a sixteenth to an eighth of an inch long, near the surface of the skin. The black color is due not to the insects themselves, but to the dust and dirt with which the little groove in

SARNA.
ITCH.

the skin becomes filled. After a time the adult insect dies, but not until she has made ample provision for the propagation of her species in the shape of numerous young; these attain maturity and repeat the process of burrowing and of laying eggs. The life of the insect seems to vary from three to eight weeks; each female produces from ten to fifteen young.

The parasites are readily conveyed from one individual to another, and even from man to several of the lower animals, especially dogs and horses; and it seems quite certain that the disease can be communicated again from these animals to man.

It is probable that the disease is rarely communicated from hand to hand. In most cases some more intimate contact of the person is necessary. In the majority of instances the disease is acquired by sleeping in the same bed with a person already suffering from it.

Certain parts of the skin are more frequently visited by the itch mite than others. This results partly from the fact that they find the best nourishment in the thinner and more juicy parts of the skin, and partly because they are transferred by the fingers to certain parts of the body with especial frequency. Among the first localities usually visited are the spaces between the fingers; they are then found upon the sides of the fingers, on the front of the wrist, on the inside of the elbow and around the armpit. In fact all those parts of the skin which an individual is especially apt to touch or rub soon become affected. Any part of the body which is chafed or irritated by the clothing is sure to be plentifully inhabited by the itch parasites. Thus in women they are found on the breast and around the waist. In men they can often be observed to mark out the course of the suspenders over the shoulders. Those individuals who support their nether garments by means of a strap or belt around the waist are sure to present a girdle of irritated and inflamed skin under this belt.

Symptoms.—The first intimation that the patient has is an intolerable itching, which is usually felt only over a limited part of the body, especially in the hands and wrists. This itching is, of course, followed by violent scratching, as a result of which the skin becomes roughened and sore. Indeed it is rare that one sees the changes caused in the skin by the itch mite without the complications due to the use of the finger nails. The rash caused by the insect itself consists of pimples which resemble somewhat those of

acne; but as we see the patient, we rarely find any of these pimples in a good state of preservation, for the top is usually scratched off and replaced by a black crust of blood. Thus the entire surface of the skin may be speckled over with these little black patches, the intervening space diversified by welts raised by the finger nails. Unless soon relieved, the patient presents patches of *eczema*, or salt rheum, in different parts of the body, a condition due entirely to the irritation caused by the scratches. In advanced cases, indeed, the physician himself may overlook the true cause of the disease, since the appearance will be that of eczema simply.

Various other irritations may cause the appearance of a rash similar to that of the itch, and may induce persistent and violent scratching; among these are *body lice*, which may sometimes afflict individuals who have no suspicion of their existence. There are two points, however, which enable one to recognize the itch and to distinguish it from all other affections; first, the *location* of the rash. For the itch parasites are distributed around the individual's body by his own hand and are hence most numerous in those parts of the body which are most accessible to the fingers. The rash is, therefore, distributed chiefly between the collar bones and the knees on the front of the body, and it may often be observed that while the skin in this locality is covered with blotches and scratches, the skin between the shoulders of the same individuals is quite free from them. This results from the fact that the itch insects do not leave the skin for the clothing, and hence do not travel around the body independently. Lice, on the other hand, live altogether in the clothing, and hence are apt to affect all parts of the body indifferently.

But the most characteristic feature in the recognition of the itch, is the occurrence of minute *black grooves* in the skin. These look as if short pieces of fine black silk have been drawn under the surface of the skin; it is often possible to detect by close scrutiny a minute whitish point, looking somewhat like a small blister located at the *end* of the black line; this is the itch insect itself, and by dextrous use of the needle the animal can be lifted out of the groove.

The extent of the rash and the consequent irritation of the skin vary much in different individuals, chiefly according to the cleanliness which the person observes. In individuals of filthy habits

the body is often a mass of eruption, and presents a most disgusting and loathsome appearance. If, however, a person who is accustomed to strict personal cleanliness be infected with the itch, the manifestations of the disease are not so numerous nor so aggravated; indeed it is quite possible for such a person to suffer for some time from scabies without suspecting the true nature of the disease. Even upon examination of the skin there will be detected only a few black furrows here and there upon the hands and wrist or in the vicinity of the genitals. Sometimes there will be also a few pale red pimples scattered here and there over the body. Such patients are often treated for weeks for some other disease of the skin.

In every case in which a person of cleanly habits complains of intense itching, *especially at night*, suspicion as to the existence of the itch should be entertained, and a close search made to detect the black furrows characteristic of the disease. In some cases the rash appears only in the vicinity of the genital organs, the rest of the body being free from it; and instances have been known in which inflammation of the glands in the groins, resulting even in the formation of matter, has resulted merely from the irritation of the parasites in this locality. This point should be borne in mind by the physician as well as by the non-professional, since the occurrence of suppurating glands in this region is usually a sign of venereal disease.

Treatment.—The object of treatment is simply to destroy the itch mites, after which the rash subsides of itself. While this is true of the itch in an early stage, or in an individual of cleanly habits, it sometimes becomes necessary to adopt additional treatment in those who have long suffered from the disease, or whose habits are such that the rash has rapidly become extensive and aggravated. The disease is confined entirely to the skin; there is no "impurity of the blood," and, therefore, no necessity for sulphur and molasses, or other medicines internally.

In ordinary cases the plan to be pursued should be as follows: The individual should take a hot bath, lying in the water sufficiently long to soak the skin thoroughly, and using plenty of soap; after leaving the bath the skin may be energetically rubbed with a coarse towel. Then all parts of the body which show any

indications of the rash should be annointed with one of the following ointments:

Sulphur,	Three ounces.
Tar,	Three ounces.
Soft soap,	Eight ounces.
Lard,	Eight ounces.
Chalk,	Two ounces.

Mix and make into an ointment.

Flowers of sulphur,	One drachm.
Ammoniated mercury,	Fifteen grains.
Olive oil,	Half an ounce.
Lard,	Two ounces and a half.

This will be found blander and less irritating than the former, though it does not always act with the same rapidity. The simple sulphur ointment as obtained at the drug store is usually efficient in destroying the parasites.

If the skin be very delicate, as is often the case in young children, ointments containing sulphur are apt to irritate extremely; in such cases the *balsam of Peru* will be found serviceable.

The ointment selected should be applied morning and night for three days; at the end of this time the patient should again take a warm bath, and he will usually find on the fourth day that there is no further itching. It is highly important in applying these ointments that they be thoroughly rubbed into all parts of the skin, especially into the folds and creases between the joints, since it is just here that the itch insects are abundant. There are various affections of the skin, called bakers' itch, grocers' itch, and the like, which are not due to parasites, but are really forms of salt rheum or eczema, caused by contact of the hands with irritating substances which these persons are compelled to handle.

Salt Rheum — (Eczema).

This is one of the commonest, most troublesome and hence most important of all the diseases of the skin. It attacks different parts of the skin, and occurs at all periods of life; it is not limited to any particular class of society, but may appear in those who give the strictest attention to personal cleanliness. It is caused by

ECZEMA.

ECZEMA.

(SALT RHEUM.)

external irritation, and by disorders of the internal organs. Comparatively few individuals, perhaps, pass through life without having suffered, at some time, from some manifestation of this disease.

One of the most common forms of eczema is that one familiar to those who have much to do with infants and children; it is the eruption which appears upon the face and head of a child, usually within the first two years of life, and often at the period of teething. It usually begins in the shape of scattered red points or pimples, which soon run together, and in a short time begin to exude a watery fluid; this is called "weeping." The eruption is always exceedingly itchy, and causes an irresistible desire on the part of the patient to rub and scratch the diseased skin; even the infant in arms finds means to attempt the relief of this irritation.

a short time after the rash has begun to "weep," crusts are for[illegible] these are at first thin and scattered, but are soon united int[illegible]k yellowish or brownish yellow layers, which may cover the entire scalp and form a mat, through which the straggling hairs project. The disease is especially apt to occur behind the ears and in the crease of the skin under the jaw, though in infants it commonly spreads from these localities, so as to involve the entire scalp and the face as well. If there be a decided tendency to the manifestation of the disease, eczema will soon be found in almost all those localities where two surfaces of skin rub against each other; in addition to the spots mentioned, it is observed at the bend of the elbow, at the back of the knee, between the thighs, and, in very fleshy children, upon the wrists. In bad cases it may spread so as to cover almost the entire body.

Eczema upon the scalp and face of children is often called "milk crust," because it is supposed that it is in some way associated with the milk. This supposition does no harm, though usually unfounded, but the child often suffers greatly from the belief which is also entertained that the "milk crust" must not be treated nor removed. It is popularly believed that if this rash be "driven in," serious injury will result to the child; hence the infant is permitted to suffer untold torment from the itching and soreness of the skin for months and years.

In previous pages we have endeavored to emphasize the remark that no harm can result from "driving in" a rash on the

skin; in fact that is quite impossible by any means at present known to us to "drive in" any rash. These remarks are true of eczema, as it occurs in infants; in every case, the child should be relieved as quickly as possible of the eruption, since it is a constant source of pain and annoyance to the infant, and reacts upon its general health in a marked degree. Furthermore, it is true of eczema, as of so many other diseases of the skin, that the longer they last the more obstinate and difficult to cure they become. It is by no means certain that the rash will disappear when the child is weaned; and if it does not, it may be quite impossible, or next to impossible, for the physician to control it after it has lasted so long.

Sometimes eczema appears during the process of teething, and the child becomes in this case also the victim of the mistaken notion that the rash is a necessary part of the teething process, and must not be interfered with.

When the children become somewhat older, they are less liable to these extensive patches of eczema; the disease occurs in them as smaller patches, moist and red, which are especially often located behind the ears.

Another form of eczema, which often occurs in children, though sometimes observed in adults also, does not proceed as far as the "weeping" form; this consists merely in redness and perhaps rawness of the surface in the folds of the skin, and between two opposing surfaces. This redness and rawness, caused by chafing, is often found in fleshy infants, and in warm weather is very apt to affect those parts of the body which are covered by the napkins. This variety of eczema is usually dependent upon the mechanical irritation or chafing in the one case, and upon the contact of wet and soiled napkins in the other. It is, therefore, a much less serious and obstinate affection than eczema of the scalp and face, and yields far more readily to treatment.

In adults, eczema occurs in almost a.. parts of the body; the forehead, the cheeks, the eyelids, the nose, the lips are very often affected. When the disease occurs in the face, especially around the mouth, it is apt to prove obstinate, in consequence of the constant movement of these parts. In men, too, the presence of the beard is an additional obstacle to the cure of the affection, since, if the beard be allowed to grow, it is impossible to reach the disease satisfactorily, while if the face be closely shaven, the eczema is often thereby aggravated.

In women eczema is very common around the nipples and on the genitals. Many of the affections of the nipples during nursing are simply cases of eczema. Very many women who are afflicted with diseases of the womb, or of the vagina, suffer constantly from eczema on the neighboring skin, as the result of irritating discharges. In some cases, too, eczema frequently appears periodically during the menstrual flow.

Eczema is also frequently found in adults on the leg, especially just above the ankle. This is especially often the case with those who are troubled with enlarged or "varicose" veins. In this location the eczema is very obstinate and is apt to proceed in the course of time to the formation of ulcers.

Cause.—Eczema is caused both by external irritation and by derangements of various functions of the body. Among the former is especially the irritation caused by the use of soaps, ointments, powders and liniments. Foremost among these is the favorite tincture of *arnica*. Every physician of experience has seen cases in which attacks of eczema, sometimes severe and obstinate, have followed the application of arnica to the skin for some trifling bruise or sprain. And there are cases in which all treatment seems to be ineffectual until the patient abandons the use of some particular kind of soap.

In some individuals the habitual use of hot baths occasions more or less extensive eczema. The long continued application of water, or of other substances which seem quite bland, occasions eczema in some individuals. Washerwomen, cooks, waiters and people of similar occupations, are often subject to the disease on the hands and wrists. In these cases treatment is unavailing until the patient abandons the employment which compels him to expose the hands to the constant irritation.

Bakers are often subject to eczema on the hands and face. In this case the affection seems to result from frequent exposure to a high temperature. This affection is called from the frequency of its occurrence in bakers, by the name "bakers' itch." People employed in grocery stores are often similarly affected, presumably from contact of the hands with sugars and various irritating articles. Bricklayers are especially prone to suffer from this disease.

One of the most frequent among the irritating causes of eczema is the scratching which every one employs to relieve an obstinate itching; hence any disease of the skin which is accompanied by

itching, is very apt to be followed by eczema. It has been already mentioned that the itch often becomes obscured and mistaken for eczema, because the irritation, which is a prominent feature of the itch, causes violent scratching, and this in turn excites an eczema. Even the pressure of tight clothing, of bands, suspenders, belts, garters, etc. may excite eczema in individuals predisposed to it. Exposure to the rays of the sun, and even sudden changes of temperature, may also provoke the disease. Pregnancy is very apt to be accompanied by eczema in the legs and on the genitals, especially if there be swelling of the feet. Contact with a poison ivy, the use of sulphur ointment, or articles of clothing containing irritating substances, also frequently cause the disease. Among the most frequent of such articles are colored stockings.

There is a great difference in the susceptibility of different individuals to this disease, since some are readily affected by causes which do not influence others at all. It may be said in general, that blond individuals are more susceptible to the disease than those of darker complexion.

The internal causes—those conditions of the system which give rise to an attack of eczema without external irritation—are by no means well ascertained. It may be said in general, that those who are afflicted with chronic diseases of the digestive organs and of the kidneys, are far more liable to eczema than others. Scrofulous individuals seem very susceptible; and so do girls suffering from "green sickness" or chlorosis. A coincidence has been observed between certain diseases of the womb and eczema; and it has been remarked that women are especially often afflicted with the disease during the change of life.

Treatment.—In every case of eczema it is highly important to ascertain the cause; otherwise salves, ointments and powders may be applied for months without improving the condition of the skin. It is impossible to mention in detail all of the constitutional conditions which seem to predispose to eczema, and which should be, therefore, looked for in obstinate cases of the disease. Yet it should always be borne in mind that if the patient be suffering from the green sickness, diabetes, dyspepsia, constipation or other affection, it will rarely be possible to relieve him entirely from the eczema without first improving his general condition.

In all such cases it will be necessary to regulate the diet, and

to avoid such excesses in eating or drinking as evidently disturb the patient's digestion.

The eczema of infants is often due to improper quality or quantity of food. It is especially common among those infants that are nourished partly or completely with artificial food. In every case of obstinate "milk crust," or of eczema in infants generally, it is a matter of prime importance to secure the best possible diet; whether this shall be mother's milk, that of a nurse, or some of the artificial foods which are recommended at the appropriate place in this book. In some cases the change of diet alone, without other treatment, is sufficient to cure the disease. In fact, in almost every case, whether the patient be adult or infant, careful attention to the diet constitutes an important part of the treatment.

In those cases in which the disease is traceable to external irritation, the source of this irritation should be of course removed. In some instances this is, under the circumstances, impossible, since the patient is unable to abandon his employment; thus the most obstinate cases occur in women who are compelled to have their hands constantly in water. In such instances much good can be derived from the use of rubber gloves. So, too, if the eczema depends upon an irritating discharge from the vagina, it will be necessary to adopt such treatment as will stop this discharge before the eczema can be cured. In general in the treatment of eczema in which there is considerable watery discharge and the formation of crusts, the surface should be softened by oiling the skin thoroughly, or by the use of a light flax-seed poultice. After this is accomplished and the crusts removed, one of the following ointments may be applied:

Oxide of zinc, - - -	Two drachms.
Lead water, - - -	Two drachms.
Glycerine, - - - -	Four drachms.
Lime water, - - -	To make eight ounces.

This may be applied to the surface by means of a soft cloth, such as an old handkerchief, which should be saturated with the lotion and laid upon the raw surface. If there should be much burning and itching, one of the following remedies may be used:

Carbolic acid, - - - -	Half an ounce.
Water, - - -	One pint.

This may be applied frequently upon soft cloths. Or

Camphor,	One drachm.
Borax,	Two drachms.
Alcohol,	Two ounces.
Rose water,	Six ounces.

For the eczema of the head in children, the following is recommended by Fox:

Ammoniated mercury,	Twenty grains.
Nitrate of mercury ointment,	Twenty grains.
Acetate of lead,	Ten grains.
Oxide of zinc,	Twenty grains.
Purified palm oil,	Half an ounce.
Fresh lard,	Half an ounce.

In many cases of eczema, especially in children, good results can be obtained from the use of *diachylon ointment*, which may be applied on pieces of soft linen or flannel. If the child's skin be especially sensitive, the ointment may be mixed with one-third of glycerine, after the following formula:

Diachylon ointment,	Three ounces.
Glycerine,	One ounce.

These ointments will generally be found more serviceable than the one previously given for all cases in which the skin is sensitive.

Whenever the skin begins to chafe in a fold, or where two surfaces come in contact, much good can be done by dusting the parts with the following mixture:

Camphor,	Half a drachm.
Oxide of zinc,	One ounce.
Powdered starch,	One ounce.

If these cases are not severe, they can often be relieved by the use of a little vaseline, to which there may be added the oxide of zinc in the proportion of ten grains to the ounce of vaseline. Another soothing lotion, which may be used to advantage when there is much itching and burning of the parts, is as follows:

Borax,	One drachm.
Carbonate of soda,	Two drachms.
Glycerine,	Two ounces.
Strong carbolic acid,	Twenty drops.
Distilled water,	Six ounces.

Mix and apply by means of soft linen or flannel.

In some obstinate cases success has been attained by the application of the *glycerole of the acetate of lead*, even after other remedies have been tried in vain.

In those cases in which eczema of the legs occurs as a result of enlarged veins, the cure will be very much hastened by the use of an elastic rubber bandage. In recent years this article has come into general use for ulcers and eczema of the legs. The rubber is made after a special formula, and is sold under the name of "Martin's bandage."

In the hospital wards of the renowned Hebra, in Vienna, success has been obtained, in obstinate cases, by the use of rubber garments. If the hands alone are affected, rubber gloves are worn night and day; if, as sometimes happens, there be extensive eczema of the legs or the trunk, closely-fitting garments of light rubber are made and worn constantly. If such garments or gloves are used, the skin soon becomes softened and macerated from the accumulation of perspiration and of the discharges. Hence it will be necessary to remove these garments every two to four hours, dry them, and wash the skin carefully. It is, therefore, necessary to have at least two sets of garments, in order that one may be worn while the other is drying.

Generally speaking, the skin which is affected with eczema must be carefully protected from water and soap. There are cases, it is true, in which it become necessary to wash the skin regularly, but in the majority of instances water should be applied only when absolutely necessary to remove the accumulated discharges. The good effects of such care are seen in those cases of eczema of the hands, in which the individual has been in the habit of washing the hands frequently. Such cases often resist all sorts of treatment until the hands are protected from water; after this, recovery follows rapidly.

The following quotation shows how this disease is managed in Vienna, the headquarters of the world for the treatment of skin diseases:

"In eczema of the scalp or of the ears, the crusts are to be removed by inunctions with oil, which are to be made twice a day, about three ounces of oil being used each time. The crusts are thus removed, and the raw places are covered with flannel. If the skin be not much thickened, the salves which have been mentioned above can be applied at once. If the skin be found red and

'weeping,' it will be necessary to apply rectified spirits repeatedly. When the swelling subsides, if the skir continues to secrete freely, tar may be applied in the case of adults; this agent should not, however, be used for children, because their skin is much more sensitive, and swelling, perhaps even suppuration, of the glands in the neck can be induced very easily. If the eczema extend into the ear, one may use injections or astringents; but in order to bring the salve into contact with the entire surface of the ear, a piece of sponge, properly shaped and covered with lint, should be smeared over with the salve and inserted into the ear. If the eczema extends high into the nostril, we may use suppositories. Each of these may contain:

Cocoa butter, - - - -	Eight grains.
Oxide of zinc, - - - -	Five grains.

This should be inserted into the nostril.

"A child suffering from eczema of the face should have a piece of linen smeared with diachyolon ointment laid upon the raw place; this may be fastened with a flannel bandage and renewed constantly until the crusts have been removed."—*Neumann*.

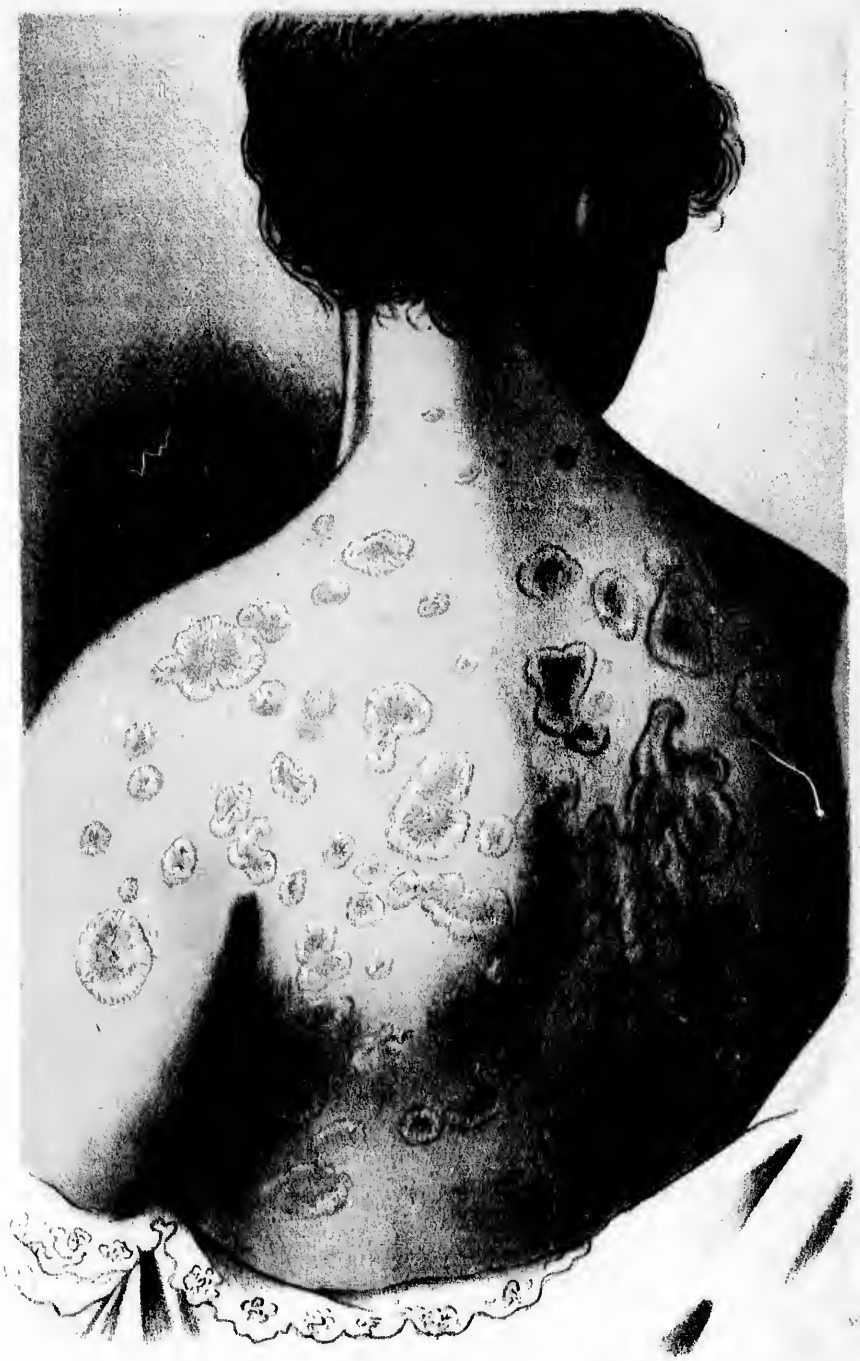
In some cases eczema appears suddenly in consequence either of some exposure to irritating substances or of some error in diet. This is what is called *acute* eczema. There is considerable swelling and heat of the skin and the sore place discharges freely.

In the early days of this affection excellent results are obtained by sponging the diseased surface with alcohol four or five times a day; after which, in the intervals, there may be applied upon linen, one of the salves mentioned above, especially the combination of borax and glycerine, as follows:

Borax, - - - -	One drachm.
Carbonate of soda, - - -	Two drachms.
Glycerine, - - - - -	Two ounces.
Distilled water, - - - -	Four ounces.

Dry Tetter—(Psoriasis.)

This disease is one of the most frequent with which the physician has to deal; and although it can with our present means be easily



PSORIASIS.

PSORIASIS.
(DRY TETTER.)

and rapidly cured, yet the affection displays the greatest perversity and disposition to return again subsequently.

This disease is marked by the appearance of scaly white patches, usually circular or oval in shape, and often surrounding a patch of healthy skin. These patches appear most frequently upon the outer surfaces of the elbows and upon the front surfaces of the knees; in fact, they are to be found here if anywhere on the patient's body. Yet they are by no means limited to these localities, since they may spread over the trunk and limbs and even cover the entire person from head to foot with a thick layer of silvery-white scales. When these patches occur on the head they cause annoying dandruff.

These patches may vary in size extremely, but can usually be recognized by the fact that when gently scraped with the finger nails so as to remove the white scales, a few bleeding points appear underneath. Psoriasis rarely causes any itching or scratching; its surface is not moist unless greatly irritated, and it occurs on the outer sides of the limbs. By these three characteristics it can readily be distinguished from the disease just described — eczema.

Psoriasis is rarely developed in very young children, nor does it usually appear for the first time after the individual has attained the age of 35 or 40 years. It is usually developed between 10 and 25 years of age.

The disease appears to be, to some extent, hereditary. Several members of the same family will often suffer from it at the same time; yet it is not in the least contagious, nor does it seem to be dependent upon any depraved condition of the system, since those who suffer from it are frequently perfectly well in every other respect. It often appears in an individual only at certain seasons of the year, especially in winter; after lasting for some months, it disappears spontaneously, but returns again at the same season in the following year.

Treatment.—In many cases it becomes necessary to use constitutional remedies in the treatment of psoriasis. This is especially true in the treatment of children, whenever the scales are very plentiful and silvery. In all cases, attention should be directed to the bowels, regular daily evacuations being insured.

Internally we may administer arsenic in some form, preferably

as "Fowler's Solution." This may be given in the following prescription:

Fowler's Solution,	Fifty drops.
Wine of iron,	Two drachms.
Syrup of orange peel,	One ounce.
Water,	Five ounces.

Mix, and take a tablespoonful after meals.

If the patient prefer to take pills, the following form of arsenic may be administered:

Arsenious acid,	One-third grain.
Carbonate of iron.	Half a drachm.
Sulphate of quinine,	Half a drachm.
Extract of nux vomica,	Six grains.

Mix, and make twenty-four pills. Take one half an hour before meals.

In cases of scrofulous, pallid children, it will be advisable to administer cod liver oil also. A teaspoonful of this may be given morning and night, and the dose gradually increased to a tablespoonful, if the stomach can bear it.

Yet, in most cases, it is quite possible cure to psoriasis by the use of remedies to be applied directly to the skin. For this purpose various substances have been used, but within the last few years it has become evident that reliance can always be placed upon some of the derivatives of *tar*. It is, therefore, a waste of time to employ other and less trustworthy remedies.

The preparations of tar, which rarely fail to cure the disease and cause a disappearance of the rash within two or three weeks at most, are *chrysophanic acid* and *pyrogallic acid*. If the former is to be used, the patient should take a warm bath and rub the skin vigorously with soap and with a flesh brush, though not so roughly as to cause bleeding; the object is simply to remove the scales. The following ointment may then be applied:

Chrysophanic acid,	Two drachms and a half.
Simple ointment;	Ten drachms.

These should be rubbed together very carefully by the apothecary; there may then be added ten drops of the oil of bergamot. This salve is to be applied immediately after the patient leaves the bath and has dried his skin. It should be rubbed *only* upon the *diseased* patches, and not promiscuously upon the diseased and the healthy

skin alike; for this agent irritates the skin considerably, and if used carelessly it may cause considerable swelling and heat of the skin. Indeed, the only objection to the use of this remedy is the fact that it sometimes causes considerable irritation of the skin and of the kidneys as well.

In most cases it will be sufficient to apply this salve once a day for three consecutive days. At the end of this time the patient may take a warm bath and thoroughly cleanse the skin. For several (five or six) days thereafter, the skin will probably exhibit a certain amount of scaliness; but this passes off entirely in eight or ten days, and the eruption will be found to have disappeared. In many cases the spots, where the salve has been rubbed in, exhibit a dark red color, due to the chrysophanic acid; this disappears spontaneously in a week, and it can be removed in a few minutes by washing the spots with benzine if necessary. The hair, also, is apt to exhibit this color, especially the gray hairs. In this case the color cannot be so readily removed, yet it is only in exceptional instances that this coloring of the hair can be objectionable.

The chrysophanic acid stains the linen as well as the skin; the clothing is not thereby injured, yet it will be desirable that the patient wear some old undergarments next to the skin so long as the salve is used.

If we have to treat a particularly obstinate case, it will be advisable to take especial pains in removing the scales before we apply the salve. For this purpose we may not only use a hand-brush while the patient is taking the preparatory warm bath, but we may gently rub the diseased patches with benzole or with *green soap* (sapo viridis), or we may prepare a solution as follows:

Bicarbonate of soda, - -	Two drachms.
Water, - - - - -	Four ounces.

A piece of flannel may then be dipped in this solution and the scaly patches of skin gently rubbed with it until all the scales are removed.

In obstinate cases — that is, those which have often recurred in the same individual and have resisted other modes of treatment — the salve may be applied for five or six consecutive days, instead of three or four, as above directed. In fact, unless the diseased surface be very extensive, the salve may be used for six to ten days

without danger. If, however, there be a great many patches, extreme caution must be employed; and at the first appearance of swelling in the face or in the healthy skin around the diseased patches, or at the first complaint of indisposition on the part of the patient, the salve should be discontinued and the patient should cleanse the skin by means of a warm bath.

If the psoriasis affect the face also, this salve may be applied to the skin of the face by means of soft cloths, upon which the ointment may be smeared.

The pyrogallic acid can be used for the same purpose. It has the advantage over chrysophanic acid that it does not stain the skin to the same extent, and does not cause the same amount of irritation. It may be used essentially as has been directed for the chrysophanic acid. It may be employed in the following prescription:

Pyrogallic acid, - - -	Two drachms.
Vaseline, - - - -	Two ounces.

Mix well together and apply to the diseased patches after the patient has taken a warm bath.

While these two remedies are extremely valuable, in fact the best and quickest in their action that we possess, yet they have the disadvantage that they sometimes cause unpleasant and even serious irritation of the skin and of the kidneys. It is therefore advised that if the treatment of psoriasis by means of either of these acids be undertaken without the professional supervision of a physician, extreme care be employed. Under these circumstances it will be advisable to treat the patient by sections, as it were; that is, both arms may be treated, and subsequently both legs, and ultimately the trunk, if this also be affected. In every case of extensive psoriasis involving trunk and extremities, it will be better to place the patient in the hands of a physician for the reasons named; but if there be only a few scattered patches, especially at the elbows and the knees, the treatment above detailed may be employed without professional assistance

Ringworm.

Under the general term "Ringworm" are included several diseases of the skin, each caused by a parasite. These parasites are all of vegetable nature, and belong to the same general class of

TIÑA.
RINGWORM.

plants — the fungus family — as the yeast plant and the various molds which so often appear upon jelly, moist bread, etc. For convenience, ringworm may be considered under the following heads: The ordinary ringworm of the body, technically known as *tinea tonsurans;* ringworm of the scalp ; *favus*, another variety of ringworm of the scalp. Ringworm, that is the ordinary ringworm of the body, is not caused by a worm, as the name would imply ; in fact, it has nothing whatever to do with worms, directly or indirectly. The name seems to be derived from the form of the diseased patch, which is almost always circular, resembling, possibly, a worm when coiled up.

The disease consists essentially in the growth upon and in the skin of a microscopic plant, technically known as the *trichophyton tonsurans.* The growth of this plant in the skin causes irritation and inflammation, so that a certain amount of redness and even a slight swelling may occur. A symptom which is rarely absent is an intense itchiness.

If the course of the affection be closely observed, it will be seen that the beginning of the disease is a small grayish speck, which rapidly spreads in all directions from the common center. It is peculiar that, as the disease spreads on the outside it heals on the inside of the ring, so that in a few days there will be a ring of perhaps an inch in diameter, composed of this minute plant, and surrounding a circle of perfectly healthy looking skin, although this circle was two or three days before quite covered with the plant. A number of these rings may be formed near each other on the skin. These are apt to run together and make a large spot, which is bounded by an irregular, scalloped line.

The disease is highly contagious. Its occurrence in one member of a family is usually followed in a few days by its appearance on the skin of other members. Yet it is limited almost exclusively to children. The affection does not attack adults, even though the plants be intentionally rubbed upon the skin.

It is a curious fact that this disease attacks several of the lower animals, especially horses and dogs, and that it may be transmitted from them to man. It is probable that many cases originate in this way, although opportunities enough are afforded for the communication of the disease in the intimate contact of children at play.

There is also a form of ringworm in which there can be seen upon close inspection numerous little vesicles or blisters at the edge

of the diseased patch. This does not differ in any essentials from the common form of ringworm, and yields to the same treatment.

The development of ringworm is favored by warmth and moisture and by the accumulation of scales upon the skin. Hence the occurrence of the disease is favored by lack of cleanliness and by the long-continued use of the same garments without washing. It is especially often found in those who inhabit damp dwellings, and in those who habitually use flannel underclothing.

Ringworm of the scalp is essentially the same disease as ringworm on other parts of the skin; it consists in the growth of a microscopic vegetable, which causes a light inflammation and irritation of the surrounding skin. In consequence of the presence of the hairs, however, ringworm of the scalp is a far more obstinate affection than ringworm on parts of the body not covered with a thick growth of hair, for these miscroscopic plants grow down into the little sacs or *follicles* which surround the roots of the hairs; hence it is far more difficult to destroy and eradicate the parasites when they acquire a foothold on the scalp than it is when they grow upon the surface of the skin elsewhere.

The fact that these plants grow into and fill up the hair follicles explains another and characteristic feature of the disease, namely: that the hairs become brittle and lose their natural luster; in a short time most of these hairs become broken off close to the scalp. In course of time it may even happen that a considerable patch of the scalp becomes quite bald. The hairs are not, however, permanently destroyed, that is, so soon as the parasite is removed the hairs grow again as before.

Ringworm of the scalp often exists for some time before it is discovered; because the little elevation caused by the growth of the plant is concealed by the rest of the hair. It may thus happen that the diseased patch has attained a diameter of an inch or more before it is detected; and in this case there are usually other patches in different parts of the scalp, of greater or less size. Ringworm of the scalp usually causes considerable itching and scratching, as a result of which salt rheum or eczema is apt to follow. The eczema causes the discharge of watery fluid, and this dries so as to mat the hairs together, hence there may result from a simple ringworm of the scalp an extensive sore on the head, which dis-

charges profusely and causes the patient great annoyance. This condition is popularly known as "scald head."

When ringworm affects the beard, it runs essentially the same course as on the scalp; in this situation it is known as "barbers' itch." There are several affections of the hairs of the beard, which are also designated by this term; the others are not contagious, but ringworm of the beard is.

This form of barbers' itch causes the appearance of pimples in and around the roots of the beard; these often result in the formation of pustules in and around the hair follicles. Sometimes these pustules occur close together, and coalesce, so as to form blisters of considerable size; when these break, and the matter in them dries, a crust is made by which the hairs are matted together.

In some cases of disease it will be impossible to recognize exactly the nature of the disease without a microscopic examination of the scales and crusts. In case of ringworm, whether of the scalp or of other parts of the skin, there will be found upon microscopic examination, numerous round or oval bodies, which are often arranged in chains; and it is sometimes possible to distinguish in the short, broken hairs, long chains composed of the parasite which causes the disease.

Treatment.—Ringworm on parts of the skin which are not covered with hair is usually cured very easily. The principle of treatment consists simply in the application of some material which destroys the vegetable parasite; so soon as the plant is killed the irritation subsides, the crust is thrown off, the skin resumes its natural condition.

A considerable number of agents have been used for this purpose; among household remedies may be mentioned kerosene oil and a solution of borax, as follows:

Borax,	- - - - -	Half an ounce.
Water,	- - - - -	Half a pint.

Some of the borax remains undissolved at the bottom of the vessel, but this is useful in order to keep the solution at full strength.

While these remedies are usually effectual, yet many people object to the application of kerosene, which is moreover irritating as well as unpleasant, and is apt to cause some swelling and pain of the skin around the diseased spot. For these reasons various other

remedies are to be preferred in the treatment of ringworm. Among those most employed by physicians are the following:

Hyposulphite of soda, - - -	One ounce.
Dilute sulphurous acid, - - -	Two drachms.
Glycerine, - - - - -	One ounce.
Water, - - - - - -	Four ounces.

This should be applied to the diseased patches by means of a stiff brush or a coarse cloth, which is to be dipped in the lotion.

Saturated solution of sulphurous acid, -	One ounce.
Water, - - - - - - -	Three ounces.

The removal of the parasites is hastened by the use of a remedy in solid form, which can, therefore, be kept in contact with the skin constantly, and not simply applied at intervals, as is necessary when liquids are used. If the disease be located on the face, an ointment can be applied at night and allowed to remain till morning; for this purpose any one of several ointments may be used, as follows:

Ammoniated mercury, -	Twenty grains.
Red oxide of mercury, powdered, -	Twenty grains.
Simple ointment, - - -	One ounce.

Mix thoroughly and apply directly to the skin, rubbing the salve vigorously into the pores of the skin.

The simple *ointment of mercury* will also be found efficient. In most cases, too, the ordinary sulphur ointment can be successfully used for destroying the parasite.

This affection is entirely a local disease of the skin, and requires no internal treatment.

Ringworm of the scalp is a far more troublesome and obstinate affection to cure, not because the parasite is any more difficult to destroy, but because it is extremely difficult to introduce the remedy into the follicles of the hair, which are a continual breeding place for these organisms. It will often happen that by a few applications of one of the remedies above given the disease will entirely disappear from the scalp, and the patient will consider himself cured; but in a few days or weeks it becomes evident that the ringworm has started again in the same place.

It is, therefore, necessary to take especial pains to introduce the various agents used for killing the parasites into the hair follicles. For this purpose the first requisite is to shave the head closely, so as to remove all the hairs from the diseased patch and

from its immediate vicinity. After this has been done there may be rubbed into the scalp daily one of the following ointments:

Hyposulphite of sodium, - - -	One drachm.
Vaseline, - - - - -	One ounce.

Or,

Salicylic acid, - - - -	Twenty grains.
Vaseline, - - - - -	One ounce.

In some cases good results may be obtained by brushing the surface thoroughly with strong tincture of iodine.

Yet in many instances the most careful treatment in this way will prove ineffectual; the disease will seem to have disappeared, treatment will be discontinued, but in a few days the parasitic growth reappears. In such cases it becomes necessary to *pull out* the hairs over the diseased patch. This is a most tedious and laborious procedure, and quite painful to the patient. Much trouble will often be experienced with children in persuading them to submit to it. But there is no other means which can be relied on to secure recovery, since the hair follicles are full of the parasites, which can be reached only after the hair has been removed. This process does not, of course, destroy the hairs, which grow again in due time; in fact, it often saves the hairs, since the disease would otherwise result in the destruction of the roots of the hair and permanent baldness in consequence.

There are cases in which even the pulling out of the hair does not suffice; in these instances it becomes necessary to apply a light blister — plaster of cantharides — until the skin is quite red, after which the usual lotions may be used.

As to the remedies themselves nothing further need be said; any of the prescriptions above given are quite efficient in destroying the parasites. The difference in treatment required by ringworm of the scalp consists merely in the care necessary to bring the lotion into the hair follicles.

In that form of "barber's itch" which is really ringworm of the beard, the same general treatment is necessary The face must be kept closely shaven, and the lotions applied as already directed in the treatment of ringworm affecting the scalp. In some cases it will be found necessary to pull out the hairs of the beard also, and to apply one of the salves or lotions mentioned after the hair follicles have been thus exposed.

In all cases of ringworm affecting a hairy part of the skin, patient and physician alike must be prepared for a long and tedious course of treatment; yet the patient should, for his own sake, never despair nor give up treatment, for he may be sure that the disease can be completely and finally eradicated, even though it require months to accomplish. On the other hand he may be sure that if allowed to proceed the disease will ultimately cause baldness of the affected spots.

Favus.

This affection, technically called *tinea favosa*, is by no means so common in the United States as in certain parts of Europe. Yet it occurs here with sufficient frequency to require a description and directions for treatment as a part of every household manual of medicine.

Favus is caused by another vegetable parasite, a member of the fungus family of plants, the *achorion schoenleinii*. This parasite grows only on the hairy parts of the body as a rule, though it occasionally appears on other parts of the skin.

In this disease crusts are formed in and around the hairs; they are often matted together so as to constitute an enormous scab over a large part or the whole of the scalp These crusts are of a yellowish color, often somewhat saucer-shaped, and are pierced in the middle by a hair. These crusts are formed almost entirely of the vegetable growth itself.

When the crusts are removed there is observed underneath a reddish surface from which the skin has been separated; in bad cases deep ulcers are found underneath the crusts. When these masses are removed by treatment the skin heals again, but in many cases the sites of the disease remain permanently bald; this results from the fact that the hair follicles are entirely destroyed by the growth of the parasite. In aggravated cases, where the disease has been neglected for months or years, the entire scalp may be absolutely devoid of hair; such cases are occasionally seen, especially among the low-caste Hebrews of Poland.

This disease affects the lower animals as well as man, and is particularly common among dogs, cats and mice. This is one of

the affections which, when it occurs in dogs, is called the "mange." It seems probable that the disease is often communicated to children by these animals.

Treatment.—The first object of treatment is to remove the masses of the parasites which constitute the crusts on the head. This must be done with care, since the scalp beneath will usually be found raw and ulcerated. In order to remove these crusts the head may be first thoroughly oiled, and may then be enveloped in a flaxseed poultice, which may be changed every two or three hours during the day. After ten or twelve hours' application of the poultice, the crusts are usually softened and can be removed by the hands without causing much pain. If they are still hard and adhere closely to the scalp the removal can be facilitated by soaking the head in hot water. After the crusts are removed the hair should be carefully cut or shaven around the diseased spots. There may then be applied one of the following ointments:

Perchloride of mercury,	-	Fifteen grains.
Simple ointment,	- -	
Vaseline,	- - -	Each half an ounce.

Mix and apply thoroughly to the scalp. If the scalp be ulcerated extensively the ointment should be made somewhat weaker, say five grains of the perchloride of mercury to the ounce; and care should be taken not to rub the ointment over the ulcerated spots.

Carbolic acid,	- -	One drachm.
Flowers of sulphur,	-	Two drachms.
Tincture of iodine,	-	Half an ounce.
Vaseline,	- - -	An ounce and a half.

Mix and make an ointment.

The tincture of iodine alone may be applied by means of a brush; or the following may be employed instead:

Hyposulphite of soda,	-	Ten grains.
Vaseline,	- - -	One ounce.

Most individuals who suffer from favus are in a poor state of health, and require general treatment. In most cases the following can be administered with advantage:

Tincture of the chloride of iron,	Six drachms.
Tincture of nux vomica, -	One ounce.
Compound tincture of gentian,	To make four ounces.

Mix and take a teaspoonful in a half wineglassful of water half an hour before meals.

Liver Spots.

Under this term there are included several distinct affections. The first of these is known in medicine as *tinea versicolor*. This consists of patches slightly elevated above the skin, and exhibiting an exquisite reddish brown, or *fawn* color. These patches vary much in size, and have no regular outline; they occur with especial frequency at the upper part of the chest and at the root of the neck, whence they may spread in various directions. These patches are raised somewhat above the surface of the skin, and are usually quite itchy; they cause no pain, and do not affect the general health. When scraped with the finger nail, the fawn-colored material comes off from the skin in the shape of minute white scales, leaving the skin underneath a little red, but otherwise healthy.

These patches consist of a network of very fine vegetable fibres; they are in fact merely patches of *mold*, quite similar to the scum which appears upon jelly.

Treatment.—The disease is readily cured by the application of any remedy which destroys this vegetable parasite. It is, of course, desirable to make use of some agent which will not irritate the skin. For this purpose there may be used the following prescription:

Hyposulphite of soda, - - -	Six drachms.
Glycerine, - - - - -	Two ounces.
Water, - - - - -	Four ounces.

Mix, and rub thoroughly over the patches, by means of a flannel or a stiff brush. This treatment should be continued for a week or ten days after the skin is apparently again in its natural condition; since, otherwise, there may remain some seeds of the plant, which will soon start again into vigorous growth.

This parasite grows with especial frequency when the skin is kept moist and warm; and its development is favored by wearing flannels next to the skin, by residence in moist, damp dwellings, and by the use of imperfectly dried towels and bed linen.

Another form of liver spots is the variety popularly known as "moth spots." These consist of yellowish or brownish spots, which occur especially around the angles of the eye and upon the

forehead; they are especially frequent in this latter situation during pregnancy, and in the years immediately subsequent to it. They seem to occur also with especial frequency in females who are afflicted with diseases of the womb.

These spots are due to the deposit of an unusual amount of coloring matter in the lower layers of the skin. They have no significance as an evidence of disease, and occasion the patient no distress, beyond the annoyance to his vanity. They can sometimes be removed by the use of the following lotion:

Corrosive sublimate, - - - -	One grain.
Water, - - - - - -	One ounce.

This may be rubbed thoroughly upon the spots, by means of a piece of flannel or other coarse cloth. Sometimes a saturated solution of the hyposulphite of soda can be made to answer the purpose. The corrosive sublimate solution must be used with caution, since this substance is a deadly poison; and when the spots are located in the vicinity of the eyes especial care must be taken that none of the mixture gets into the eye.

Fever Blister—(Herpes).

This affection is known by various names, according to its location; when it occurs upon the lips it is popularly called "fever blister" or "water blister;" when upon the side of the body, it is generally designated "shingles."

Herpes consists in the formation of watery blisters, several of which lie in close proximity, each surrounded by a reddened and inflamed base. The vesicles do not burst, but their contents become somewhat milky, and finally dry up. The development of the blisters is attended with itching, burning, and finally with a smarting which amounts to acute pain. In many cases one blister, or crop of blisters, will be followed by a second before the first has dried up.

In many cases a certain amount of fever and general indisposition precedes the development of the blisters; in other instances herpes appears, especially on the lips, in the course of acute diseases. It is especially common during the convalescence from pneumonia.

Herpes may occur on the lip alone, though in many instances blisters appear at the edge of the nostrils, and perhaps inside of the mouth and on the palate. The blisters may occur on other parts of the face as well as on the lip, especially on the cheeks and forehead. Sometimes, too, the eruption occurs on the eye, when it is quite painful and is apt to alarm the patient.

Among the other parts of the body which are especially liable to the occurrence of the eruption, are the genital organs of both sexes and the sides of the chest. When it occurs in the former situation it is apt, especially if combined with a guilty conscience, to excite suspicion of venereal disease. Only a practiced eye can distinguish between the latter affections and an innocent eruption of herpes. When the rash appears in this locality in females, it excites considerable burning pain and much annoyance. Some women suffer from herpes on the genitals at every menstrual period.

Herpes occurring on the side of the chest is found to follow the edge of a rib, perhaps all of the way from the backbone to the front of the chest.

The appearance of the eruption is often preceded by neuralgia in the side, and perhaps even by attacks of colic, and by difficulty in breathing. After two or three days of this feeling the patient perceives a burning sensation in the side, the skin being often somewhat tender upon pressure. With the appearance of the rash, the burning pain subsides, but the skin becomes extremely itchy. Herpes of the side follows pretty accurately the track of some one of the nerves, from which fact it has been assumed to be essentially a nervous disease.

Herpes of the side — shingles — may appear at any time of life, even in infants, but is most frequently observed between ten and twenty-five years of age; men are more susceptible than women; and spring and fall seem to furnish more cases than the other seasons of the year.

The eruption of shingles begins with a reddening of the skin, upon which a few vesicles or blisters as large as the head of a pin appear. In the course of a few days these blisters have increased in size, and may run together so as to form vesicles as large as a bean. The contents of the blisters is at first a clear watery fluid which gradually becomes cloudy and yellow; in ten to fifteen days the blisters begin to dry up and are replaced by blackish scabs.

The disease lasts from two to three weeks, and the eruption leaves no permanent scar.

A curious fact about shingles, as well as about herpes generally, is that it occurs only on one side of the body or face. It is often remarkable to see how abruptly the rash ends exactly at the middle line of the body. Yet cases do occur in which both sides of the body are affected at the same time.

Treatment.—Herpes is a perfectly harmless and innocent disease; the popular impression that the patient would die if the rash should extend entirely around the body is, of course, an error. It seems to have arisen from the fact that the rash rarely appears on both sides of the body at the same time. Yet instances have been known in which herpes zoster or "shingles" did appear on both sides at the same time, and did encircle the body so far as it is possible, yet the patients recovered.

The object of treatment is simply to diminish the irritation caused by the rash and to prevent any aggravation of the difficulty by tearing open the vesicles. Herpes of the lips rarely requires any attention; if it be recognized early it may be to a certain extent cut short by a free and repeated application of the tincture of camphor (spirits of camphor). Herpes occurring elsewhere may be treated by the application of some soothing ointment, such as vaseline, and may be dusted with powdered starch. When it occurs on the sides, as shingles, it becomes necessary to protect the blisters and the surrounding inflamed skin from the friction of the clothing. For this purpose a piece of soft rag may be smeared with vaseline, laid over the blistered surface, covered with flannel, and kept in place by narrow strips of adhesive plaster.

When herpes occurs upon the genitals, it may be advisable to protect the inflamed surface in the same way by the use of soft rags covered with vaseline or soaked with sweet oil. There is no use in applying ointments or powders to hasten the disappearance of the eruption, since this must run its course.

If herpes occurs often in the same patient, attention should be directed to the general health. Sometimes it becomes necessary to relieve habitual constipation; at other times there is decided pallor; if the appearance of the rash be preceded and followed by

neuralgic pains in the side, benefit will be derived from the use of the following prescription:

Sulphate of quinine, - - -	Forty grains.
Reduced iron, - - - - -	Twenty grains.
Extract of nux vomica, - -	Four grains.

Mix and make twenty pills; take one morning and night.

In elderly people, especially, and sometimes in others, an attack of shingles is followed by obstinate neuralgia in the side, which persists for days or weeks after the rash is entirely healed. In this case it will be necessary to employ, in addition to the above prescription, some form of opium. The best form is a hypodermic injection of one-eighth of a grain of morphine, inserted under the skin of the painful part.

Barbers' Itch—(Sycosis).

This is the technical term for what is popularly known as "barbers' itch." There are, as has been said, three varieties of barbers' itch—that is, there are three distinct affections, which attack the bearded part of the face and cause a pustular eruption. First among these is "ringworm," which has been already described; the second form is merely eczema, affecting this part of the skin. In addition to these affections there is, however, a pustular inflammation, which affects the hair follicles of the beard. This form of barbers' itch is not contagious, but is often very obstinate. It is especially apt to occur in those whose health is broken down by debauchery, intemperance or dyspepsia.

There appear, oftentimes first on the upper lip, just below the nostrils, a number of pimples; at the same time the skin in the vicinity becomes swollen, red, hot and painful. In a short time these pimples show the formation of matter at their tops, thus becoming *pustules*. Upon close inspection it will be seen that each of these pustules is pierced by a hair. In a short time the disease spreads and appears, perhaps simultaneously, on different parts of the face, more especially around the chin and in front of the ears. The hairs are apt to fall out to a considerable extent, so that bare patches appear. If left without treatment this form of sycosis may last for years.

Treatment.—In every case attention should be directed to the general condition of the patient, and any derangement of function of the internal organs, such as dyspepsia or constipation, should be remedied so far as this is possible.

Then the face should be carefully shaven, and the beard kept short by daily shaving. This is apt to be a painful process at first, but it must be done. If there be much thickening of the skin, as is often the case, the treatment should be begun by the application of the *ointment* of *mercury*. The different pustules should be carefully opened, their contents gently pressed out and the ointment thoroughly rubbed into the surface. In some cases it may be necessary to apply light poultices or flannel cloths wrung out in hot water, until the excessive pain and heat of the skin have subsided. In case the eruption is quite extensive, it will be advisable not to use the mercury ointment in full strength, but to employ the following mixture :

Ointment of mercury, - - -	Half an ounce.
Diachylon ointment, - - -	Half an ounce.

To this there may be added sufficient olive oil to make a soft and agreeable salve.

In case there is not much thickening of the skin, and but little redness and swelling, the rash can often be subdued by the diachylon ointment alone ; if this be not sufficient, one-half or one-third its weight of mercury ointment may be added to it. In every case in which mercurial ointment is employed for weeks at a time, attention should be given to the condition of the teeth ; so soon as the least tenderness is felt when the teeth are pressed firmly together, the mercury ointment should be discontinued.

This form of sycosis is, at best, an obstinate affection, and will require weeks or months of careful treatment.

Baldness.

Baldness may be partial or complete, acquired or hereditary. It is sometimes an affection by itself, at other times merely the symptom of other diseases. It may result either from disease of the scalp, such as favus, syphilis or eczema ; or it may be the consequence of a general failure of nutrition, which manifests itself by

changes in the body elsewhere. This latter form of the affection is manifested especially in elderly people.

In some individuals there is congenital absence of the hair; that is certain parts of the scalp are bald from birth on. In some other cases these bald patches first appear in the early years of life. Such congenital baldness is usually only partial, there being in most cases one or more spots of limited extent on which no hair grows.

Baldness is, however, in most cases acquired usually in advanced life. The hair begins to fall out first on those parts of the head bordering upon the temples and around the crown of the head. In many cases there is a hereditary tendency to early baldness, which is distinctly marked in several generations.

Several of the infectious diseases are usually accompanied by a falling out of the hair; among these are typhus fever, scarlet fever, measles and syphilis. In most of these cases the hair grows again so soon as the individual has recovered from the acute attack. The hair may also fall out when the vital powers are diminished from any cause; it is a not infrequent occurrence in nursing women.

In all these cases the treatment should be addressed to the general health; the hair requires no special attention, provided it be free from the various diseases which have been enumerated on previous pages as causes of baldness.

It is interesting to know that baldness is far more common in men than in women. Many explanations of this familiar fact have been advanced; a popular one, especially with the male sex, is the idea that excessive use of the brain is accompanied by interference with the growth of the hair. This idea has, however, but little support in fact, though it is true that baldness is more common among those engaged in intellectual pursuits than among hand laborers. Yet this fact can be explained more plausibly by the fact that brain workers rarely have the same degree of physical health as those whose occupations keep the body in a state of robust vigor.

It has been supposed, also, that men have less fatty tissue underneath the scalp than women; and that in advanced years the scalp becomes tightly stretched over the skull, so that the supply of blood is to a certain extent cut off from the hair in men, while in women the excess of fat still secures ample circulation of the blood

to the hair. This seems a more plausible explanation, though still lacking several facts for its support.

Another form of baldness is one which often occurs in childhood and youth, and is called *alopecia areata*. In this disease the hair begins to fall out at one or more spots, and the scalp underneath is found to be very white and dry. It will be found that although there is apparently no disease of the skin on these bald spots, yet the hair follicles are very small, or have perhaps entirely disappeared. When first discovered, these spots are usually half an inch or more in diameter; they usually increase in size, slowly but surely. After a time, the spread of the baldness may stop spontaneously, or it may progress until the greater part of the head is quite bare, only a few tufts of hair scattered over the scalp remain; the rest of the head may be as smooth and soft as the skin of an infant.

This affection is most frequently met with in children who are somewhat naturally delicate, or whose vital strength has been broken down by prolonged disease. Such children are especially apt to suffer from the "green sickness" (chlorosis) or scrofula.

Treatment.—The treatment of baldness will in every case be determined by the supposed cause. In the form last described — alopecia areata — the baldness is supposed to be due to a disease of the nerves. Treatment will therefore include attention to the general health. If the patient be evidently debilitated, provision must be made for nourishing food, air and exercise. If there be evidence of chlorosis, the following prescription may be given:

Fowler's solution, - - - -	Two drachms.
Tincture of nux vomica, - -	Four drachms.
Syrup of the iodide of iron, - -	Ten drachms.
Syrup of orange peel, - - -	One ounce.
Water, - - - - - -	To make four ounces.

Mix and take a teaspoonful four times daily; if the child be under 12 years of age the dose must be diminished correspondingly.

Locally the treatment consists in the application of blistering fluid to the bald spots. The hair around the spots may be shaven, and the spot should be painted every day or two with the tincture of cantharides (Spanish flies). After a time, which may vary from

a few days to weeks, there will be observed a slight growth of short soft, downy hairs, which are apt to be of a lighter color than the surrounding hair. The treatment should be persevered in, however, until the hair on the bald spots becomes so long that the application of the fluid to the skin is no longer possible.

It is surprising to observe what can be and has been done in this way in the restoration of the hair; the writer saw in a London hospital a woman, 27 years old, who possessed a beautiful head of thick, long hair; this individual had at the age of 12 years become almost completely bald, only a few tufts of hair remaining on the head; and this condition had lasted for six years. For some weeks after treatment with the blistering fluid was begun, there was no appearance of hair to encourage further effort. At the end of two months there appeared a few thin, downy hairs, but it was not until six months of treatment had elapsed that the growth of the hair was at all satisfactory.

There are, however, cases in which the hair follicles are quite destroyed, and in such cases no mode of treatment can hope to produce hair. In these instances it will be observed that the scalp does not present the usual appearance: that is, it is not studded all over with minute openings or "pores;" the skin is smooth and glistening. When this condition exists it is rarely possible to procure the growth of the hair; and if after a few weeks' trial with the blistering fluid there be no appearance of hair on the bald spots, the attempt should be abandoned.

Hair Dyes.

The color of the hair varies in the age of the individual, and is dependent upon the presence in the shaft of the hair of certain coloring matters which are deposited as fine granules, set closely together. When the hair becomes gray there is a gradual decrease in the quantity of this coloring matter. In some individuals no coloring matter is ever deposited in the hairs, and they are from birth to old age provided only with white hair; such individuals are called *albinos*. There is usually less coloring matter in other parts of the body than is usually found; thus, the colored ring around the pupil of the eye — the *iris* — is sometimes quite devoid of coloring matter, so that it looks pink from the reflection of light which comes from the interior of the eye; the skin, too,

is in such individuals extremely white, from the small quantity of coloring matter contained in it.

The change in color, whereby the hair becomes gray, is usually a gradual process; yet instances occur in which the hair becomes suddenly gray in the course of a few months. This is apt to happen after some severe acute illness, such as scarlet fever. There is a popular belief that in consequence of violent emotion, such as fright, the hair can become suddenly gray. It is said that Marie Antoinette experienced such a sudden change in the color of the hair in consequence of the terror inspired by the horrors of the French Revolution. But little reliance can be placed upon such legends; yet there are well authenticated instances in which the hair has, in the course of a few days, exhibited a decided change in color.

In one case the hair became suddenly gray during an attack of acute mania; in another the hair of a soldier, which had been black before a battle, was found to be gray after the conflict.

The prevalence of grayness of the hair has occasioned an immense demand for hair dyes; and enormous quantities of mixtures are sold under various names for this purpose. All of these are compounds either of lead or of nitrate of silver or of sulphur. Of these three substances the least injurious is undoubtedly sulphur; yet sulphur alone is not always reliable for the purpose desired. Even sulphur, when used in excess, can be decidedly injurious to the system; the nitrate of silver affects the general system sooner than sulphur, and has the disadvantage that it colors the skin as well as the hair. The most injurious of all is the lead, which is not infrequently the cause of *lead poisoning*, indicated by severe attacks of colic and by paralysis, as has been described in previous pages.

In order to indicate to the reader the composition of the ordinary hair dyes, the following analyses, made by an eminent British chemist, are presented:

Sample No. 1, Hair Restorer.—The sample examined consisted of a colorless fluid and a grayish yellow deposit. The deposit consisted almost entirely of sulphur, with a minute quantity of carbonate of lead. The solution contained acetate of lead and glycerine.

In a bottle containing ten fluid ounces, forty-four and eight-tenths grains of sulphur, and lead corresponding to twenty-one and eight-tenths grains of the acetate of lead, were found.

Sample No. 2, Hair Restorer. — The bottle examined contained eight and one-half fluid ounces of mixture, composed, like the last, of a colorless fluid and a yellowish gray powder, this latter consisting of sulphur, with a trace of carbonate of lead, the solution containing acetate of lead and glycerine.

The results of an analysis of the contents of the eight and one-half ounce bottle indicated seventy-five and six-tenths grains of sulphur, and an amount of lead corresponding to eighty-seven grains of acetate of lead.

Sample No. 3, Hair Restorer. — Like the preparations previously noticed, this consisted of a colorless fluid and a yellowish gray deposit, and also contained the same ingredients — sulphur, acetate of lead and glycerine, the deposit in this case being pure sulphur.

A bottle containing eight fluid ounces furnished eighty-one and eight-tenths grains of sulphur, and lead corresponding to forty-five and one-tenth grains of acetate of lead.

Another preparation was found to be similar to the others, the deposit containing sulphur, sulphate of calcium, and a trace of sulphate of lead, the solution containing acetate of lead, glycerine and a trace of acetate of calcium. In distinguishing this preparation by the epithet vegetable, the maker has allowed his inventive faculty to overstep the bounds of truth, and has given moralists another instance of the common commercial practice of calling things by their wrong names.

A bottle containing six fluid ounces furnished seventy and two-tenths grains of sulphur, mixed with sulphate of calcium ; also, lead corresponding to fifty and eight-tenths grains of lead.

As a matter of fact no hair dye has been invented which is absolutely free from injurious effects. The numerous compounds advertised as " purely vegetable " dyes, are found upon analysis to contain one of the three substances named, as reported in the above analyses. Yet various vegetable substances are capable of affording materials which can be used as hair dyes. Among these is an extract made from walnuts. A few formulæ are appended as examples of hair dyes :

Pyrogallic acid, - - -	Fifteen grains.
Pyroligneous acid, - -	An ounce and a half.
Rectified spirits, - - -	An ounce and a half.

This mixture is to be marked number one.

Nitrate of silver, - - - -	Fifty grains.
Distilled water, - - - -	Three ounces.

Dissolve, then add a solution of strong ammonia until the cloudiness which appears at first disappears again. This is to be marked number two.

The hair should be thoroughly washed with soap and water, and then number one should be applied by means of a piece of flannel. Immediately thereafter number two should also be used to wash the hair. Another formula is the following :

Nitrate of silver, - - - -	One drachm.
Acetate of lead, - - - -	Twelve grains.
Distilled water, - - -	Four ounces.

Still another may be made with lead alone :

Sugar of lead, - - - -	Forty grains.
Glycerine, - - - -	One ounce.
Distilled water, - - - -	Five ounces.

In certain Oriental countries the use of hair dyes seems to be almost universal. The following account of the custom in Persia is taken from Neumann's Treatise on Diseases of the Skin :

" In Persia the hair remains black from childhood to old age, as the result of the use of dyes. These are always employed in the so-called Turkish bath. The process is as follows : First, after remaining for a short time in the bath, the hair is well soaked and washed with water, whereby it is cleansed from fat. Second, they take some henna powder, mix it with warm water till it attains the consistency of cream ; this is then smeared upon the hair. This paste is allowed to remain upon the hair for more than an hour, and is then washed off with warm water. It will now be observed that the hair which was previously of a light color has acquired a dark orange or saffron color. After this the powdered leaves of the indigo plant are rubbed into a paste with water, and the hair is again smeared. This paste remains for an hour and a quarter and is then washed off. The dyeing process is now complete, though the dark hue appears in the hair only several hours later through oxidation of the indigo.

" If it is desired to color the hair not black, but chestnut brown, they take one part of the henna and three parts of the pulverized indigo leaves. These are smeared upon the hair after the fat has been removed with soap and water, as in the former case.

The longer this paste lies the darker is the shade. One hour is usually enough to produce a light brown color, and an hour and a half for the dark brown. If the first dyeing be found too light, the paste must be renewed.

"Since both powders, henna and indigo, are quite harmless, even upon accidental contact with the eyes, their employment causes no injury to the body or to the hair. The Persians, indeed, maintain that this dyeing process strengthens the scalp, a statement which they seek to prove by the fact that baldness is a rare occurrence among them.

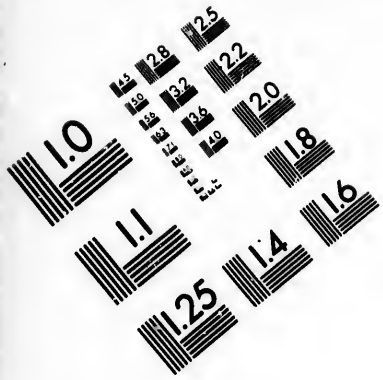
"The henna retains its power a long while, but the indigo powder takes up moisture and then becomes weak in color. The result is that the powder when exported from Persia is usually quite useless upon its arrival. According to Pollak, a substitute can be prepared as follows: Take eight grains each of pulverized commercial indigo, grape sugar, and a meal made from peas or beans; mix these with two ounces of water and add a little yeast. Put the vessel in a warm place, and employ the liquid for dyeing purposes only when fermentation is going on. After the hair has been smeared once or twice with henna, this fermenting liquid can be applied, with the production of more or less dark color. As the process is a tedious one, it is better adapted for ladies, since their hair will need a repetition of the process only after several months. It is self-evident that the fermenting indigo liquid must be prepared fresh for every dyeing, since the dye disappears so soon as the liquid ceases to ferment."

Erysipelas.

This disease, sometimes called Saint Anthony's Fire, is more properly described among the diseases affecting the general system than among the skin diseases; yet, in many cases, it appears to be not a general but a local disease, being limited to a circumscribed part of the skin. Many other affections than true erysipelas are often designated by this name. Many people are accustomed to regard any redness of the skin accompanied with heat as erysipelas.

True erysipelas is an acute inflammation of the skin, which may affect any part of the body, but is especially often met with

ERISIPELA.
ERYSIPELAS.



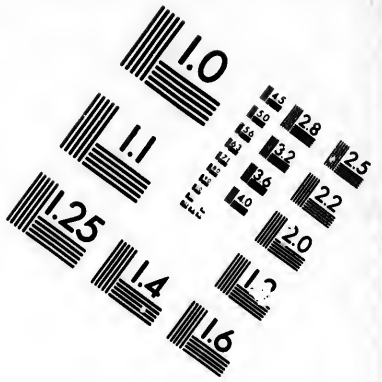
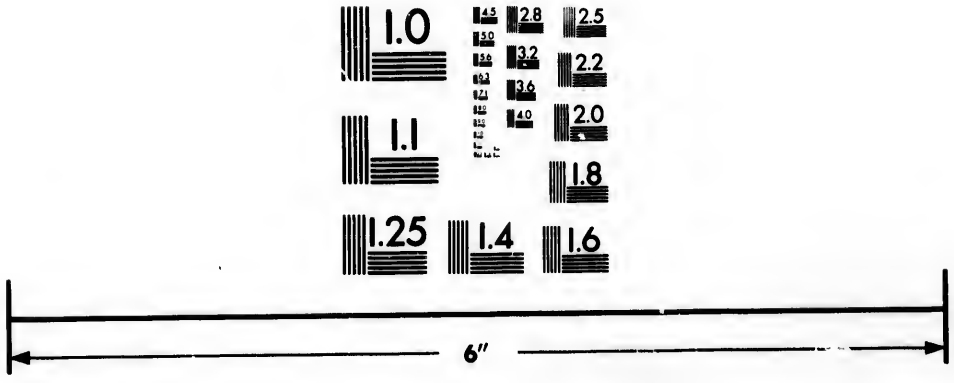


IMAGE EVALUATION TEST TARGET (MT-3)



Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

2.8
3.2
2.5
2.2
2.0

on the face. The skin is red, shiny and swollen; the patient has a sense of pain and of burning in the part.

The disease is ordinarily preceded by a severe chill and high fever; if the face be the part affected, there may occur also vomiting, delirum and even stupor. The symptoms become more severe when the inflammation appears in the skin.

The appearance of the skin varies somewhat according to the part affected; but there is always this characteristic feature, that the inflamed skin is sharply marked off from the healthy skin by the difference in color. The outer layer of the skin is often raised in the shape of small blisters, whose contents may be watery or may contain matter. After a time these blisters dry into black scabs.

When the inflammation subsides, the skin loses its red color, but remains swollen for a considerable time; the hairs of the affected part fall out, but grow again subsequently. Sometimes a series of boils and abscesses follow in the wake of erysipelas, and at times a considerable part of the skin mortifies and is removed by suppuration.

Erysipelas occurs either as scattered cases which apparently have no connection with one another, or in epidemics. In the latter form it is especially apt to attack patients who are suffering from wounds, injuries or surgical operations. Until the introduction of certain recent improvement in methods of surgical dressing, erysipelas was the scourge of hospitals. It often happened that the disease would sweep an entire ward of surgical patients, attacking every one that had been operated upon; many cases which would have recovered easily from the effects of the operation died of the erysipelas.

Aside from the occurrence of this disease in the wards of hospitals, it is frequently met with in private practice among those who have not been exposed to contagion. These are the so-called *sporadic* or scattered cases. In these cases erysipelas occurs most frequently in the face; it has been ascertained that twenty cases of facial erysipelas occur to one case of the disease in other parts of the body. It is especially apt to begin on the side of the nose; often commencing as it seems in some scratch on the mucous membrane of the nostril, or in a sore of the nostril or lip. The skin just under the eye, extending to the side of the nose, becomes somewhat painful and itchy; in a few hours the redness appears

accompanied by the symptoms of constitutional disturbance — chill, fever, vomiting, etc. — detailed above. The redness and swelling extend over a considerable part of the face, often causing great deformity for the time being. One or both eyes will be closed entirely by the enormous swelling of the lids; the nose, too, is very much thickened, and the nostril is thereby so much diminished in caliber that the patient is often compelled to breath entirely through the mouth. In many cases the inflammation extends upward over the scalp, and may cause great danger to life by attacking the membranes of the brain. Much or all of the hair may be lost in this disease, but the baldness is only temporary.

The symptoms of inflammation begin to subside on the fourth or fifth day, and in a few days more the skin usually resumes its natural condition, except that the outer skin peels off in large flakes. Sometimes an affection of the eyes remains for a considerable period after the inflammation of the skin has subsided.

This is the usual and favorable termination of facial erysipelas. But it sometimes happens in erysipelas of the face, and frequently when the disease affects other parts of the skin, that the inflamma- does not subside so quietly. The redness and pain may diminish considerably, but the swelling remains; and it will be found that the skin has a peculiar soft, doughy feel; if the finger be pressed firmly on the part a depression remains for a number of minutes after its removal. These symptoms generally indicate that matter has formed in the skin; in this case recovery will not take place until the skin be opened and the matter permitted to escape. This is absolutely necessary, since otherwise the pus will burrow under the skin, and even downward between the muscles, resulting in a condition which may seriously impair the usefulness of a limb, or even cost the patient his life. Even when promptly opened, the abscess (collection of matter) may run a long and tedious course, and cause mortification of the skin and of the muscles underneath; sometimes in spite of all treatment, it ultimately exhausts the strength of the patient, and causes a fatal result.

Erysipelas of the face often occurs several times in the same individual; in fact, there are those who suffer from it almost every year during the spring months. In general, erysipelas is more prevalent during the spring and fall than at any other times of the year.

Treatment.—The treatment must always be adapted to the patient; and the constitutional treatment is, therefore, of far more consequence than the application of remedies to the inflamed skin.

If the individual be at the beginning of the attack somewhat debilitated, or if he be evidently much exhausted by the onset of the disease, it is extremely important that his strength should be sustained in every possible way. For this purpose we rely upon iron and quinine. The following prescription may be given:

Tincture of the chloride of iron,	One ounce.
Sulphate of quinine,	One drachm.
Tincture of nux vomica,	Half an ounce.
Syrup of orange peel,	Two ounces.
Water,	To make four ounces.

Mix, and take a teaspoonful in water every four hours.

Sometimes the pain is so intense that it becomes necessary to administer opium. Twenty drops of laudanum may be given every three or four hours until the pain is somewhat allayed.

For application to the skin itself one of the best remedies is the following:

Tincture of opium,	One ounce.
Liquor plumbi sub acetatis (lead water),	Five ounces.

Mix and apply by saturating soft cloths with the lotion and laying them upon the inflamed skin.

Various measures have been tried to prevent the spread of the disease, for one of the unpleasant features of erysipelas is that the inflammation shows an inclination to extend indefinitely over the skin. In order to limit the inflammation, it was formerly the habit to draw a line around the advancing disease with a stick of lunar caustic. Although success was claimed for this practice, yet it was finally abandoned. In more recent times, several other measures have been proposed and used to accomplish the same result; among these is the injection of a three per cent. solution of carbolic acid at several points in the skin in front of the advancing inflammation; this is done by means of a hypodermic syringe, and the process must be repeated two or three times within a couple of days, if the inflammation be not arrested. This measure should be carried into execution only by a physician, and it must be

admitted that its utility in limiting the spread of the disease is very doubtful.

In the early stage of the inflammation, the application of cloths wrung out in ice water, or of the ice itself, will often be grateful to the patient, though it has probably no influence in arresting the disease; after the first day or two, cloths wrung out in hot water will usually be found more agreeable to the patient than the ice.

Redness—(Erythema).

Several varieties of erythema are recognized, all characterized by redness, *without swelling* of the skin. In simple erythema there is a limited redness, occurring in spots or blotches, over which the skin feels hot, and causes a somewhat painful sensation. These red spots persist for some hours or days, though in exceptional cases they disappear rapidly and reappear in other locations—resembling the familiar "nettle-rash" in this respect.

Several varieties of erythema are occasionally found in which a certain amount of swelling also occurs. The form which is called *erythema multiforme* appears as spots and pimples from the size of a dime to that of a quarter; these cause some itching and a burning pain. The spots are almost invariably located on the back of the hands and of the feet, or on the forearm and on the leg. They last from two or three days to two weeks, and then disappear spontaneously.

The different forms of erythema occur almost exclusively in individuals of rheumatic tendencies. Such persons are apt to suffer at short intervals from repeated attacks of the rash in various parts of the body. The disease occurs with especial frequency late in the spring and early in the fall, and is more apt to affect individuals who have not yet attained the twenty-fifth year, than those in more advanced life.

While erythema exhibits this marked preference for rheumatic individuals, it may be brought on in others by errors of diet and by exposure to cold; it occurs, also, wherever the skin is irritated by acrid discharges. It seems to occur, also, with considerable

frequency in dibilitated individuals, and in those who suffer from the green sickness and from dyspepsia.

Treatment.—In most cases the inconvenience caused by erythema is so trifling that the individual prefers to endure the disease rather than be troubled with treatment. Yet in every case the patient should take such measures, by attention to his general health, as will prevent the recurrence of this annoying affection. If debilitated he should take a tonic, consisting of quinine and iron, according to the following formula :

Reduced iron, - - - -	Twenty grains.
Sulphate of quinine, - - -	Thirty grains.
Extract of nux vomica, - -	Four grains.

Mix and make twenty pills ; take one morning and night.

If the patient be inclined to rheumatism, he should adopt the treatment which is recommended in the discussion of that disease.

Locally it is rarely necessary to make any applications ; yet, if the pain and sensation of burning be severe, one of the following lotions may be applied :

Laudanum, - - - - -	Half an ounce.
Lead-water - - - - -	Four ounces.

Mix and apply by means of soft cloths, which may be bound upon the affected part.

If this fail to give relief, the following mixture may be used:

Boracic acid, - - - -	Four drachms.
Alcohol, - - - - -	Eight ounces.

This lotion may be applied in the same way as was directed for the preceding.

Nettle-rash—(Urticaria).

Nettle-rash, also called *hives*, seems to be somewhat allied to the rash just described, erythema. It appears in the shape of elevated patches, or " wheals," which are of irregular shape, flat upon the top, hard, and usually of a pale red color ; in some cases, however, the elevated portion of the skin is whiter than that which surrounds it. In general, the larger ones are light in the middle and red at the circumference, while the smaller ones are pale red.

The rash may also appear in the shape of stripes, either straight or of a serpentine shape. These patches itch intensely, and may be accompanied by some burning pain.

The rash may appear on any part of the body; when it is developed on the face the skin may swell enormously, so as to alarm the individual extremely. In most cases there is no constitutional disturbance aside from the irritation caused by the itching; in some cases there is, on the other hand, slight fever.

Nettle-rash in the adult differs somewhat from the same rash as it appears in the child. In the adult the wheals are well marked and disappear completely, leaving no trace of their presence. In the child the wheals are usually not so distinct, and are often followed by the appearance of little pimples. These may persist for days and are called by a separate name — *lichen urticatus.*

The wheals rarely persist for more than a few hours, and often disappear in a comparatively few minutes. The rash usually appears in the morning, disappears before noon, and perhaps is seen again once or twice in the course of the day. It is apt to recur on the following day, and perhaps daily for a week.

Nettle-rash occurs most frequently in women and children. It is often the result of some indiscretion in diet. Oysters, fish, pickles, honey and strawberries are among the articles which seem especially apt to induce an attack of urticaria. Certain medicines also occasion nettle-rash in some individuals. Thus it has been known to follow the use of turpentine, copaiba, chloral and morphine. Some individuals learn by experience to avoid certain articles of food and certain drugs, knowing the indulgence in them is followed by an outbreak of nettle-rash.

Urticaria also follows the irritation caused by vermin in the clothing and the itch. In fact, long-continued irritation of the skin from any cause may induce an attack in an individual predisposed to it.

Nettle-rash also appears as an accompaniment of several constitutional diseases; among these affections are catarrh of the stomach and of the bowels, jaundice and Bright's disease of the kidneys. It has also been observed during the course of typhoid fever, of rheumatism and of intermittent fever.

Treatment.— The treatment of nettle-rash will depend altogether upon the cause. If it have resulted from eating oysters, shell fish, or the like, the most expeditious method of treatment

consists in an emetic. For this purpose a teaspoonful of mustard in a glass of hot water may be given. If it can be traced to any derangement of the internal organs, such as catarrh of the stomach, the latter must, of course, receive appropriate treatment. If none of these causes be present, a careful search for bed-bugs, fleas and other skin irritants, should be instituted. While an acute attack of urticaria is in most cases easily disposed of, the chronic form in which the individual is tormented at short intervals and for days at a time with frequent attacks of nettle-rash, is a very troublesome affection. It is often impossible to cure such a nettle-rash until some disorder of the liver, or stomach, or uterus, which may be present, is permanently relieved. In every case the patient should for several days use only bland diet, especially milk, starchy articles, such as arrow root, corn-starch, and the like, and should avoid eating much meat or the use of condiments. He should also keep the bowels active by means of saline laxatives, such as the ordinary mineral waters, the citrate of magnesia, or epsom salts.

Numerous remedies have been recommended for the relief of nettle-rash. Among these are the following:

Sulphate of atropia, -	Two grains.
Distilled water, -	Half a drachm.
Glycerine, - -	Half a drachm.
Gum tragacanth, -	Enough to make twenty pills.

Take one morning and night. Another prescription is the following:

Strychnine, - - - - -	One grain.
Peppermint water, - - - -	Six ounces.

Take a teaspoonful twice daily.

In most cases it will be desirable for the patient to take Fowler's solution internally and to employ alkaline baths. The prescription may be written as follows:

Fowler's solution, - - -	Three drachms.
Syrup of orange peel, - -	Two ounces.
Water, - - - - -	Two ounces.

Mix and take a teaspoonful before meals.

An *alkaline bath* is made by adding from five to ten ounces of the bicarbonate of soda, or four ounces of borax to an ordinary bath containing twenty-five gallons. The patient may lie in this for fifteen or twenty minutes, the water being kept at a temperature

of about 90 degrees F. In the intervals between the baths, one of the following lotions may be applied to the itching skin :

Dilute hydrocyanic acid,	One drachm.
Solution of the acetate of ammonia,	Two ounces.
Rose water,	Four ounces.

Soft cloths may be wet with this and applied to the skin.

Cyanide or potassium,	Five grains.
Cold cream,	One ounce.

Mix and apply directly to the skin. This is an extremely poisonous mixture, and should be carefully guarded from careless hands ; it would be better to keep it in a dark place.

Benzoic acid,	Fifty grains.
Water,	Six ounces.

This may be applied upon moist cloths.

A similar course of treatment may be employed for children ; out it is usually necessary to use an extremely bland ointment, since the child's skin is especially tender. For children the following lotion may be used :

Oxide of zinc,	Two drachms.
Calamine powder,	Half an ounce.
Glycerine,	Two ounces.
Rose water,	Four ounces.

Apply by means of soft cloths.

Lupus.

This name, which means " wolf," is applied to a disease which attacks the skin in early life, lasts for years, and finally destroys a considerable portion of the skin.

It begins as small yellow or red points which project somewhat above the surface of the skin, and are usually arranged in groups. They occasion no itching or pain. After a time these points become ulcerated — that is, raw — at the top ; this ulceration slowly increases in extent and often includes several of the pimples in which the disease began. After the ulcer has attained a certain size it begins to heal at one side, while it is constantly extending

in other directions. The scar which is formed as the ulcer heals is at first red, but gradually becomes white and shiny.

This form of lupus usually begins during childhood, and although it may affect any part of the body it is especially common on the face. Its favorite seat is at the angle of the nose, or just below the eye; it may also begin around the ear. As the disease progresses, the nose — if this be the part first affected — is gradually destroyed; the sore becomes covered with thick dark crusts, which often close the openings of the nostrils. Bleeding from the nose is an occasional symptom. The disease spreads backward along the nostrils, and may affect the palate as well. The disease may also attack the upper lip as well as the nose; the lip becomes very thick and everted, so that the patient loses control of the lips to a certain extent and cannot articulate distinctly, nor take his food with comfort. In time the gums are attacked, become soft and bleed easily; finally the teeth are loosened and fall out. In bad cases the entire cavity of the mouth is a mass of ulcers. The disease may progress and attack the larynx, in which case the voice becomes hoarse or is altogether lost.

Lupus may affect other parts of the body also; next to the face, the legs are most frequently the seat of the disease. We sometimes see cases in which the leg, almost all the way from the knee to the ankle, is covered with lupus scars, composed of thin, smooth, glistening skin, while somewhere on the surface there will be an open ulcer surrounded by the characteristic pimples.

Lupus may also affect the eyelids, the ear and the genitals. It rarely occasions any considerable loss of substance — that is, ulceration — until it has existed for several years.

No one but a practiced physician will be able to distinguish lupus from several other affections which present an appearance to that of this disease Syphilis often causes ulcers which can scarcely be distinguished by their appearance, though the distinction can be made by the duration of the disease, for syphilis progresses far more rapidly than lupus; in a few months syphilis can cause an ulcer as large as that which would be produced by lupus in as many years. In other cases it becomes very difficult to distinguish lupus from a form of cancer which affects the skin. The recognition of the disease, therefore — the *diagnosis*, as it is technically called — can be made by a physician only, and usually only by one especially familiar with diseases of the skin.

Treatment.—In many cases sufferers from lupus are evidently scrofulous, and need the treatment which is required by scrofulous patients. For this purpose cod liver oil may be given, a teaspoonful at first, the quantity being gradually increased to a tablespoonful or two three times a day. Children may also take with advantage the following prescription :

Syrup of the iodide of iron	One ounce.
Glycerine,	One ounce.
Water,	Two ounces.

Mix, and take a teaspoonful after meals.

If the individual be not of a scrofulous habit, he may take the following prescription :

Iodide of potassium,	Four drachms.
Fowler's solution,	Two drachms.
Syrup of sarsaparilla,	Four ounces.

Mix, and take a teaspoonful before meals.

The most important of the treatment is usually the local applications. These vary according to the severity of the case. If there be but little ulceration, the *mercurial ointment* may be applied by smearing it upon soft cloths which are then laid upon the diseased surface. This should always be tried in the treatment of lupus in children. If this do not succeed, the following mixture may be prepared :

Iodine,	One drachm.
Iodide of potassium,	Two drachms.
Glycerine,	Three ounces.

This may be painted upon the ulcerated surface and its vicinity three times a day.

Another valuable application is chrysophanic acid, which may be used in the form of an ointment :

Chrysophanic acid,	Two drachms.
Vaseline,	One ounce.

This may be applied directly to the ulcerated surface.

Cases are found in which all these applications prove ineffectual. In such instances there are several measures to be employed, any one of which can usually be relied upon to secure a good result. The first of these is the use of what is called the "sharp spoon," an instrument by which the diseased surface can be thoroughly rasped and the tissue removed. Such treatment must, however, be used only by the physician.

Molluscum.

This affection is an enlargement of the sebaceous or oil glands of the skin, which become distended by an accumulation of matter in their cavities. These distended glands may become as large as a pea or even as a hazel nut; the top is flattened and the center usually somewhat depressed. When the tumor is compressed a whitish cheesy mass—the accumulated secretion of the gland—escapes.

These little tumors occur especially on the face, on the eyelids, on the neck and on the hands; sometimes they are solitary, but are often arranged in groups. They usually occur in children, and have been supposed to be contagious, since the occurrence of one on the hand of a child is apt to be followed by the appearance of similar growths on the skin of its playmates. Yet numerous efforts to inoculate an individual with the contents of these tumors have failed, and it seems doubtful whether they are really contagious.

Treatment.—In many cases these little tumors wither away spontaneously, in other instances they become inflamed and matter is formed around them, as a result of which they are ultimately destroyed. They can be readily removed in any one of several ways; their contents may be squeezed between the thumb nails, and the interior of the sac can be destroyed by touching it with a stick of lunar caustic, or the little tumor may be snipped out with a pair of scissors.

Impetigo.

This affection consists in a rash composed of little blisters full of matter. It attacks children almost exclusively. The rash occurs chiefly on the face and head and after these parts most frequently on the hands. The pustules vary in size from that of a pin's head to that of a pea. They are usually scattered and quite distinct from one another, though sometimes running together and making a blister as large as a dime. The matter soon dries up into a yellow scab, which projects above the surface and looks as if it were stuck onto the skin. The skin around the pustules is not red nor swollen.

The disease is usually ushered in by a slight fever; aside from this there is no constitutional disturbance. Each of these little pustules runs a definite course lasting eight or ten days; at the end of this time the scab falls off leaving a red surface, which after a few days has entirely healed.

The disease occurs in consequence of general disease such as small-pox and child-bed fever; but is more frequently induced by external irritation of the skin, such as is caused by the itch mite and by lice. It may also result from the application of irritating substances, such as croton oil. In bad cases which are long neglected, the removal of the scab may be followed by the formation of deep and obstinate ulcers. In some cases the irritation caused by this rash leads to violent scratching, as a result of which eczema is developed.

Treatment.—The scabs may be removed by oiling the skin with sweet oil, or by soaking the patient in a warm bath. After they have been thus removed, the following ointment or lotion should be applied night and morning for three or four days, to the raw surface beneath:

Ammonia (chloride of mercury),	Five grains.
Simple ointment;	One ounce.

Or the following lotion may be used:

Sulphate of zinc,	Eight grains.
Corrosive sublimate,	Six grains.
Water,	Four ounces.

Another good application for this purpose is the ordinary diachylon ointment.

The pustles of impetigo are contagious; that is, when the matter is communicated to another individual, or to other parts of the skin on the same individual, similar pustles are formed. This fact should be remembered in handling and treating these cases.

Ecthyma.

Ecthyma differs from impetigo in the size of the pustules, and in the fact that the skin around them is inflamed and swollen The pustules are as large as the finger nail or even more extensive.

They are covered by thick, dark crusts, which adhere firmly to the sore underneath, and when removed leave red, raw patches. The skin around the crust is thickened, elevated, red and painful.

These sores may develop anywhere upon the body, but are especially often met with on the lower limbs. The disease usually occurs in poorly nourished individuals; in fact it is rare among the better classes of people. In many cases disease results from the presence of parasites in the clothing or in the skin; indeed the majority of cases of eczema are due to the itch or to body-lice.

Treatment.—In every case attention should be directed to the condition of the clothing and of the skin; the possibility of the occurrence of parasites, even when unsuspected, may not be forgotten. The removal of these will be in such instances sufficient to cause the ecthyma to disappear.

In case no parasites can be detected and the individual appears debilitated, tonics should be administered, and regular evacuations of the bowels should be secured. For this purpose the following prescription may be given:

Sulphate of magnesia, - - -	Three drachms.
Sulphate of iron, - - -	Forty grains.
Dilute sulphuric acid, - - -	One drachm.
Infusion of quassia, - - -	Eight ounces.

Mix, and take two teaspoonfuls before meals.

If the patient exhibit signs of scrofula, he may take in addition a teaspoonful of cod liver oil after meals.

For the local treatment of the sores the following plan may be adopted: The scabs should first be removed by immersing the patient for fifteen or twenty minutes in a warm bath, whereby they become softened and can be more readily detached. The ulcers which are left can then be dusted with powdered *iodoform* twice daily, until they have lost the original foul appearance, and show a clean red base. Instead of the *iodoform* the following formula may be used for the same purpose:

Powdered starch, - - - -	One ounce.
Glycerine, - - - - -	Three ounces.
Water, - - - - - -	Four ounces.

Boil these together, and when the mixture is nearly cold, add

one ounce of the tincture of iodine. After the sores are cleansed they may be dressed twice a day with the following:

Mercurial plaster,	One ounce.
Soap plaster,	One ounce.

Mix, and apply upon soft cloths.

Another excellent ointment for these sores is the following:

Camphor,	Half a drachm.
Pitch,	Four drachms.
Yellow wax,	Ten drachms.
Red oxide of lead,	Two ounces.
Olive oil,	Four ounces.

These are to be melted together and applied upon cloth.

Lichen.

This is a very frequent disease in childhood, and one which gives parents as well as children much annoyance. It consists of a rash of small pointed pimples about as large as millet seeds, which are usually found on the outer surfaces of the limbs and on the back, though the rash may extend over the entire body, including the face.

Lichen is characterized by its extreme itchiness, a feature which gives the patient an amount of annoyance and torment quite out of proportion to the apparent insignificance of the eruption. Sometimes the rash is localized in limited parts of the body; thus it may appear on the back of the hands only; at other times it affects the wrists and the front of the forearms.

Sometimes the pimples become considerably larger, and flattened upon the top. These pimples are extremely uncomfortable, since they cause the patient to scratch the skin incessantly. When these pimples disappear, they leave brown stains upon the skin much resembling freckles. This variety is somewhat unusual, and from the flatness of the pimples is called *lichen planus*.

The rashes which often appear upon children during nursing or teething, and which are known by various popular names — "red gum," "tooth rash," etc.,— are forms of lichen. Another common variety of lichen is what is known as "prickly heat," with which all are familiar. Still another variety is seen in the form of

pimples around the hairs on the arms and legs. This form of the disease seems to result from insufficient bathing, but causes the patient no annoyance.

The treatment of lichen varies extremely. In nearly all cases, except the "prickly heat," it will be found that there is some derangement of the internal organs, upon which the skin rash depends. Thus the rashes which appear upon children during nursing, are usually due to an improper quality of food; they occur especially often upon bottle-fed children and upon infants who are but poorly cared for.

In every case it will be necessary to see that the digestive organs are kept in good condition; the diet should be bland and unirritating, consisting of milk, eggs and vegetables, to the exclusion of meats and condiments. Regular evacuation of the bowels should be secured by the use of some saline cathartic, such as a teaspoonful of the citrate of magnesia.

For the treatment of the skin itself the patient may have an alkaline bath. This may be prepared by adding six ounces of baking soda to twenty gallons of water, which is to be kept at a temperature of 90 deg. F. This bath may be repeated morning and night. In obstinate cases the following formula may be used:

Precipitated sulphur,	Two ounces.
Hyposulphite of soda,	One ounce.
Dilute sulphuric acid,	Half an ounce.
Water,	One pint.

Mix, and apply to the skin by means of a soft cloth three or four times daily.

In many cases it will become necessary to administer arsenic in some form; the most convenient and desirable will be Fowler's solution, which may be given in the following prescription:

Fowler's solution,	Three drachms.
Tincture of the chloride of iron,	Six drachms.
Tincture of quassia,	To make four ounces.

Mix, and take a teaspoonful before meals.

Fish-skin Disease.

This affection, technically known as *icthyosis*, is so called because the skin is arranged in the shape of large crusts, sometimes overlapping one another, and thus resembling slightly the scales of

a fish. In many cases this resemblance to fish scales is rather imaginary; the actual appearance of the skin suggests rather a layer of dried mud which has been caked upon different parts of the surface. These cakes or scales project somewhat from the surface of the skin, and are thickest and most abundant upon the outer surfaces of the legs and of the arms. Sometimes only a limited portion of the skin will be affected; at other times almost the entire body, trunk and limbs present this remarkable appearance.

Cases of fully developed icthyosis are rare; but a milder form of the affection, which is known as *xeroderma*, or parched skin, is not uncommon. In these cases the skin does not present the dirty appearance characteristic of the fish-skin disease, but looks simply dry and parched; the individual perspires very little, and the skin is easily chafed. The sensibility of the skin is apt to be impaired in this disease.

Icthyosis is a congenital disease; that is to say, it is developed in the infant soon after birth without the occurrence of any perceptible cause. Yet it often occurs in individuals whose parents have never suffered from a similar affection.

Treatment.—The disease is, so far as known, absolutely incurable. Yet much can be done to relieve the discomfort attendant upon it and to prevent further progress. For this purpose the skin may be kept soft and flexible by means of free application of sweet oil or lard, and by frequent alkaline baths, each of which shall contain six or eight ounces of baking soda. The excessive use of soap should be avoided, since it tends to aggravate the condition.

Leprosy.

This disease has at the present time an historical interest rather than immediate practical importance; in the United States especially the disease is very rare, so that a case of it is an object of extreme interest to physicians. Nearly all the cases of leprosy which are observed in the United States have been imported direct from some of those localities where the disease still exists; the great majority of cases observed in the northern part of the

Leprosy.

ENGRAVED FROM PHOTOGRAPHS OF ACTUAL CASES.

United States, at least, occur in Swedes, Norwegians and Danes who have contracted the affection in their mother countries.

It seems to be generally agreed that the disease known as leprosy to-day is the same as the leprosy of the Scriptures. Yet it is probable that the term leprosy, as used in the Bible, included several distinct diseases of the skin. Thus several individuals are described as being "as white as snow;" since this appearance is not presented by leprosy, but is a frequent occurrence in psoriasis ("dry tetter") it seems probable that the latter affection was designated.

The disease now known as leprosy has certainly been in existence and has been recognized as such since 1500 B. C. The first accounts that we have of it indicate that it originated in Egypt. In Persia the disease was known in the sixth century B. C.; it seems to have appeared first in Greece and Italy in the first century B. C. From these countries it spread over the greater part of Europe; for a long while—several centuries—it was quite common in the Italian Peninsula; it seems to have migrated with the Romans to Spain, where it flourished for hundreds of years, and can indeed be found at the present time. In the fifth century of the Christian era leprosy was a common disease in Germany, Switzerland and Flanders. In the twelfth century the disease was a familiar one in England, Scotland and Ireland.

In most of the countries named leprosy gradually disappeared, so that it is now a comparatively rare disease, except in Spain; but in Sweden and Norway, where it seems to have made its appearance later than in other European countries, there is still a considerable number of cases. It is supposed that the Crusaders were the agents in bringing back a considerable stock of the disease from Palestine.

At the present day leprosy is common in certain parts of South America — Uruguay, and Guiana for example — in Mexico, especially among the Indian races; in certain other parts of Central America and in Brazil. The disease is also found at the eastern end of the Mediterranean Sea, along the shores of the Red Sea, and at points around almost the entire coast of Africa; it is found in Abyssinia, in Soudan, at the Cape of Good Hope, in Senegambia, in Morocco and Algiers. In the southern part of Asia the disease is also quite prevalent; the various provinces of the British Empire in the East Indies contain many cases of it; thus

within two years two hundred and twelve cases of leprosy were treated in the hospital at Madras. In numerous islands of the Pacific the disease is also at home, notably in the Sandwich Islands; and it seems to have been transported thence to Australia, where it was unknown until 1848, but is now quite prevalent.

Many cases of leprosy are found also in Japan and in China, where hospitals for the reception of sufferers from this disease are constantly full.

Cause.—Until quite recently the vast amount of study and research which had been expended in studying the nature and cause of leprosy seemed to have proved fruitless. It was ascertained that certain climates, insufficient and injudicious diet, imperfect sanitary regulations, all contributed to the development of the disease. It was found that leprosy occurred chiefly on the sea coast, and was rare in the interior, especially in mountainous regions; yet this was true of cold as well as of warm climates. It was assumed that the disease might be contracted from the consumption of stale fish, since it occurred with especial frequency among those whose diet consisted largely of fish. In some regions turtles were held responsible for the occurrence of the disease; in others the affection was ascribed to the fat of hogs. Yet these were mere assumptions, and have never been supported by facts of observation.

It was also ascertained beyond question that there was a decided hereditary tendency to the disease, since it occurred far more frequently in the children of leprous parents than in others.

In ancient times leprosy was regarded as highly contagious; the sufferers from it were distinguished by a particular garb, and were not allowed to come into contact with other people. In some parts of Germany, during the middle ages, leprosy patients wore bells attached to their clothing, so as to warn others of their approach; they were permitted to go out of their hospitals at night only. They wore black clothing, and a broad white band on the hat; they carried a cane, with which they pointed out objects that they wished to buy, since it was unlawful for them to touch anything that could be used by a healthy person. In other places it was the custom whenever an individual contracted the disease to announce the fact with religious ceremonies; at the conclusion of this formality, a shovelful of earth was thrown upon his feet as a sign that the person was dead to the church and to the world; begging was

the only occupation permitted to the leprous patient. Haeser states, in his "History of the Epidemic Diseases," that the city of Harlem had the right to grant to healthy people the privilege of wearing the costume of leprosy patients in order that they might carry on the occupation of begging undisturbed.

In the last century or two the contagiousness of leprosy has been much doubted, and it seems with reason; for many cases of the disease have occurred in different parts of the world in perfectly healthy communities, where they have been permitted unrestrained personal freedom, yet so far as known no instance has ever been observed in which the disease has been communicated by such individuals; whence physicians have been inclined to the belief that leprosy is really not contagious.

Such a conclusion neglects the fact, however, that in order that a disease shall be contagious there must not only be something capable of being transmitted from one individual to another, but also an individual capable of receiving such contagious material. It is doubtless true that leprosy is for all practical purposes not contagious, since people nowadays are not susceptible to this particular contagion. Yet, that the disease can be communicated by contact is abundantly proven by numerous instances which have been observed in recent years in the various countries where the disease is still prevalent. Hansen, for example, reports two cases in Bergen, Norway, in which two nurses employed in the leprosy hospital contracted the disease from patients. Another individual, whose occupation brought him into frequent contact with leprosy patients, acquired the disease; shortly afterward his wife also became affected. After the husband died, the wife married again, and her second husband became affected with the disease.

Milroy reports that a white boy stuck himself with a needle with which a leprous child had previously played, and that the former soon afterward exhibited signs of the disease. Yet that the disease does not always result from contact with afflicted individuals, is shown by such instances as the following: Koebner treated a patient 19 years old, sick with leprosy, whose father remained quite healthy, although he had been married to two women, each suffering from the disease.

Symptoms.—For some time, amounting perhaps to months, the oubreak of leprosy is preceded by general debility, emaciation and weakness. The onset of the disease is marked by fever, which

lasts usually only two or three weeks. When the fever ceases an eruption appears upon the skin. This eruption takes the form of pimples somewhat resembling warts, though not fissured like the latter. These pimples or *tubercles*, as they are called, usually appear first on the eyebrows and soon afterwards on the face, the ears and the lower extremities. At first they are scattered, but soon become thickly crowded together, so that the entire surface of the skin, on the face and hands particularly, becomes a mass of little tumors or tubercles. After a time similar tubercles appear in the mucous membrane of the mouth, the throat and the eyes; they may also spread to the larynx, causing hoarseness, cough and loss of voice. The result of these growths is a most repulsive and loathsome appearance of the face—an appearance which has been described as like that of a lion, though the resemblance does not seem especially striking.

Although leprosy is commonly referred to and described as a disease of the skin, it is really a constitutional affection. For it attacks not only the skin and the mucous membranes, but also the internal organs. The nerves, especially in the extremities, are so diseased that the patient after a time loses the sense of touch. The muscles and other tissues, especially those constituting the joints, are gradually eaten away and destroyed. The result of this is that the joints of the fingers and toes dry up and drop off; in fact the patient may lose in time an entire foot or hand.

The internal organs, including the brain and the organs of digestion, are also attacked by the disease; and the result is sooner or later necessarily fatal.

The duration of the disease is usually several years, rarely more than ten or less than three. In many cases death results from some acute affection—inflammation of the lungs, brain, bowels, or kidneys—which has nothing to do directly with the leprosy. But these leprous patients are found to be unusually susceptible to other diseases. Cases are known in which the patient recovers spontaneously, the tubercles gradually disappearing; in some instances the disease reappears after an interval of several months, and may then lead to a fatal termination.

There is a second form of leprosy called *anæsthetic leprosy*, because the nerves are early affected, and the patient soon loses the sense of touch. In these cases the tubercles of the skin appear in small numbers or not at all. Considerable portions of the skin

may become quite devoid of sensibility, so that the individual may be cut or burned in those parts without suffering pain. This form of the disease is less frequent than the other and lasts a longer time; patients have been known to suffer from twenty to thirty years with this disease before death put an end to their sufferings.

Treatment.—Nearly all the remedies known to physicians have been used in the treatment of leprosy; but none of them are capable of curing or even arresting the disease. At different times various remedies have been vaunted as successful; but further trial has in every case shown the fallacy of this belief. The latest candidate for favor is *chaulmoogra oil;* it remains to be seen whether this will prove more effectual than other remedies which have been tried and abandoned.

In the last few years it has been discovered that the tissues and organs of leprosy patients always contain a certain minute vegetable parasite; that this organism is found all through the body wherever the tissues are diseased. It has not yet been proven that this parasite causes the disease, though it seems highly probable; nor it is yet known from what source this plant is derived, nor how it gets into the body.

Barbadoes Leg.

This affection, which is also called "elephant leg," and technically *elephantiasis*, consists, as the name implies, in an enormous enlargement of the leg. This enlargement consists at first and in large part merely of a thickening of the skin. It may occur also in other parts of the body than the leg, and affects especially often the genital organs of both sexes. Sometimes a similar thickening of the skin is observed in the female breast, in the ears and the scalp.

The disease occurs over the entire world, but is most frequently found in tropical regions. Among these localities is the Island of Barbadoes — from which the affection derives one of its names — Brazil, Japan and the East Indies. In Europe elephantiasis occurs most frequently in France and in Ireland.

The disease rarely occurs before puberty, and most frequently begins before the age of 30 years.

When the disease occurs upon the leg this member becomes enormously swollen, smooth and shiny; but there is not usually any evidence of inflammation or pain. After a time the skin becomes rough and covered with small pimples; the extreme size of the limb renders the patient unable to walk. In the course of the disease there finally occur extensive ulcerations of the skin which resist treatment most obstinately.

Treatment.—The disease may last for years without serious impairment of the patient's health; but in many cases the tissues of the leg become mortified, and are often attacked by erysipelas which may end the patient's life.

In the beginning of the illness the patient may be much improved by rest in a recumbent position, and by wrapping the limb in cloths wrung out in hot water. Yet the most reliable and most rapid means for reducing the swelling is the bandage of india rubber termed "Martin's bandage." When this is worn the patient can continue his occupation without interfering with the cure of the affection.

In cases where the disease affects the face or other parts that cannot be subjected to the pressure of a rubber bandage, advantage may be derived from the use of the following lotion:

Iodine, - - - - -	One drachm.
Glycerine, - - - - -	Three ounces.

Mix, and apply to the thickened skin.

Advantage may also be derived from the use of the *ointment of the iodide of potassium.*

Pemphigus.

This disease is characterized by the occurrence of oval-shaped blisters, which may vary in size from that of a bean to that of a walnut. Each blister contains at first a watery looking fluid; in a short time the fluid becomes milky and then dries up, leaving a small scab. These blisters may occur singly or in groups, and are found in all parts of the body, and even on the mucous membranes of the mouth. When the scabs are removed there remains either a raw surface or a dark spot, but never a scar.

The outbreak of the eruption is accompanied with a chill, fever, headache and sleeplessness; the skin is the seat of a burn-

ing sensation, which is sometimes followed by extreme itchings. There is rarely any considerable pain unless large areas of the skin are attacked at once.

Pemphigus occurs with especial frequency in children, and oftenest in children of debilitated constitutions; yet the disease is sometimes observed in adults also. Several successive groups of blisters are observed on the same patient, one set appears after another has dried up. The duration of the disease varies extremely. Sometimes it runs a rapid course, and is concluded in two to three weeks; in other cases it may persist for months or years.

When the disease becomes chronic, the patient is almost always reduced to a debilitated condition. In this state he is very apt to suffer from other diseases, especially inflammation of the kidneys.

Pemphigus is one of the few skin diseases which sometimes results fatally. These fatal cases usually occur in poorly-nourished and scrofulous children.

This disease is often observed in new-born children, where it is found in large watery blisters on the palms of the hands and the soles of the feet. Under these circumstances, it is almost without exception an evidence of syphilis; one or the other of the parents having suffered from this disease. This form of pemphigus will be discussed under the head of syphilis.

Treatment.—In many cases it becomes necessary to use constitutional treatment, since the individual's general health requires improvement. For this purpose it will be well to administer the following prescription:

Sulphate of quinine, - - -	One drachm.
Tincture of the chloride of iron, -	Six drachms.
Syrup of orange peel, - - -	One ounce.
Water, - - - - -	To make four ounces.

Mix, and take a teaspoonful before meals. This is the proper dose for an adult, and should be diminished for children.

The rash can be in most cases readily relieved by the use of arsenic, which can be given in Fowler's solution, as follows:

Fowler's solution, - - - -	Two drachms.
Water, - - - - - -	Four ounces.

Mix, and take a teaspoonful four times a day.

The comfort of the patient will be much enhanced, in those cases in which the eruption is extensive, by immersion in a warm

bath. This bath may consist simply of warm water, or there may be added to it eight ounces of the bicarbonate of sodium. In the skin hospital at Vienna, patients suffering from pemphigus are placed in baths prepared for the purpose, and are allowed to remain there for days or weeks until the formation of blisters ceases. The water is frequently changed; the bath is provided with coverings, and with a water pillow; the patient takes his meals in the bath, and, in fact, does not leave it until the cure is complete. Not the least of the advantages of this permanent bath is the complete relief from the itching which otherwise torments the patient extremely. If it be impossible to employ such a bath, the patient should be wrapped in wet sheets, and the sore spots on the skin may be dressed with the diachylon ointment. Sometimes the sores are extensive and foul, and emit an offensive odor; in this case, there may be applied to them cotton-wool which has been soaked in a five per cent. solution of carbolic acid in water.

Prurigo.

This is, in America, a rare disease, though in certain parts of Europe it is most frequent and troublesome. It consists of small elevations or pimples, from the size of a pin's head upward, and of a pale red color. These pimples are very hard, and occasion an intolerable itching. They occur chiefly on the lower limbs, especially below the knees; in obstinate cases they are also found on the arms and on the trunk.

At first the disease consists simply in this rash, but as time elapses the constant scratching results in an inflammatory thickening of the skin which becomes hard and feels like a board. Another result of the constant scratching is a discoloration of the skin, which assumes a brown color. The rash, in the early stages, can be felt before it is seen; it is only after it has endured a considerable time that the pimples become sufficiently large to be seen.

In the course of time the glands in the groin and in the armpits, if the arms also be affected, become enlarged and hardened. A frequent result of the scratching is eczema of the leg, the result of which is to increase still further the thickening of the skin and the enlargement of the glands.

As to the cause of this disease, there is no definite informa-

tion; it has been supposed to result from improper nourishment, and from various affections of the nervous system; it is also observed that the children of consumptive parents are more frequently affected than in those of others. Scrofulous children who suffer from eczema (as they so often do) are very apt to have prurigo of the skin in consequence.

The disease is, in most cases, congenital; that is to say, the child manifests the beginning of it in the first year or two of life. If treated early, it is often possible to cure the disease permanently; but if allowed to go untreated until the child becomes 10 or 12 years old, the disease often resists all remedies.

Among children, prurigo occurs in all classes of society, the well-to-do as well as the poor. Among adults, on the other hand, it is confined almost exclusively to the poorer classes; this fact alone indicates that the persistence of the disease is favored by neglect of sanitary conditions — a fact which is also illustrated by other features of the disease.

Treatment.—The treatment of the disease must always begin with strict attention to the sanitary surroundings of the patient. It will be necessary to give him the best nourishment and care. Some cases have been much improved by residence at the seaside.

As for the remedies to be used, reliance is chiefly placed upon arsenic. This may be given in the following prescription:

Fowler's solution, - -	One and a half drachms.
Wine of iron, - - -	Two ounces.
Simple syrup, - -	One ounce.
Water, - - - -	One ounce.

Mix, and take a teaspoonful after meals.

In the local treatment of the rash it becomes necessary to employ some means to relieve the intense itching. For this purpose alkaline baths are useful. These may be made by adding eight ounces of the bicarbonate of soda to eighteen or twenty gallons of water. Sometimes much relief can be obtained by oiling the skin. For this purpose we may use either pure sweet oil or cod liver oil, or the following:

Perchloride of mercury, - - -	One grain.
Dilute hydrocyanic acid, - - -	One drachm.
Emulsion of almonds, - - -	Five ounces.

A simpler and often very efficient application to the skin is the following:

Chloroform, - - - - -	Two drachms.
Glycerine, - - - - -	One ounce.

In adults the affection is usually incurable; the most that can be done is to relieve the itching and irritation of the skin. Yet the disease involves no danger to life, and need occasion no anxiety on that account.

Itching—(Pruritus).

Itching of the skin is a symptom of numerous conditions and diseases; in fact, most of the skin affections are accompanied by more or less itching. It is only those which are dependent upon constitutional taints—such as scrofula and syphilis—which are rarely accompanied by itching.

In most cases in which itching is felt at any part of the skin, a cause can be readily discovered in some local irritation. This may consist in parasites, such as the itch mite; or it may exist merely in the form of an inflammatory rash. Yet there are many cases in which intense and obstinate itching occurs in certain limited parts of the body, for which no cause for the sensation can be discovered. We are all familiar with an occasional itchy sensation lasting but a moment or two, which leads us to look intently at some part of the skin, but without finding anything unnatural in the appearance of the skin. Now, in some individuals, this itchy sensation persists for days and weeks, localized in some limited part of the skin, and yet unaccompanied by any rash or by any unnatural appearance of the skin or its surroundings. It is this condition which is designated by the term pruritus.

This symptomatic itching is often most intense and annoying, so that it may make life wretched for an individual who is apparently in perfect health. In many cases the sensation is limited to certain parts of the skin, to be presently described; in other instances it is felt over a large surface, or even the entire body. This is especially apt to be the case with elderly people, so that the disease is often called *pruritus senilis*—the itching of old age. In some individuals this condition exists during the winter, while they

are free from it in warmer weather. In some cases doubtless, this itching of the skin is favored by wearing flannel; yet it may occur during the winter in persons who avoid the use of this article. In still other cases the tendency to itch is greater during warm weather; in these cases there seems to be no more apparent cause than in the former instance.

Although this itchy feeling may be felt over a considerable part of the body, or even over the entire skin, yet the cases are far more frequent in which the sensation is limited to certain small parts of the body. The parts most frequently affected are the genital organs of both sexes, the palms of the hands, the soles of the feet and the skin between the thighs.

In these situations the itching is not constant, but occurs in paroxysms, during which the patient is completely unfitted for active employment, and is compelled to retire to the privacy of his apartment and devote his entire attention to the relief of the itching. The attempt to relieve this feeling by rubbing or scratching the skin, merely aggravates the difficulty and often induces the appearance of other symptoms as well. Thus one of the first effects is eczema of the part, accompanied by deep fissures and furrows in the skin; in women, itching about the genitals often causes unnatural sexual excitement. This itching in these parts occurs in women with especial frequency during the change in life; it is also a frequent occurrence in those who suffer from disorders of menstruation and from diseases of the ovaries. It often accompanies diseases of the womb and of the vagina, and is a frequent result of the "whites;" when the latter condition has once existed the itching may last for a considerable time, even after the discharge has ceased.

In nearly all these cases the paroxysms of itching occur especially at night when the patient has become warm in bed. Itching between the thighs is often caused by the piles.

Among the general conditions which are accompanied by itching over a large part of the skin, are chronic Bright's disease of the kidneys and diabetes. The same symptom frequently accompanies diseases of the liver which cause jaundice, catarrh of the stomach and inflammations of the womb. In all those cases in which a careful search fails to reveal the presence of lice or other local causes, the patient should be at once examined, to ascertain the existence of one or another of these conditions. In

every case it should be remembered that itching will be followed sooner or later by a rash on the skin, caused by incessant scratching; care must be taken not to mistake this rash, which is the result of the itching, for the cause. The first item in the treatment of pruritus, whether it be confined to a part or spread over the entire skin, is an attempt to ascertain the cause. This is a far more troublesome undertaking in many cases than one might suppose. The first object of suspicion must always be animal parasites; even in our first families bed-bugs, fleas, and other vermin are occasionally found; the constant intercourse with other people upon the streets, in public vehicles, etc., frequently leads to the introduction of these parasites where they are least expected.

When the itching is constant, not occurring in paroxysms, but *increased at night* by the warmth of the bed, it should excite suspicion of scabies or the "itch," and should lead to a careful search of the skin between the fingers, on the wrists, and about the genitals. Itching between the shoulders and on the back is often caused by body lice; itching at the back of the head in children by head lice. Itching between the thighs is often caused by eczema of these parts, and in children by thread worms. Itching which occurs suddenly and ceases abruptly, felt here and there about the body, especially at night, but accompanied by no perceptible rash. may be due to any one of several causes—disorders of menstruation or of the womb in women, nettle-rash, or one of the general conditions which have been already mentioned—Bright's disease, diabetes, etc.

In case any of these causes can be discovered to explain the itching, the treatment will naturally begin with the removal of the cause, so far as this is possible. In addition, it is necessary to employ remedies which will temporarily, at least, allay the itching, since this will otherwise provoke scratching, and the scratching will result in several additional difficulties, such as eczema.

To allay the itching the patient may take warm alkaline baths once or twice a day. For this purpose four ounces of borax may be dissolved in twenty gallons of warm water. In some cases better results will be achieved by dissolving three ounces of sulphurated potash in the same quanity of water. In many cases of itching without appreciable cause, such as the itching of old persons and that form of itchiness which occurs in many individuals in winter,

relief can be obtained by an acid bath made by adding one ounce of muriatic acid to twenty gallons of water. Several remedies have been found useful as applications to the skin for the relief of itching. The following formulæ are given as examples :

Borax, - - - - - -	Half an ounce.
Sulphate of morphia, - - -	Four grains.
Rose water, - - - - -	Eight ounces.

Mix and apply by means of a soft cloth.

Dilute hydrocyanic acid, - -	Two drachms.
Borax, - - - - - -	Four drachms.
Rose water, - - - - -	Eight ounces.

This is often especially useful in the itching of elderly people.

Cyanide of potassium, - - -	Four grains.
Glycerine, - - - - -	Two drachms.
Simple ointment, - - - -	Two ounces.

When the skin is especially irritable the following mixture may be used :

Extract of belladonna, - - -	One drachm.
Dilute hydrocyanic acid, -	Two drachms.
Glycerine, - - - - -	Two ounces.
Water, - - - - - -	Four ounces.

Another formula which is often useful is the following :

Camphor, - - - - -	One drachm.
Oxide of zinc, - - - -	One ounce.
Powdered starch, - - - -	One ounce.

Mix and dust upon the part.

Borax, - - - - - -	One drachm.
Carbonate of soda, - - - -	Two drachms.
Dilute hydrocyanic acid, - -	One drachm.
Glycerine, - - - - -	Two ounces.
Water, - - - - -	Four ounces.

In all cases of obstinate itching care should be taken that the clothing over the part is as unirritating as possible ; hence no flannel should be worn next the skin, and the underclothing should be frequently changed, especially if the individual perspire freely.

Condylomata.

These are small tumors, often looking like exaggerated warts. These are two varieties, which it is important to distinguish from each other, because of the difference in their nature.

The first of these varieties is composed of slender pointed projections of the skin, which usually rise not more than a quarter of an inch above the surface of the skin, but may attain a much greater length. They occur usually in groups, but sometimes separately. They are covered with natural skin, and present no differences in appearance from the rest of the skin. They are found almost exclusively around the orifices of various openings of the body, especially around the vagina and rectum; they are located usually at the junction of the skin and mucous membrane.

This variety of condyloma, called the *pointed* condyloma, is caused by irritating discharges, or by lack of cleanliness. They do not necessarily indicate any venereal disease, though they are especially often found in those addicted to excessive indulgence. They may occur as a result of a simple leucorrhœa, or even without this cause.

The treatment consists simply in snipping them off with a pair of scissors, and in applying a stick of lunar caustic to the base after removal. This plan answers perfectly well, except where the condylomata are arranged in large groups, so as to cover a considerable surface. In this case removal with the scissors is apt to be followed by considerable bleeding, and the matter should not be undertaken by any but a professional hand.

The other variety of condylomata is composed of tumors which differ from the preceding in their shape, size and nature. They are flat upon the top, usually reddish or brownish in color, and seem to be divided upon their surface into numerous pieces by furrows. They occur around the mouth, nose, and genitals; they are apt to secrete a thin, watery fluid, and sometimes produce considerable matter. These condylomata are of *syphilitic* origin, and are highly *contagious*. Extreme care should be taken, therefore, to prevent the entrance into the body of another personal discharge or matter from these tumors.

The treatment of the syphilitic condylomata consists first in careful attention to cleanliness, and second, in the treatment appro-

priate to syphilis. The latter part of the treatment will be discussed in the chapter on syphilis. Cleanliness may be attained by frequent washing and by dusting upon the parts the powder of calomel or powdered iodoform. In either case the tumors should be covered with cotton, which may be fastened by means of a bandage or adhesive straps.

Sweat Rash—(Miliaria).

At any season of the year, but especially in the spring, when the weather becomes warm, there may often be seen numerous minute watery blisters, not so large as pin-heads, scattered over various parts of the body. This eruption may be limited to a small part of the skin such as the hand, or may be visible over the entire person. The rash causes no further annoyance than a slight itching sensation which is not usually enough to induce violent scratching.

This rash consists merely in a stoppage of the sweat glands. These are minute bodies situated in the substance of the skin and opening upon the surface by a very fine spiral tube or duct. Under ordinary circumstances the secretion of the gland—the perspiration—escapes upon the surface so soon as it is formed; but in certain conditions of the skin these tubes become stopped up, and the perspiration collects in the little ducts so as to distend them and form the minute blisters above described.

This condition occurs usually after the patient has been perspiring profusely, and is therefore most frequently observed in the late spring or early summer months; yet it may occur at any time during the year, in winter as well as in summer.

In most cases the blisters do not increase in size beyond that of a pin's head; sometimes, however, they run together so as to make vesicles an eighth or a quarter of an inch in diameter. After a time the outer skin dries and peels off. For this reason the condition is often mistaken for eczema; but it can always be distinguished by the fact that there is no watery discharge, or "weeping," such as is always found in eczema.

Treatment.—This condition usually occurs in debilitated individuals, and the treatment must, therefore, be directed to the

improvement of the general health. In some cases the patient is decidedly gouty or rheumatic, and should have the treatment specified in the chapters on these diseases respectively. Generally speaking, it will be beneficial to administer some remedy which will increase the secretion of urine, such as the following:

Acetate of potash, - - -	Three drachms.
Sweet spirits of niter, - -	Two ounces.
Water, - - - - -	Two ounces.

Mix, and take a teaspoonful every four hours. If the patient be very weak he should have a tonic remedy, such as the following prescription :

Tincture of the chloride of iron, - -	Six drachms.
Compound tincture of gentian, - -	To make four ounces.

Mix, and take a teaspoonful in water before meals.

The skin should be soothed by the application of vaseline, and advantage may be derived from the use of an alkaline bath, such as is made by the addition of six ounces of the bicarbonate of sodium to the water. Afterwards it may be advisable to use an astringent ointment, such as the diachylon salve.

Piebald Skin.

This condition, which is known as *leucoderma*, consists in an irregular, spotted, or patchwork coloring of the skin so that large brown spots occur in the midst of skin of the natural color, or unnaturally white spots are observed surrounded by natural skin ; sometimes both variations from the natural color will be found side by side; a very white spot will be surrounded by a margin of unusually dark skin. Sometimes these spots are arranged symmetrically on both sides of the body. It is often found on the backs of the hands and on the neck.

This appearance of the skin is all the more remarkable when it occurs, as it often does, in negroes ; in these cases light or even perfectly white spots of different sizes are found on the body, and often on the face.

The disease occurs among whites chiefly during or after residence in a torrid climate. It can generally be relieved in the course

of time by the use of tonics and electricity to the spine. If there be patches of unnaturally dark skin, these can sometimes be removed by the daily application of the following :

Corrosive sublimate, - - - -	Two grains.
Water, - - - - - -	One ounce.

This may be rubbed over the spot by means of a soft cloth or piece of flannel ; the application should not last more than two or three minutes nor be made more than once per day. In fact, it is necessary to be extremely cautious in the use of this powerful remedy on the skin, as well as elsewhere.

Allied to this condition is that which is called, technically, *albinismus*. This consists in an absence of the natural coloring matter over the entire body ; an individual thus affected is called an *albino*, a term derived from the Latin word *albus*, which means white. Such individuals have a milk-white skin, silvery hair and pink eyes ; the same condition is observed in white rabbits. The curious fact about this is that a member of the negro race is sometimes a perfect albino — a " white negro "— while his brothers and sisters may be as dark as the average African.

Pityriasis.

This term is applied to two different diseases of the skin ; one of these, which is caused by a parasitic plant, has been described under the head of *tinea versicolor*. The other is a somewhat rare disease which consists in an excessive shedding of scales from the skin. It often begins as a single red scaly spot on some part of the body and spreads rapidly, so as to cover the entire surface in a comparatively short time. The skin becomes extremely red and covered with scales lying one over another in large flakes. These scales are gradually thrown off, sometimes as large pieces of skin ; underneath the skin remains red and tender but not raw. The skin is much less flexible and soft than in the natural state, so that the movements of the patient's limbs are impeded ; he cannot bend the knee nor the elbow with the same freedom as before.

The disease seems to be the result of defective nutrition : yet it is not ascertained in what this defect of nutrition consists. The

affection is extremely obstinate, and may last for years. Some cases seem to have been incurable.

Treatment. — In every case the patient's general condition must be built up, and his strength supported by tonics. For this purpose the following prescription may be employed:

Fowler's solution, - - -	Two drachms.
Tincture of nux vomica, -	Six drachms.
Compound tincture of cinchona, -	To make four ounces.

Mix and take a teaspoonful before meals.

The patient's skin must be kept soft by some ointment; for this purpose cod liver oil will be found useful. In recent years success has been obtained by the use of the *glycerole of the acetate of lead.* This should be spread upon soft cloths, and these wrapped around the patient's limbs, where they may remain until it becomes necessary to renew the ointment. It may be necessary to persevere in this treatment for several months before a cure is effected.

Rupia.

This term was formerly applied to a variety of affections in which a thick crust or scab was formed upon the surface of the skin. In recent years the term is limited to one eruption, which begins as small blisters containing a watery fluid. In a few days this fluid becomes mixed with matter and with blood, after which the blisters dry into dark, thick scabs. If these scabs be removed there is found beneath a raw, ulcerated surface, bounded by ragged and prominent edges. But in the ordinary course of the disease the scabs do not fall off when first formed. The first scab is raised from the raw surface by the formation of a second one beneath it. This second and lower scab is larger in extent than the first, and is in turn replaced by a third larger than itself. Thus there accumulate a series of scabs one above another, the entire mass presenting a conical shape.

These may occur at some limited part of the body or they may be scattered pretty generally over the entire surface. In this latter case the patient is exceedingly uncomfortable, and is unable to rest in any position without pain.

Treatment.— This disease is always of *syphilitic* origin. The patient has acquired the disease usually at least eighteen months or

two years previously. In most cases his general health is greatly impaired, and he may have some other symptoms of syphilis. The treatment consists in supporting the powers of the individual, in the administration of tonics and of those remedies which are known to counteract the effects of syphilis. Locally it is necessary to soften and remove the scabs by immersing the patient in a hot bath for fifteen or twenty minutes. Then the ulcers which are left after removal of the scabs may be dressed by dusting them with powdered iodoform.

Seborrhoea.

By this term is designated an unnatural secretion from the sebaceous or oil glands of the skin. This variation from the natural secretion consists sometimes merely in an excessive quantity. In this case the skin is constantly covered with a thin layer of oil, and is usually shiny in consequence; the hair too is apt to be constantly moist and glistening from excessive secretion of the glands at the roots of the hairs. In other cases the secretion is dried into scales or plates of a dirty white color, which lie upon the skin, and when removed leave a reddened surface. These scales have a greasy feel to the finger, and often a somewhat strong odor. This condition is exceedingly common upon the scalp, where it constitutes the affection known as "dandruff" or "scurf" in the head.

In the third form of seborrhoea the secretion of the oil glands takes the shape of small plugs, which distend the orifice of the gland; in this case the skin feels harsh and dry and somewhat rough like a file.

Seborrhoea occurs with especial frequency on the face and on the scalp, though it may be found on other parts of the body. It is liable to be mistaken for eczema, since the crusts produced are often thick and scaly; but, whereas the removal of the crusts in eczema leaves a reddened and somewhat raw surface, the removal of the same in seborrhoea shows no rawness, but merely a redness of the skin underneath.

Treatment.—In almost all cases it is desirable to give tonics

and arsenic. For this purpose the following prescription may be ordered :

Arsenious acid, - - - -	Half a grain.
Sulphate of quinine, - - -	Thirty grains.
Extract of gentian, - - -	Twenty grains.

Mix, and make twenty pills. Take one half an hour before meals.

At the same time the crusts may be removed by rubbing the skin with oil, and the following lotion may be applied :

Oxide of zinc, - - - -	Three drachms.
Glycerine, - - - - -	Two ounces.
Lead water, - - - -	Two drachms.
Lime water, - - - -	Six ounces.

Mix and apply to the surface upon soft cloths.

Inflammation of the Skin.

The various skin eruptions which have been described are forms of inflammation of the skin. There occur in addition several varieties of inflammation in the skin, which are not recognized as distinct diseases, but are included under the general name *dermatitis* (inflammation of the skin).

Among the various causes which may induce inflammation of the skin, are exposure to heat and cold, including the various degrees of burns and scalds. These belong properly in the domain of surgery and will be discussed under that head. Aside from these, the more common causes of inflammation in the skin are various poisonous substances, which are apt to come into contact with the individual. Many of these induce eczema, as has been already described. Some others, however, cause a diffuse redness and swelling of the skin accompanied with a burning sensation and sometimes extreme pain. Among these is the poison derived from the so-called *poison ivy*. This eruption begins with a burning and tingling feeling, which is soon followed by redness, swelling, and the development of numerous small blisters This burning sensation, together with the accompanying desire to scratch, often gives the patient extreme annoyance and even distress. These feelings may persist for a long time even after a slight exposure to the

poison. Some persons suffer from this eruption even without coming into actual contact with the plant itself; it is sufficient for them to pass through a region where the ivy grows, to have an inflammation of the skin. This eruption may also be produced in some individuals by the dried plant, and has been known to occur in those who had handled evergreens for decoration in the winter; in this case, the cause was presumably some of the dry ivy which had become mixed with the evergreens.

This poison ivy is a very common plant, which closely resembles the ordinary woodbine. From this the ivy is, however, readily distinguished from the fact that it has but three leaves on each stem, while the woodbine has five. Another plant which may cause a severe inflammation of the skin, is the *poison oak*, which is also called *poison sumach* and *swamp sumach*. Some people are also susceptible to the ordinary sumach, which induces in them a decided inflammation of the skin, though this is less violent than that caused by the poison sumach of the swamp. These may be distinguished from each other according to Dr. Bulkley, as follows: The poison sumach is a plant six to eighteen feet high; the leaves are dark green, pointed, shiny and smooth on the edges, which are not notched, they are arranged in pairs of four to six on opposite sides of the middle stem with one at the end. The harmless sumach has many more leaflets on each side. The flowers are very small and greenish, and the berries greenish white or yellowish; the berries of the harmless variety are always of a crimson red. The young shoots are purple or green clouded with purple and marked by orange colored dots which turn grayish.

In all forms of inflammation of the skin from external poisons, the object is to relieve the burning and itching. For this purpose several prescriptions may be employed, as follows:

Borax, - - - - -	Two drachms.
Glycerine, - - - - -	Two ounces.
Water, - - - - -	Two ounces.

Mix and apply to the inflamed skin. Or,

Oxide of zinc, - - - -	Two drachms.
Lead water, - - - - -	One drachm.
Wine of opium, - - - -	Four drachms.
Rose water, - - - - -	Four ounces.

If the burning and itching be intense, the surface may be dusted with this powder:

Camphor,	Half a drachm.
Oxide of zinc,	One ounce.
Starch,	One ounce.

This is to dusted thickly upon the skin.

Camphor,	One drachm.
Borax,	Two drachms.
Alcohol,	Two ounces.
Glycerine,	Two ounces.
Rose water,	Four ounces.

This should be applied to the skin upon soft cloths, and changed as often as the cloths become dry.

Freckles.

Freckles consist in the deposit of an excessive amount of pigment (the coloring matter of the skin) in irregular patches. This deposit is favored by exposure to the sun, and to excessive heat without sunlight; yet there is a predisposition of the individual to this irregular pigmentation, as is evident from the fact that some persons never have freckles, no matter how much they may be exposed to the sun's rays.

Treatment.—It is sometimes possible to remove freckles by the daily application of the following solution:

Corrosive sublimate,	Two grains.
Water,	Two ounces,

This may be gently rubbed into the skin at the discolored part by means of a piece of flannel. Yet this remedy should be used with extreme caution since it is a most violent poison.

Lice.

In addition to the vegetable parasites of the skin, which have been described as causing various eruptions such as favus, ringworm and the like, there are numerous animals which live in the vicinity of the skin and pasture upon it. Some of these are com-

paratively uncommon, and need be only mentioned here. Such is the *leptus autumnalis*, a red or yellowish insect which lives upon various kinds of grain, but seizes the opportunity of burying its head in the human skin whenever the occasion offers. The bite of the insect occasions considerable trouble to harvest hands in various parts of the world, since it causes severe itching and considerable swelling of the skin.

More familiar parasites are the common bed-bug and the flea. In the United States the flea is associated in the popular mind with the dog and cat, but in many parts of Europe the flea is a constant inhabitant of the bed-chamber and even of the body linen.

In this country the physician finds as the most frequent animal parasites of the skin three varieties of lice. Each of these varieties is characterized by certain features of size and shape and by its habits.

The largest of the three is the *body louse* (*pediculus vestimenti*). This animal lives altogether in the clothing, and hence when its presence is suspected it does not suffice to examine the body simply in order to detect it. Search should always be made in the creases and folds of the underclothing, especially in those parts where it rub closely upon the person; thus they are especially liable to be found around the shoulders and under the arms, around the hips and between the thighs.

The presence of these parasites is indicated by the intense itching and by the occurrence of minute red spots or small dried flakes of blood. The irritation caused by the parasites results in scratching, which then induces the development of pimples. These are irritated, their tops scratched of, and there finally results an extensive rash on the skin, which may become so serious that the origin of the difficulty is not suspected.

Body lice are usually found first around the neck and shoulders; and the rash induced by them consequently appears first in these parts. Subsequently, however, the animals find their way over the entire body, and the skin may accordingly exhibit their effects throughout its entire extent.

Treatment.—So soon as the existence of body lice is discovered, all the clothing worn by the patient should be put into an oven and kept at a temperature of at least 225 degrees F. for two or three hours. This will be sufficient to destroy the mature

animals, though it may not annihilate the nits, which are also found upon the clothing. To accomplish this latter object the underclothing and the linen should be subsequently boiled; and it will be better to repeat this process again during the course of a week. As for the body of the patient himself nothing further is needed than a hot bath. After this, and the removal of the cause, the rash on the skin will subside spontaneously. This species of louse does not inhabit the hair, and, therefore, need occasion no anxiety as to the condition of the head. In order to prevent the return of any of the parasites which may have escaped the efforts made for their destruction, the following ointment may be rubbed upon the skin:

Perchloride of mercury, - - -	Two grains.
Chloride of ammonium, - - -	One drachm.
Alcohol, - - - - - -	One ounce.
Rose water, - - - - -	Four ounces.

The *head louse* is smaller than the former and lives exclusively on the scalp; three or four are often found on one hair, the lowest being the oldest. These lice may extend their depredations somewhat outside of the hairy part of the scalp, and may invade the neck and even the face. The irritation caused by them is often sufficient to induce eczema of the scalp; in every case of this disease search should be made for these animals as the possible cause.

The nits or eggs of the head louse are firmly attached to the hair, so that they cannot be removed by combing, nor, indeed, in any way without destroying them. These hatch in about nine days; hence the head may be thoroughly cleansed of all the mature animals to-day, but be thickly populated again by the end of the week.

Treatment.—The lice can be removed by careful combing with a fine-tooth comb. The nits can be destroyed by any one of several agents. It is not necessary to cut off the hair to accomplish this.

One of the speediest ways for eradicating both the mature lice and the nits from the head consists in the application of *kerosene oil*. The head and hair should be thoroughly shampooed with this oil three times in the course of the day, and the head should be bound up in a towel during the intervals. At the end of twenty-four hours the head and hair may be thoroughly washed with soap and

water. The towel which has been used to cover the head should be baked thoroughly in the oven.

In carrying out this plan, extreme care should of course be taken to keep lights and fires away from the individual's head. Several serious accidents have followed the neglect of this simple precaution.

Those who may deem kerosene oil too unpleasant and irritating for application to the head, may use the following substitute: An ounce of *stavesacre* seeds may be bruised in a mortar or in a cup, into which there may then be poured half a pint each of alcohol and water. The vessel is then thoroughly shaken and allowed to stand covered for half an hour, at the end of which time the liquid may be rubbed into the scalp and onto the hair. This shampooing may be repeated three times during the day; on the following day the hair is washed with soap and water.

If this measure prove unsuccessful, the hair may be washed with a solution of corrosive sublimate, three grains of which are dissolved in six ounces of water. Yet it must be repeated that this substance cannot be used by an inexperienced person without some danger.

The third variety of louse which makes its home on the human body is the one known as the *pediculus pubis*, vulgarly known as the "crab louse." This animal inhabits the hair on all parts of the body except the head. It is more frequently found, therefore, in the hair of the genitals, but also inhabits the beard and the eyelashes. In the latter situation it is a frequent cause of a disease of the eye, which is manifested by the formation of thick crusts along the edges of the lids. Close inspection shows that these crusts consist largely of the lice themselves, which cling so closely to the hairs that they are detached with great difficulty.

These lice may be destroyed by kerosene oil. They are also destroyed by the common *mercurial ointment*, though this should be used with caution in order not to provoke salivation. Perhaps the most convenient way is the use of the ordinary "insect powder." By blowing this powder freely upon the parts two or three times a day the animals are destroyed and may be washed off subsequently with soap and water.

The irritation caused by lice, whether on the body or the head, often results in swelling of the glands near the irritated part of the skin. Thus their presence in the hair of the head often causes the

appearance of lumps at the back of the neck, especially in scrotulous and ill-nourished children. These lumps may proceed to the formation of abscesses and boils. On other parts of the body, too, such lumps may form and discharge matter profusely. So soon as the cause of irritation — the lice — is removed, these abscesses subside.

After an individual has been afflicted for a considerable time with body-lice, and has relieved himself by violent scratching, the skin presents numerous discolored spots and lines of a darker hue than natural. These dark spots persist for some weeks after the cause of the irritation has been removed, but ultimately disappear.

The fact that lice are often found in and around the abscesses which result from the irritation of the skin, gave rise in former times to various fables, which were believed by the medical profession as well as by the people. Thus Aristotle taught that lice were produced in the flesh of the individual, and that they came out to the surface through these abscesses. It was asserted that individuals sometimes died through this production of lice in their bodies out of the injurious humors that were circulating in the blood. It was believed that the Danish King Snyo, for instance. died of this disease. Lice are, however, air-breathing animals, and cannot, of course, exist under the skin. They are found only upon the surface of the skin, or upon the garments covering the skin, where they have opportunities for breathing.

Corns.

Corns are one of the evils which seem inseparable from modern civilization. They consist of a thickening of the horny layer of the skin with an excessive development of blood vessels and nerves in the deeper parts. They result from long-continued pressure upon the skin, usually upon the feet, since these are the parts of the body most frequently exposed to continuous pressure. The corn is ordinarily the product of an improperly-made shoe, which causes pressure either directly upon the skin at some particular part of the foot, or compresses the toes so that they rub against one another. While such shoes are generally too small, they may be in some cases abundantly large, except at some particular point.

Corns are ordinarily spoken of as *hard* and *soft*. These are essentially the same, differing only in the rapidity and extent of their formation.

Treatment.— The most troublesome corns cease to give any annoyance, and finally disappear, if only such shoes be worn as afford ample room for the foot. Yet this plan is rarely followed, and it becomes necessary to devise some means for removing the growth outright. There are several means for removing corns. The first of these consists in relieving the tender part from pressure, by wearing over the toe a piece of felt or doeskin with a hole in the center large enough to receive the corn. This felt or doeskin is made adherent by some form of sticking plaster, and is thus attached to the skin in the proper position; or even without being made adhesive itself, it may be held in position by narrow strips of adhesive or "sticking" plaster. In this way the corn is protected from the pressure of the shoe, the projecting part can be readily removed with a sharp knife or razor, and in the course of time the corn disappears.

Another method consists in the use of lunar caustic. The foot is soaked for a quarter of an hour in warm water, after which as much of the corn is cut away as can be, without causing it to bleed. The surface is then rubbed thoroughly with a stick of lunar caustic, after which the toe is covered with sticking plaster. At the end of one or two weeks a thick scab is loosened from the toe, with which the corn is usually brought away. In using this method the foot should be rested for some hours after the application of the caustic; hence this should be applied in the evening before retiring.

Another method, which is extensively practiced by the professional corn doctors, consists in scraping around the corn and down on either side of the "core" until the point is reached; the entire mass can then be extracted without causing pain. In order to accomplish this, the operator must have a special instrument as well as considerable experience.

Another method, which is that commonly employed in the application of the patent remedies for the cure of corns, consists in the use of some material which will soften the outer layer of the skin, such as potash or acetic acid. These substances are made up into the form of a paste, which is applied to the thickened skin every night for four or five nights; by this time the skin is well softened,

and when the foot is soaked in warm water for fifteen or twenty minutes the mass of thickened skin can be readily detached.

In the treatment of corns it should be remembered that the painful spot is right under the "core;" it is here that the skin is thickest and hardest, and it is under this core that the greatest tenderness exists. Hence in cutting corns we should not pare the outside and leave the core, since thereby the corn is rendered extremely sensitive to pressure; the object should be always to dig out the central part, the core, and leave the external part of the mass as a protection.

Suffering from corns can also be diminished by the use of different pairs of shoes on successive days; since no two shoes will press in exactly the same place, the skin is relieved from pressure for several days at a time.

The soft corns which occur between the toes, may be treated in the same way as the hard corn. Sometimes the annoyance from them can be much diminished by daily washing with spirits of camphor, and by wearing pieces of cotton between the toes; relief may also be obtained by the employment of pieces of felt or doe-skin with holes cut through the middle, so that the corn is relieved from pressure.

Mother's Marks.

Mother's marks or *naevi* are congenital discolorations of the skin. They are of two varieties: first, there is the simple increase in the coloring matter of the skin, constituting what is known as a *mole*. These moles are often supplied with hairs of unusual size and length, whereby the disfigurement of the skin is much enhanced. The other variety is the reddish discoloration of the skin, which is variously known as *wine mark* and *claret stain*. This reddish color is due to an unnatural size of the blood vessels in the skin at the given point. Sometimes this enlargement of the vessels is quite limited, making merely a reddish point; at other times the vessels over a considerable part of the skin are enlarged and dilated, so that the entire side of the face or neck exhibits an intense red color.

These birth marks are associated in the popular mind with numerous curious fables. Every deformity of a new-born child,

whether it consists merely in a discoloration of the skin or in more serious departure from the natural condition, is explained by supposing that the mother during her pregnancy had witnessed some scene or beheld some object, the sight of which had impressed itself upon her memory and upon the body of her unborn child. These wine marks, so called, are attributed to such causes; in one instance the mother asserts that she had, a few months previous to the birth of the child, seen an individual with blood on his face, exactly in the location in which the discoloration subsequently appeared on the face of her child.

It is needless to say that there is no foundation whatsoever for such explanation of these deformities. These fables are merely evidences of the curious fancies which have always been invented to explain the unknown.

In consequence of the superstitious ideas associated with the origin of these mother's marks, there has prevailed a belief that these deformities should not be corrected lest some harm should happen to the individual. This, too, is a mistaken idea, as has been often demonstrated by the removal of such marks. There is no objection on this score to removing mother's marks; but there is often considerable difficulty in the execution of this plan. Various procedures have been devised and carried out by surgeons for the relief of this condition, but until recently, all of them have required some interference by means of the knife or of caustic. It is, however, now possible to remove many of these mother's marks without injury to the patient, but such measures can be successfully carried out only with the apparatus and skill of the surgeon.

Medicinal Rashes.

Quite a number of the remedies in common use are capable, when taken in excess, of exciting eruptions upon the skin. Prominent among these is the *bromide of potassium*. This remedy is taken for a long time in the treatment of various diseases, among them epilepsy and persistent wakefulness. After the use of the drug for several weeks or months, according to the susceptibility of the patient, there appears a rash upon the face, shoulders and

breast. This rash is caused by the inflammation of the sebaceous glands in the skin, and cannot be distinguished from the common *acne* or pimples upon the face. If the medicine be discontinued, the rash usually subsides in the course of a few weeks. If it becomes necessary to continue the use of the bromide, the appearance of the rash may be avoided by administering Fowler's solution at the same time. For epilepsy, for instance, the following prescription may be ordered:

Bromide of potassium,	-	One ounce.
Fowler's solution,	-	One and a half drachms.
Syrup of orange peel,	-	Two ounces.
Water, - -	-	Two ounces.

Mix, and take a teaspoonful four times a day.

If the rash which is produced by the bromide of potassium be not treated, it is apt to result in the production of large blisters containing matter—the condition known as *ecthyma*. This results in part from the itching of the skin and the consequent scratching by the patient.

The *iodide of potassium* is also a frequent cause of a skin eruption. It is important to bear this in mind, because the failure to remember it, and to recognize the nature of the rash, sometimes leads to serious errors of diagnosis, for the iodide of potassium is taken for months at a time in the treatment of syphilis; now this disease causes, among other things, several eruptions on the skin, and it has sometimes happened that a patient has persisted for a long time in the use of iodide of potassium to remove a rash which he supposed was due to syphilis, but which was really the effect of the remedy itself.

The rash produced by the iodide of potassium is very similar to that caused by the bromide, and resembles, therefore, the common acne.

Arsenic causes certain derangements of the skin, when brought in contact with the person repeatedly and persistently; thus many of the workmen employed in the manufacture of dyes and of articles in which these dyes are freely used, such as wall paper, are apt to suffer from severe inflammation and ulceration of the skin. It may also induce a hardening of the skin, when taken to excess as a medicine.

Copaiba also causes a rash on the skin when taken to excess, as it often is in the treatment of gonorrhea. This rash causes a

reddish eruption composed at first of pimples simply, which may be followed by blisters of considerable size and by swelling of the skin, such as occurs in nettle-rash.

Tar and the various substances which are made from it also cause an eruption on the skin.

Arnica often induces eczema of the skin when applied to bruises, sprains, swellings and the like.

The Nails.

The nails are merely thickened pieces of skin, being made from the same materials and arranged in essentially the same way as the outer parts of the skin in general. The nails are subject to a number of diseased conditions. They are often affected when the skin is the seat of a rash. Thus in *psoriasis* (dry tetter) the nails of the hands and perhaps of the feet also are affected; they become speckled, whitish, irregular and brittle; sometimes the free edge is split up into several distinct layers.

In *ichthyosis* (fish skin disease) the nails are apt to be thickened and dull. In *lichen* they are also affected.

In *syphilis* the nails are often deformed, and their beds become the site of inflammatory processes.

In *scrofula* the nails are often marked with distinct lines, and may be thickened; in consumption they are often club-shaped and arched. A similar arched appearance is often presented by the nails in cases of heart disease.

Another cause of difficulty in and around the bed of the nail is the occurrence of parasitic growths, like those which cause ringworm on the skin. In this affection the nail becomes somewhat thickened and raised. The cause of the difficulty is usually indicated by the occurrence of ringworm elsewhere on the skin.

Ingrowing toe-nail is a troublesome affection, which is apt to follow the compression of the foot by tight boots. At times the nail is really not at fault, the flesh at the side being merely forced over and against it by the pressure from without. In these cases the nail retains its natural flat shape, and is not tender upon pressure.

In other instances of ingrowing toe-nails the difficulty lies really in the nail itself. In these cases the bed of the nail has been irri-

tated for a long time by pressure. As a result, the nail is thickened and its shape essentially changed; for instead of being flat, with a simple depression at the sides, the nail is usually thickened and raised in the middle, while the sides are directed downward and grow deeply into the flesh. In these cases pressure upon the nail, especially upon the end, causes pain.

After a time the constant irritation of the flesh, caused by the sharp edge of the nail, excites inflammation of the skin, which may proceed to ulceration. A considerable surface along the side of the nail may become raw and covered with matter. Under these circumstances the toe is very painful, and the shoe cannot be worn without extreme annoyance.

Treatment.—The treatment of this condition must depend upon the degree to which the inflammation and ulceration have progressed. In the early stages, that is, when the skin alongside of the nail is merely red and tender, it will usually be sufficient to wear only shoes which afford ample room for the toe. It is important to see that the shoes are not simply wide enough, but that they also are made so as not to press upon the toe from above.

If there be already some ulceration at the side of the nail, the skin should be gently pulled away from the edge of the nail and the groove should be washed out thoroughly with water; it will often be possible to discover small fragments of the nail which have broken off and are lodged in the groove, where they keep up a constant irritation and provoke a profuse discharge of matter. These should, of course, be removed. A little vaseline should then be smeared upon a small piece of cotton wool and gently inserted between the edge of the nail and the skin. This dressing should be renewed at least once every day, the part being washed at the same time. If care be taken to avoid further pressure by the shoe, recovery will usually take place by this simple means. If not, narrow strips of adhesive plaster should be so applied around the toe as to hold the skin at the side of the nail away from the edge of the nail itself.

If all these measures fail, the edge of the nail may be removed to such an extent as to afford the skin sufficient room. This is an operation which should be performed only by a surgeon.

DIET IN DISEASES OF THE SKIN.

The physician is constantly asked by patients suffering from skin diseases, what they shall eat and what they shall not eat. Probably no other class of patients is so deeply impressed with the idea that their diseases are due to impurities of the blood, and that extreme care should be taken to avoid the use of certain articles of food. Most of these patients have theories and hobbies as to the diet which it is proper for them to take and to avoid; and most of them seem to believe that dieting consists in the avoidance of food so far as possible.

It is true that the diet can be made to exercise considerable influence upon diseases of the skin as well as upon diseases of the internal organs; but it is not especially necessary to regulate the food in diseases of the skin, with certain exceptions to be presently mentioned.

In every case it should be remembered that the plan of dieting does not mean to reduce the patient to the verge of starvation, but simply to grant him such articles of food and in such quantities as will, in the opinion of the physician, tend to restore his bodily functions to their natural condition. In most cases the patient needs to be *built up* rather than *torn down;* for most diseases of the skin, even those of local origin, such as ringworm, indicate that the patient is in a more or less debilitated condition, since these diseases do not ordinarily occur in persons of the most robust habits.

There are certain affections of the skin which are provoked and aggravated by indulgence in particular articles of diet; the patient soon learns to discriminate for himself upon this point; he soon discovers what articles of food are especially apt to provoke the outbreak of his complaint. Thus the sufferer from nettle-rash early ascertains that he has an attack of the disease whenever he eats strawberries, or oysters, or shellfish, or whatever his particular weakness may be.

Aside from these personal peculiarities, there are certain principles which apply to patients affected with chronic diseases of the skin. In most cases the appetite is a reliable guide, though it sometimes needs direction.

To begin with, it must be remarked that much of the difficulty from errors of diet arises not so much from the nature of the substances eaten, as from the imperfect and careless way in which they are eaten. In our country especially, rapid eating and hurried chewing are prevalent habits, which are responsible for many difficulties of other organs than the stomach. For digestion really begins in the mouth; here the food is not simply divided into small particles, so that it can be acted upon by the juices of the alimentary canal, but it is also mixed with the saliva, which effects certain changes in it. If the chewing be imperfectly performed, or if the saliva be but slightly mixed with the food, there will result first derangement of the stomach, and subsequently derangements of other organs. For the ill effects are not limited to the stomach alone. If this do its work but imperfectly, additional labor is required of other organs to piece out the work of the stomach; while at the same time these other organs are supplied with imperfect blood, since the stomach does not digest and take up the food in a natural way. It is evident, therefore, that one of the first requisites for the diet of a patient affected with skin disease is that the food shall be easily digested. The patient's own sensations will usually indicate to him when he has indulged in indigestible food.

As to the quantity of food which should be taken, it may be said that but very few of the skin diseases are caused or aggravated by excessive indulgence in food. Patients with acne are perhaps the only ones whose complaint is aggravated by simple over-indulgence. Such patients should avoid hot drinks and soups, since these provoke flushing of the face and favor the development of the rash. It is well for them to avoid desserts, since these are usually just so much more than the individual requires or really desires.

A prevalent habit, which probably contributes largely to the prevalence of indigestion, is the habitual use of large quantities of liquids with the meals. Aside from the injury which may result from alcohol or tea or coffee in excess, it is not desirable to fill the stomach with any liquid, however harmless, during the process of digestion; since the stomach juices are thereby diluted and weakened and the process of digestion is, to say the least, retarded. This is especially true if the liquids taken be cold, since the effect of chilling the stomach is also to arrest the digestive process.

Patients with eczema are apt to dislike and avoid fatty food. It has been ascertained that the use of fats in the food generally

exercises a good influence upon the course of the disease; hence it is desirable that such patients take a moderate amount of fat with their food, even though they do not crave it. These patients with eczema are apt to eat vegetable food by preference, especially the starchy substances, such as rice, arrow-root and oat meal. It is well for them to bear in mind the popular idea that "oat meal is heating," since there seems to be some foundation for this idea in fact.

One of the most frequent causes and one of the most constant means in prolonging the various diseases of the skin, is indulgence in fermented liquids. These generally exercise a decided influence in originating and in prolonging diseases of the skin. A patient suffering from such disease should, therefore, abstain from the use of beer, ale, wine, whisky, cider, etc., unless his condition is so debilitated as to require some of these liquids to increase and support his strength.

Especial care must be taken in the food of infants who are afflicted with diseases of the skin. The great bane of infancy among skin affections is eczema. This is doubtless often caused by a poor quality of food, whether this food be artificial nourishment or the milk from a debilitated mother. In every case of eczema in an infant, the attention should be directed to the matter and manner of nourishment of the child; the mother should scrutinize carefully her own condition; should see that she eats only suitable food and avoids articles which she knows to be harmful, even though she have a craving for them. She should also endeavor to avoid any mental disturbances, excitement or emotion of any sort, undue sexual indulgence, and she should secure sufficient rest by retiring in due season at night.

Another habit which may assist in the development of eczema is the practice of giving the child the breast too frequently. The custom is almost universal of using the breast to soothe a crying infant; this is usually a successful device, but it exerts a most injurious influence upon the child's digestion, and promotes the development of several skin diseases, especially eczema. As will be observed under the appropriate heading, the child should not have the breast, even in the early weeks of life, oftener than once in two hours; and as time passes this interval should be lengthened, in the interests of the child as well as of the mother.

Doubtless another factor in the production of eczema in nurs-

ing infants is the use of fermented liquors by the mother. It is well ascertained that the use of such liquors promotes the occurrence of eczema in adults and in infants through the mother's milk; hence, unless the mother's general condition is such as to absolutely require the support which can be given only by fermented liquors, it is advisable that she avoid these, in spite of the counsels and remonstrances of friends.

Eczema is especially frequent among artificially nourished or "bottle-fed" infants. It is often impossible to relieve an infant from eczema until its diet be radically changed. Directions for the feeding of infants will be found in the section on "diseases of women and children." It is scarcely necessary to remark, that the habit of feeding suckling infants with scraps from the table, pieces of cake "which won't do him any harm," sips of tea and coffee, and the like, should be avoided even when the child is perfectly healthy, in the hope of keeping him so. It is all the more necessary when the infant is afflicted with a disease of the skin.

Much might be said, also, as to the hygiene of the skin during the existence of ailments affecting it. The popular idea that bathing is always desirable in all diseases of the skin, is a mistaken one; some of these diseases, especially eczema, are greatly aggravated and prolonged by frequent contact of the skin with water. Yet certain diseases, especially psoriasis, are certainly benefited by frequent bathing, especially at the sea shore. In fact everything which tends to increase the activity of the skin — muscular exercise in the open air, sunlight, fresh air in the bedroom, etc. — is highly desirable and important in the treatment of chronic diseases of the skin.

Dr. Fox gives the following directions as to diet in skin diseases:

First.—A distinction must be made between the diet of the private and the hospital patient. The latter often requires to be well fed and his disease then speedily goes; the former, on the other hand, often needs to have a check put on the quantity and quality of his food.

Second.—In children, skin diseases may arise directly from defective alimentation, as in the case of eczema; and it is frequently the case that the child who is the subject of eczema or of psoriasis, has not a sufficient supply of milk, either from excessive dilution or otherwise.

Third.—The regulation of the diet, setting aside the question of quantity or quality, is as a rule needed not so much to directly influence skin disease as certain states of the general health, which modify the particular disease present; for instance, to meet especially dyspeptic, gouty and rheumatic conditions, but particularly the former.

In dyspepsia, in connection with eczema, acne, psoriasis or congestion of the face, it is advisable, especially if the urine be very acid, to avoid sugar, tea, coffee, alcoholics, beer, raw vegetable matter, unripe or uncooked fruit, veal, pork, seasoned dishes, pastry and the coarser kinds of vegetables, but especially all articles whose use is followed by heat or flushing of the face, and by flatulence and the like. Milk, the common meats, light kind of bread and some very light wine should be the diet of dyspeptic patients whose skins are at all in a state of irritation. In very many cases the stomach is at fault at the outset, and a careful regulation of the diet is of the utmost importance as an aid to the other means adopted to correct faults in other parts of the system.

In gouty subjects much the same line of treatment is to be pursued. As regards stimulants, hock, a good light claret or whisky and water are the best beverages.

In scrofulous patients the diet should consist of as much fatty matter as possible.

Fourth.—In children who suffer from ringworm it is desirable to give plenty of fatty food by means of milk, cream, eggs, and fat meat, if they can be persuaded to eat it.

Fifth.—In syphilis the greatest care should be taken to avoid everything beyond the most moderate use of stimulants; their abuse in this disease is a source of the greatest aggravation.

Sixth.—In all cases in which the onset or early stage of a skin disease is accompanied by fever, however slight, stimulants should be avoided, and the plainest and simplest diet ordered. In marked cases of this kind a milk diet for a while is often found to be very beneficial.

Seventh.—In some cases in which the disease is accompanied by flushing of the skin, this condition is much increased by the consumption of food, especially if dyspepsia exist, in consequence of the sympathy existing between the stomach and the skin of the part affected. This state of things is especially marked in such

diseases as acne, congestion of the face and sycosis (barbers' itch). Stimulants must be avoided, unless they be diluted with some alkaline water. The use of a diet appropriate to the dyspepsia must be rigorously enforced.

Eighth.—It is said that psoriasis requires an ample meat diet; but the patient must be dieted, and not his disease. That is, the diet should be plain and nutritious and adapted to the constitutional peculiarities, according to circumstances.

Ninth.—In all cases where a skin disease has become chronic, and where there is debility, the patient should be allowed a full unstimulating diet.

At the well-known hospital for diseases of the skin, Blackfriars, London, the following directions are issued, to be observed by patients:

Remove flannel from next the skin affected, or line it with soft linen. Wash with warm water, and, as regards *diseased* skin, not more frequently than cleanliness requires.

Avoid using soap of any kind to the affected parts. To cleanse the diseased skin, substitute instead of soap a paste or gruel made of bran, oat meal, linseed meal, arrow root, or starch and warm water. Rinse off with warm water or warm milk and water; and employ yolk of an egg and warm water to cleanse the scalp.

Dry the skin with soft linen, and smear it lightly with the ointments or liniments, or dress wounds with the same spread thin upon lint or linen. Afterward apply the bandages evenly should they be required. Bathe the affected part by means of a sponge or rag with the lotions or embrocations, or paint them over with a camel's hair brush, not more frequently than directed by the physician.

Rinse the mouth with water, and brush the teeth after taking the medicines, and observe that neither more nor less than the dose ordered is taken.

At the same institution the following rules of diet for patients are observed:

For breakfast—Bread and milk, rice, milk or porridge instead of much tea, coffee or cocoa—with or without eggs, and bread and butter, or a little animal food.

For dinner—Plain roast or boiled fresh meats, fish or poultry plainly cooked, egg or farinaceous (starchy) puddings, potatoes, and few other vegetables, plain boiled rice.

For supper—Milk and water, or gruel or other farinaceous

food, with bread and butter, a little cream, cheese or poached eggs.

Beverages—Barley water, toast and water, thin gruel beef tea, soda, potash or seltzer water.

N. B.—*To be avoided*—Salt meats, soups, sweets, acids, fruits, pastry and raw vegetables.

No malt liquors, wine or spirits are to be taken without the sanction of the medical officers of the hospital.

Keloid.

This is a somewhat rare affection, consisting of a scar-like growth which appears in the shape of white shiny streaks. The surface is usually very smooth and covered with minute hairs. At first the skin is soft and elastic, but afterward becomes hard and painful.

The tumor begins with a circumscribed discoloration of the skin, which is surrounded by a red ring. In a short time an itching sensation or even positive pain is occasioned by pressure; it sometimes happens that the patient's attention is first called to the growth by a painful feeling resulting from the pressure of the clothing.

Keloid grows slowly; in the course of time the central part becomes sunken, while here and there narrow streaks may be elevated. It appears most frequently on the breast, the neck, and the back, though it may be found on any part of the surface. The growth is rarely observed before puberty. It is said to occur in tropical countries and among the negroes.

As to the nature of the growth, nothing definite is known. In some cases it appears to be merely the beginning of a cancerous formation, while at other times the keloid seems perfectly harmless, and may even result in a spontaneous cure.

Treatment.—The cases which have thus far been observed have shown themselves very obstinate against treatment. In most instances the attempt has been made to remove the growth either by the knife or by the use of corrosive substances. If the growth occasions no pain, it is better to avoid irritating it by such treatment and simply to protect it by a bandage, so that it will not be irritated by the clothing.

Fatty Tumors.

There frequently occur small tumors of the skin, which are composed merely of fat. They are of course of no especial consequence, except as they affect personal appearance. It is, however, important to recognize them in order to relieve the mind of the patient from unnecessary anxiety and apprehension.

A tumor composed simply of fat is never painful; the skin over it is not red nor in any way changed from its natural appearance. The surface is usually rounded and can often be separated into lobes; indeed, we can see without touching the tumor that it is divided into parts by furrows which traverse it in different directions.

These tumors are most frequently found after the thirtieth year of life; they may, however, be met with in younger persons, and are sometimes even born with the individual. They seem to result, in some instances, from a blow or a wound. They are most frequently found on the shoulders and the hips, more rarely on other parts of the body; sometimes numerous tumors are observed on the same individual.

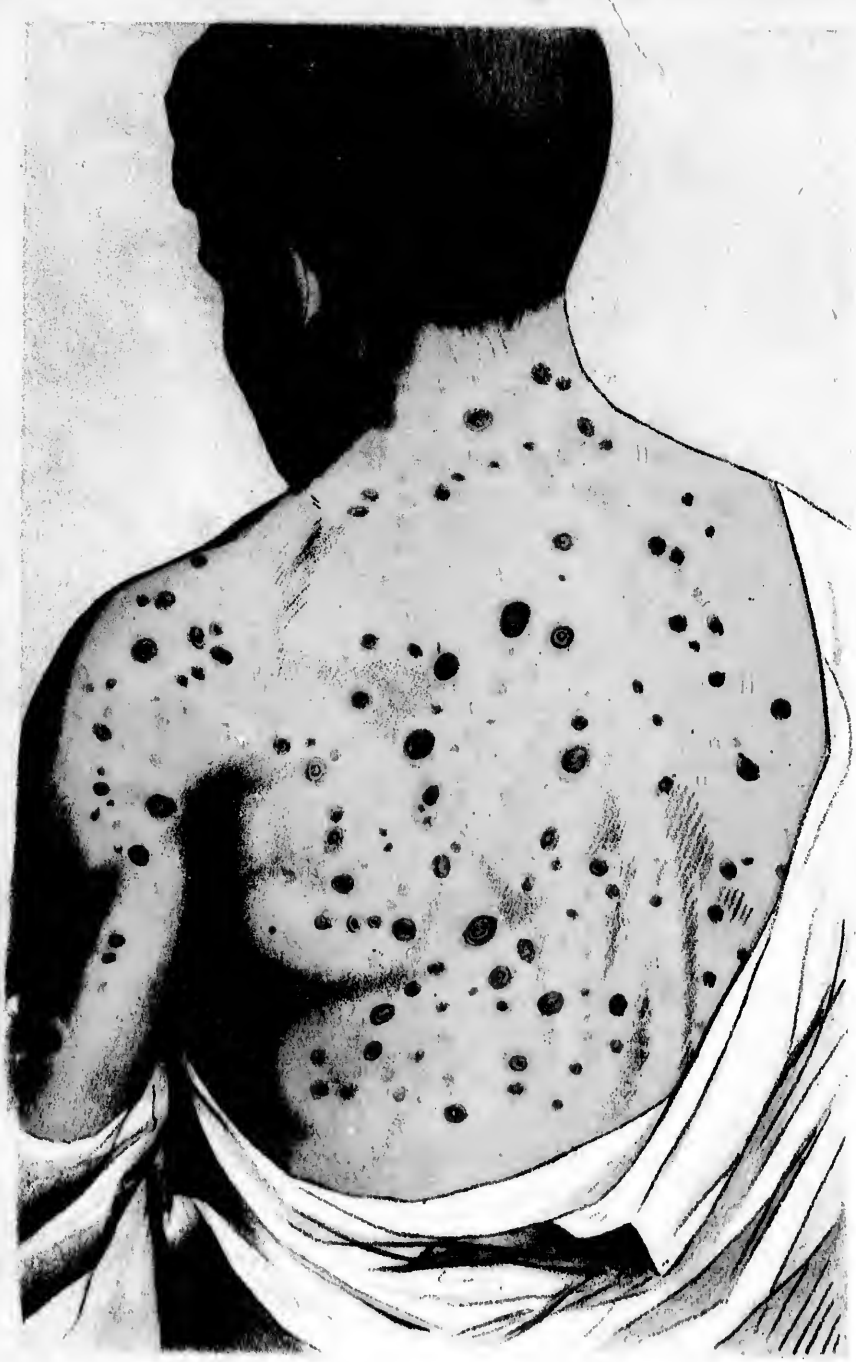
Treatment.—So long as the tumor occasions the patient no annoyance, it need not be interfered with; it will never endanger his life or health. If, however, it be situated on the face or other part of the body, where it constitutes a deformity, the tumor may be removed without danger by a surgical operation.

in, which are
special conse-
t is, however,
e mind of the

nful; the skin
ıtural appear-
be separated
tumor that it
ifferent direc-

thirtieth year
persons, and
hey seem to
They are most
ıore rarely on
s are observed

ıc patient no
ver endanger
face or other
e tumor may



SÍFILIS.
SYPHILIS.

VENEREAL OR PRIVATE DISEASES.

By this name are designated three diseases which are usually acquired by the impure intercourse of the sexes: hence the name, from *Venus*, the mythical Goddess of Love. These three diseases are: Syphilis, chancroid or venereal ulcer, and gonorrhea.

Pox—(Syphilis).

Much time and labor have been expended by medical historians in ascertaining the date and location of the earliest manifestation of this disease. It is one of those contagious diseases which are acquired only by contact with an individual already subject to the affection; and this individual must be, moreover, a human animal, since man is the only one of all known creatures who is susceptible to this disease. For many years experimenters have busied themselves with the attempt to inoculate the lower animals with syphilis; at first the ordinary domestic animals — dogs, cats, rabbits, and the like — were employed for the purpose; and after innumerable failures to inoculate these animals with syphilitic material from human subjects, it was deemed possible that the monkey might be a more favorable object for the purpose, because of his greater resemblance to the human animal. One or two observers have, at different times, reported that they have succeeded in inducing this disease in monkeys by inoculation with the syphilitic poison from human patients, but the almost unanimous testimony of experimenters is, that the monkey, notwithstanding his intimate relationship to man, is nevertheless not susceptible to this curse of the human family.

The attempt to fix the date and locality at which the disease originated has not met with much success. It seems certain that

the disease was known in the time of Moses, since in the Fifth Book of Moses an ailment is described which was apparently a manifestation of syphilis. It is quite certain that the disease was known to physicians several centuries before Christ; and it has been ever since one of the recognized affections of human patients. It seems also quite certain that syphilis was present among the ancient tribes of America, before the invasion of the continent by the whites.

In the middle ages syphilis was extremely prevalent, so that at the end of the fifteenth century the disease ravaged the population of Europe like an epidemic of small-pox.

With occasional slight exceptions, syphilis is known wherever man has set his foot. In a few remote and isolated spots syphilis is still unknown, or has been introduced within the last few decades. The following account of the geographical distribution of syphilis is taken largely from Zeissl's text book of syphilitic diseases.

The disease is more prevalent on the shores of the East and North sea and in Jutland, and around the shores of the Mediterranean, than in certain parts in the interior of the European Continent.

In the Faro Islands, on the other hand, syphilis was unknown until the year 1844; and in Iceland the disease was not found until quite recently. This latter fact is very remarkable, since between two and three hundred ships from different parts of Europe visit Iceland every year, and many of them remain in the harbors during the entire summer. There is evidently opportunity enough for the communication of the disease to the inhabitants of the island, since sailors furnish probably a larger percentage of sufferers from syphilis than any other class of society.

The disease is prevalent throughout Europe, especially in the capitals. Certain provinces are especially afflicted; among these are Galicia, Iberia and the provinces around the Adriatic.

In Southern Asia — Palestine, Arabia and Persia — syphilis prevails to an unusual extent. It is especially frequent among those people who are brought into contact with Europeans. In Syria the disease has been known only since an invasion by Turkish troops.

In Australia, and most of the islands of the Pacific, the disease has been introduced by white settlers. During the latter half of the last century many of the Pacific islands were devastated by syphilis obtained from the sailors of Captain Cook's expedition.

Syphilis is especially virulent and deadly when it is introduced into a community for the first time. This has been well illustrated in the history of the Sandwich Islands. For some time after these islands had received a considerable white population syphilis remained almost unknown, so far, at least, as the natives were concerned; but as the islands acquired commercial importance, and were more frequently visited by vessels, the disease was introduced by sailors among the native population. The result was a frightful epidemic of syphilis, in which many lives were lost and many individuals mutilated for life. The white population, however, suffered no more from it than the whites of Europe or America — showing the difference between the effects of the disease when freshly introduced to a people unacquainted with it.

In America syphilis seems to be extensively distributed. It is most virulent and frequent in Mexico, Central America and some of the islands of the West Indies. It is also frequent in several of the countries of South America.

It appears, therefore, that syphilis is one and the same disease over the entire world. It is communicated wherever introduced, without regard to differences in race or color. It is however noteworthy that in Iceland and Central Africa the disease finds no foothold. It would seem at first as if its absence from the inhabitants of Central Africa might be due to the absence of exposure to the disease, since but few whites ever penetrate this region; but the fact is, that the negroes of the interior of Africa are in constant communication with those of the coast, and that these latter are afflicted with syphilis to a great extent.

As to the influence of climate upon the virulence of syphilis but little information has been acquired. It is by some maintained that the course of the disease is milder in warm climates than in colder ones; yet this seems to be by no means established. It seems, however, to be the fact that syphilis runs a milder course in those regions where the climate is uniform and even, while its course is more severe — other things being equal — in countries where the climate exhibits sudden and extreme changes of temperature and of moisture.

Yet the extent and severity of syphilis is determined largely by the social and sanitary conditions of a people. The most favorable conditions of climate are powerless to prevent the prevalence of syphilis where filth, poverty, ignorance and a neglect of

sanitary regulations prevail. This is brilliantly shown in the eastern provinces of Austria. Although this region enjoys a wonderfully mild and beautiful climate, thanks to the filth and ignorance of the inhabitants, syphilis prevails to an appalling extent. The young men go to other countries as soldiers or sailors, and bring syphilis with them on their return, and, of course, communicate it in their homes.

Another feature which promotes wonderfully the spread of syphilis is an unsettled condition of society. It is notorious that a political upheaval — such as a war or revolution — is followed by marked increase in the extent and severity of syphilis. This has been often and amply shown, though never more strikingly than in the history of France, from the time of the Revolution to the battle of Waterloo.

The moral culture of a people has, of course, considerable influence upon the prevalence of the disease; though just what that influence is, it is somewhat difficult to say, since the centers of civilization — the European capitals — are, without exception, hotbeds for the propagation of syphilis. Doubtless the dissemination of the disease is favored also by the high-pressure method of living, which is now so fashionable throughout the world, especially in America. The necessity of attaining a certain rank and standing in society before entering upon matrimony, acts, of course, as an agency in spreading the disease among young people of both sexes.

The course of syphilis is divided, for convenience, into several stages or *periods;* these are usually designated primary, secondary and tertiary. The *primary* stage begins with the first manifestation of the disease, which is, in almost all cases, a sore at the point of contact with the diseased individual from whom the contagion was obtained. This sore usually occurs upon the genitals, but may be found upon any part of the body. The next most frequent point of infection is the mouth, and after this the nipples of women.

This sore, and the swelling of the neighboring glands which ordinarily accompanies it, lasts without other symptoms from three to six weeks. At the end of this time other symptoms make themselves manifest, marking the beginning of the second stage of the disease.

The *secondary* period begins from the seventh to the twentieth week of the disease. Its onset is indicated by an eruption on the

skin and by sores in the throat and mouth. After this the glands swell in different parts of the body, and there may appear later any one or more of several eruptions which are characteristic of this disease.

The *tertiary*, or third stage of syphilis, manifests itself at or after the sixth month by the occurrence of lumps in the skin and in the bones. Several eruptions are also observed on the skin during this stage of the disease. The duration of this period is very indefinite; in some cases most of the symptoms disappear in eighteen months or two years. But unless the circumstances be peculiarly favorable the individual is rarely entirely relieved from manifestations of the disease for several years after this period, and even then has no assurance that he will be spared further attacks. It is customary to speak of the secondary and tertiary stages of the disease as *constitutional syphilis*, because the symptoms constituting these stages show that the syphilitic virus or poison has been taken into the system and has modified the vital functions of the individual. The sore through which the syphilitic material enters the body and which constitutes the first evidence of syphilitic infection is called the " primary sore " or *chancre*.

Symptoms.—In order that an individual shall acquire syphilis it is necessary first that he come into contact, direct or indirect, with an individual already affected with the disease. By indirect contact we mean that some of the secretions from a diseased individual may be brought to a healthy one through the medium of some inanimate object, such as a pipe or a towel. Many instances are on record in which the disease has been acquired in this way. A man has for example smoked a pipe which had been recently held between the lips of a syphilitic person, and has in this way taken into his mouth some of the contagious material which was present in the saliva of the latter individual. So, too, a towel which has been employed by a person suffering from some of the syphilitic eruptions on the skin, may contain in its meshes the contagious virus, and when applied to the skin of a second person may deposit some of this poison upon him. It is of course needless to enumerate all of the ways in which the contagion of syphilis may be thus indirectly transferred, and through which a person may innocently acquire this formidable disease.

But this alone does not suffice to communicate syphilis; for the virus is incapable of penetrating the skin or mucous membranes

so long as these are uninjured and perfect. In order that the poison may be taken up into the system, it is necessary that there be some opening through the skin or mucous membrane; that is, that the outer or horny layer of the skin should be scratched off or perforated. Yet the slightest opening through the skin — a scratch with the nail or even the prick of a pin — is sufficient to afford access of the virus to the body. It is evident, therefore, that the only security against infection consists in absolutely avoiding all contact with the diseased individual. Physicians are in the habit of touching and handling syphilitic sores, both primary and secondary, and they are usually enabled to do this with safety — always, indeed, so long as there are no cracks nor abrasions on the fingers. Yet it occasionally happens that a physician acquires the disease through examination of an individual with the fingers; and this is especially apt to occur in cases where he is not aware of the fact that his patient is syphilitic, since under these circumstances he is not so careful to inspect the condition of the skin on his finger before bringing it in contact with the surface to be examined. So, too, the kiss of a syphilitic individual involves no terror to a healthy person, so long as the mucous membrane of the latter's lips and mouth is perfect and uninjured; yet since there are often, or nearly always, slight fissures and abrasions on the lips, it frequently happens that the disease is communicated simply by a kiss.

The most frequent method of communication is, of course, by sexual intercourse. For if the disease manifest itself anywhere on the body, it is pretty certain to appear on the genitals; the source of the infection is, therefore, provided by the organs of the diseased individual. Since the act is almost always accompanied by more or less severe abrasions of the parts, it probably rarely happens that a healthy individual escapes contagion if he indulge in intercourse with a diseased person. This statement applies, of course, to those stages of the disease in which syphilis is contagious; as will be hereafter described, there is a time in the history of a syphilitic individual — the so-called *tertiary* period — when the disease seems to have expended its force, at least so far as communicability is concerned; during this period the individual is rarely, if ever, capable of communicating the disease.

That syphilis can be and is communicated from one individual to another has been amply proven by direct inoculation as well as by the observation of patients. In the last half century there have

been found numerous physicians who were sufficiently devoted to the cause of science to submit themselves voluntarily to inoculation with syphilis in order to decide certain disputed points; and there have been instances in which patients also have undergone a like inoculation.

After exposure to syphilitic contagion — that is after contact with a syphilitic individual — several days or weeks may elapse before evidences of the disease are manifest. If the infection have taken place through the skin or mucous membrane of the genitals — the usual mode — a slight abrasion or scratch may be the only sign that there has been a possibility of contagion. In many cases the patient does not observe anything wrong with the parts for two or three weeks after exposure; in other instances he may notice a slight sore, which perhaps heals in a few days without treatment, or in other cases resists somewhat obstinately the ordinary household means. At the expiration of two or three weeks the patient's attention is usually attracted to a small shallow sore, which is not particularly painful, in fact often gives him no physical annoyance whatever. But if the sore spot on the skin be gently pressed between the finger and thumb, it will be noticed that this piece of skin is *very hard;* one gets the same sensation through the finger as is given by compressing the point of the nose. *This means syphilis.* There are, it is true, cases in which the skin surrounding a sore that is not of syphilitic nature is somewhat hard; yet, in the great majority of cases, it will be found that such a sore will be followed, in a few weeks, by all the signs of constitutional syphilis.

Aside from this hardness the primary sore of syphilis — the chancre — does not present any marked symptoms. It is usually of small extent, not more than a quarter, or at most a half, inch in diameter, and often smaller than this; there is but little matter secreted by it, and it does not occasion any particular pain. In fact, were it not the harbinger of one of the most dreadful diseases with which we are acquainted, this sore would be quite an insignificant affair. It is not nearly so large nor so troublesome as the other sore which is often obtained from impure intercourse — the *venereal ulcer* or *chancroid*, to be presently described.

Soon after the sore makes itself manifest, it will be observed that the glands in the groin — on one or both sides of the body — are somewhat enlarged, and very hard. In the healthy individual the glands in the groin can usually be felt only upon somewhat firm

pressure; and even then they feel about the size of beans. So soon however as the syphilitic sore is developed upon the genitals, these glands in the groin become much larger, so that they can be felt upon the slightest touch, and may even be visible to the eye as enlargements under the skin.

Sometimes it is possible to trace a thick, hard cord which begins somewhere in the vicinity of the sore, and passes along the parts into the enlarged glands in the groin. This string marks the position of the *lympathic* vessel, that is the channel along which the poison has passed from the sore to the glands in the groin.

This sore or cancer is very obstinate, and may resist all treatment for several weeks. This is, however, a matter of slight consequence, since it rarely gives much pain, as has been already remarked.

While the primary sore of syphilis is usually situated upon the genitals, it may be found in other situations. Perhaps the most frequent location next to that mentioned is the lip, where it appears almost invariably as the result of a kiss. It may be well in this connection to enter a most emphatic protest against the almost universal habit of submitting children for promiscuous kissing to strangers as well as to friends, for syphilis is not confined to the outcasts from society nor to the lower classes; it finds its way into the very best society, and is no respecter of persons, of innocence, nor of youth. This habit of indiscriminate kissing is as repulsive as it is useless and dangerous, and many a life has been blighted in childhood or even infancy, by a kiss which was given and taken only out of regard for this useless custom. It is well, too, to remember that the susceptibility to the disease does not cease with infancy; that a flirtation which proceeds to the kissing point may ruin a girl's happiness for life. It has fallen to the lot of every physician who practices in a large city, to see cases in which young and innocent girls have contracted the disease by simply permitting a kiss. It would be supposed that a man who knew himself to be suffering from the disease would carefully abstain from kissing, simply for the sake of the other person; but some of these individuals are not aware of the fact that they can communicate the disease in this way; others doubtless think themselves cured, and while aware that syphilis can be communicated by a kiss, do not suppose that they are in a condition to thus communicate the disease. Then

there are, of course, some who are perfectly regardless of the interests of others, and take no precautions at all in the matter.

We have just called attention to the fact that children, or even infants, sometimes contract the disease from the kisses bestowed by adults. It should also be remarked that there is danger for the adults as well, though not so frequently perhaps as in the former way, for children are sometimes born with syphilis derived from their parents, and in many cases they can communicate the disease as thoroughly as the most abandoned rake. It is from such children that wet-nurses frequently contract the disease. In this case the primary sore of syphilis appears on the nipple of the nurse.

Occasionally the chancre is observed upon the cheek, the tongue or the finger. In fact, it may be found wherever there has been contact with a diseased person.

In women the primary sore is often located on the external genitals, where it can readily be detected by the eye; but in other cases the sore is situated in the vagina, or at the mouth of the womb. In this situation it will be discovered only by a careful examination by a physician; indeed, there are instances in which the sore is located at some point inaccessible to the eye. This is a point to be remembered in private practice as well as in the treatment of prostitutes, for it constitutes one argument — a small one perhaps — against the legalization of prostitution. For it is evident that if a woman's freedom from this disease can be assured only after the most careful and searching examination by a physician, the ordinary hasty and incomplete examination gives no security of her harmlessness, notwithstanding the physician's certificate to that effect. In fact, in the European capitals where prostitutes are licensed, cases are frequently met in which the disease has been communicated by a woman who had submitted to the usual examination and had been pronounced free from syphilis.

The primary sore usually lasts at least a month and more frequently two, three or four months before it is entirely healed; indeed, instances are known in which the sore persisted for six months and even a year before healing. Even after the skin has grown over the sore, the characteristic hardness of the part — to which attention has been already drawn — persists for some weeks or months.

So soon as the first rash appears on the skin, usually six or eight weeks after the contraction of the disease, the sore and the hardened base around it become smaller and show signs of disappearing. The site of this sore is marked by a scar which usually persists for years.

As a rule an individual acquires a chancre — that is, syphilis — but once in a lifetime, no matter how many times he may be exposed to contagion. The reason seems to be that the disease in most cases remains permanently in the system. Yet it must not be inferred that syphilis is an incurable disease; on the contrary, instances enough are known in which the patient recovered under treatment so as to be entirely free from all subsequent manifestations of disease; indeed, they have in some cases given the best possible proof that they were cured, by going and contracting the disease a second time. Zeissl, the great Viennese authority of syphilis, has himself seen almost a score of cases in which the disease had been contracted twice by the same individual.

As occasional means for the transfer of the syphilitic material, there should be mentioned childbirth, surgical operations, dentistry, and the use of a common toilet room. While these means are sometimes instrumental in communicating the disease, yet such instances are doubtless infrequent.

The glands lying next to the primary sore become enlarged and slightly tender soon after this sore makes its appearance. If the chancre be located on the genitals — the usual situation — the glands in the groins are the first to become swollen; if the primary sore be located on the lip or cheek, or in the mouth, the glands at the angle of the jaw and at the side of the neck become enlarged; when the sore is located on the nipple the glands under the arm become enlarged.

These glands, although swollen, are not usually very tender and rarely suppurate or produce matter. In the course of a few weeks the glands become swollen throughout the body; even if the sore be in the usual situation it will be found that the glands of the neck are somewhat enlarged. This enlargement of the glands is one of the most persistent symptoms of syphilis, and one which may betray the individual to an expert physician long after the skin eruptions and the usual signs of syphilis have disappeared.

Secondary Syphilis.

The spread of the syphilitic poison through the system is manifested by a series of symptoms which culminate in the appearance of a rash upon the skin. This rash usually appears from six to eight weeks after the disease has been contracted. For a few days before the appearance of the rash the patient suffers from general indisposition, lassitude, wandering pains in the joints and in the head, fever, loss of appetite and of sleep, and often profuse perspiration. In many cases the symptoms are vague and indefinite like those just mentioned, and the patient may have no suspicion as to the cause of the difficulty. In some instances, however, there occurs agonizing pain in some of the bones; sometimes the patient has a most violent headache which renders him almost or quite delirious.

If the individual has already some constitutional taint, such as rheumatism, gout or tuberculosis, the outbreak of constitutional syphilis may be accompanied by an attack of rheumatic or gouty pain. If the individual be poorly nourished or exhausted by excessive mental or physical exercise, or by the use of alcoholics, the appearance of the constitutional symptoms of syphilis is hastened so that the rash may become visible at the end of a month.

After the symptoms above described — headache, fever, etc., — have lasted for several days, the rash appears in the shape of delicate red spots, usually from a quarter to half an inch in diameter. Simultaneously with the appearance of this rash the fever and accompanying symptoms subside.

The rash — which is called the syphilitic *roseola* — consists entirely of these red or brownish-red discolorations of the skin. There is, therefore, properly speaking, no *eruption* at this time — nothing which is elevated above the surface of the skin. Indeed, the skin remains perfectly smooth and even, and is changed in nothing except its color.

This roseola is more distinctly seen on the sides of the chest and on the neck; and it is usually more distinct when the individual's skin is somewhat warm. This rash may escape a careless scrutiny; indeed, there are cases in which the patient himself is not aware of its existence until his attention is directed to it by the physician.

This is usually the first, though not the only skin eruption which appears as a manifestation of constitutional syphilis. It will be useless to describe in detail the eight or ten varieties, since these can be recognized, not from any description, but only from long practical observation. It will suffice to say that they resemble the different varieties of skin eruptions which have been described in the section on skin diseases. Many of them have white scales like psoriasis (dry tetter); some consist of pimples like the common acne; some appear as little blisters containing matter; others are composed of watery blisters; and one causes the formation of thick scabs upon a raw surface — the last named has been already described on a previous page under the name of *rupia*.

There are certain peculiarities as to the location of the syphilitic rash. Thus one of them is especially apt to occur on the palms of the hands and on the soles of the feet, so that the nature of the disease can often be recognized just from its location.

Another feature which is often of service in distinguishing the syphilitic eruptions from those of similar appearance which are not syphilitic in their nature, is the *absence of itching*. The eruptions of syphilis rarely cause any itching, while the non-syphilitic eruptions which may be mistaken for them — such as psoriasis, prurigo and eczema — are accompanied by more or less intense itching.

The skin is not the only part of the body in which the syphilitic infection is manifested. The mucous membranes are also the seat of disease at an early period of syphilis. The throat and the mouth are almost always affected within the first few months after the disease has been contracted. In fact, there are cases in which no rash occurs upon the skin until long after the throat has become sore; such cases have been occasionally mistaken for mild attacks of diphtheria. These sores in the throat consist of whitish patches, varying in size from a pin's head to half an inch or more in diameter. They occur on the tonsils, on the roof of the mouth, on the sides of the tongue where it presses against the teeth, and in the groove between the lip and the gum. In many cases one sees nothing unnatural — unless, perhaps, a slight redness of the throat — upon looking into the patient's mouth; and if the examination be not carried further, it might readily be supposed to be a simple and innocent one. In such cases the examiner should always turn the lip out so that he can inspect the base of the gums and the inner

surface of the lip. The trouble will often be rewarded by the appearance of small white patches surrounded by a reddish border.

It should be said, however, in order to allay undue and unjust suspicion that patches of similar appearance may be present in the mouth of an individual who is not syphilitic. The distinction between the syphilitic sores and those from other causes can be made only by the practiced eye.

These sores appear with especial frequence, and are unusually obstinate in individuals who do not attend carefully to the cleanliness of the mouth and teeth. They are apt to be obstinate also in those who use tobacco in excess.

Another manifestation of syphilis, which often appears within a few months after the contraction of the disease, is the occurrence of small moist tumors called *condylomata.* In a previous chapter we have described the *pointed* condylomata, which are merely large warts, usually caused by some irritation of the skin, but not due to syphilitic infection. The condylomata which occur as a part of syphilis, however, are not pointed, but *flat;* they do not look so much like warts as the other variety. They consist of broad, flattened tumors, usually raised a quarter of an inch or so above the surface, and covered with skin or mucous membrane. The surface is often moist and sometimes ulcerated.

These tumors occur especially often at the places where the skin and the mucous membrane are joined; their favorite location is therefore around the orifice of the vagina, around the rectum and in the vicinity of the mouth. Syphilitic individuals often have minute tumors, looking like simple pimples, in the corners of the mouth; these may be so small and insignificant as to attract no attention. The fact is, however, that these tumors or condylomata are extremely contagious; the least matter or discharge from their surface conveys the disease either to a healthy individual or even to an adjacent portion of the same person. That is to say, that if one of these tumors be located in a fold of the skin, so that its top comes in contact with the skin on the opposite side of the groove, a second tumor will soon be developed at the point of contact If one of these condylomata grows upon the inside of the thigh, a second one will in all probability be developed at a corresponding point on the other thigh.

In consequence of this fact — that new tumors are caused by the discharge from any one — it happens that these condylomata

are almost always found in groups, and rarely alone. They may occur on all parts of the body where there are large oil glands and hair follicles. They are found on the genitals especially, on the inner surface of the thighs, in the groins, under the arm, at the corner of the mouth and of the nose, at the back of the neck, in the ear, on the breast in women, and between the fingers and toes.

These tumors are more frequently found in women than in men who suffer from syphilis; this seems to result from the fact that a lack of cleanliness favors the development of these tumors, and that it is possible for women to be more filthy than men in their personal habits.

The skin eruptions in syphilis sometimes take the form of ulcers, which may or may not be covered by thick scabs. This is especially apt to occur in poorly nourished individuals and in those who are neglectful in the care of the person. These scabs are sometimes so thick and numerous as to interfere seriously with the movements of the limbs and with the wearing of the clothes. When these ar, removed there remain large foul ulcers, which are apt to be very painful in consequence of the irritation to which they are subject from the clothes. When these ulcers heal they leave large scars which, for a time at least, exhibit a dirty brown or copper color. This peculiar color sometimes serves for the detection of syphilis, even after the symptoms of the disease have subsided.

Another manifestation of the disease consists in the appearance of lumps in and under the skin. These must not be mistaken for enlarged glands, which occur in a few weeks after the contraction of the disease. These lumps appear in the skin on all parts of the body, though especially often on the skin of the head and face, on the forehead, nose and lips, on the shoulders and thighs. These lumps, which may reach the size of hazel nuts, or even larger, disappear under appropriate treatment without causing trouble, but if not treated promptly they are apt to result in the formation of ulcers, which may occasion the patient considerable pain and annoyance.

Another manifestation of syphilis, which often occurs at the same time with the appearance of these lumps on the skin of the head, is *falling out of the hair*. The hair becomes dull, loses its natural luster, and comes out upon very slight contact. Sometimes

whole bunches of it will be drawn out by the comb or even by a stiff brush. The individual may become quite bald, though the skin of the head is found to be covered with thick scales. Sometimes the loss of hair affects the eyebrows and eyelashes, the beard, and even the entire surface of the body. This loss of hair usually happens only in individuals who are in a debilitated condition, either from the ravages of the syphilis itself or from some other impairment of the health. Under appropriate treatment the patient's general condition can be readily improved, after which the hair grows again as luxuriantly as before.

Another manifestation of the syphilitic poison is a *disease of the nails*. Properly speaking, the disease affects the skin around the nails and the surface upon which they lie — the *bed* of the nails. The skin surrounding the nail becomes red, swollen and painful; in many cases ulceration results, so that considerable matter is formed and escapes at the sides and from under the nails. This disease affects the toes as well as the fingers; the fact occurs more frequently on the former than on the latter.

In consequence of this affection the nails become uneven, knotty, deformed and discolored; they are usually loosened and drop off, though new nails grow again when the ulceration of the surrounding skin ceases. These new nails are not usually so regular and natural in appearance as the former ones were.

Syphilis also causes a disease of the nails themselves, without affecting the skin around them. In consequence of this disease the nails become discolored and deformed; they are dotted over with white or brown specks, and the free edge of the nail is often broken off.

Such are, in brief, the affections of the skin and mucous membranes which occur during the first six or eight months after an individual has contracted syphilis. The number and extent of these eruptions, and the injuries inflicted upon the individual in consequence, depend largely upon the person's general health and condition, and upon the treatment pursued. If the subject of the disease has always enjoyed robust health and taken care to keep himself in good physical condition, he may escape most of the affections which have been described in these pages. If in addition he place himself under appropriate and skillful treatment, his chances for suffering but slightly from these affections are very good. When properly managed an individual enjoying good health

in other respects need suffer, during the first six months, almost no other affection of the skin or mucous membranes than a soreness of the throat and the simple rash on the skin which has been described under the name of *roseola*.

The serious affections of the skin occur chiefly in persons of poor constitution and in a debilitated condition. Generally speaking it is therefore true that syphilis creates far more havoc among hospital patients than among those of the better classes who are met with in private practice.

While these affections are manifesting themselves on the skin of the syphilitic individual, other changes are frequently taking place in the internal organs, and it is these which constitute the danger of the disease. The eruptions which appear upon the skin are often very annoying, and sometimes give the patient much bodily discomfort; but they rarely, if ever, are sufficiently serious to threaten his existence, or even to interfere with the perfect performance of his bodily functions. But the changes which occur in the internal organs, though not so readily discovered as the rashes upon the skin, are none the less real and are far more serious.

It is beyond our province here to attempt any description of the diseases of the internal organs which are caused by the presence of the syphilitic poison in the body, yet a few of them are so important that brief reference must be made to them.

One of the first of these consists in the *impoverishment of the blood*. This is manifested by the pallor, lassitude and loss of strength which the individual suffers, usually within the first three or four months after contracting the disease. This pallor and impairment are sometimes so great as to unfit the individual for the performance of his usual duties, and even to confine him to the house or to the bed.

Sometimes the syphilitic poison affects the brain, resulting in the growth of tumors, which press upon this organ and prevent the performance of its usual functions. The resulting symptoms vary with the part of the brain affected: sometimes the individual suffers a stroke of "apoplexy" or paralysis; at other times the movements of the eyes are impaired so that the individual has a persistent squint, or inability to move the eyeballs in the natural way. Thus it may happen that the patient is unable to turn one of his eyes inward toward the nose, or outward in the opposite direction. Sometimes the upper lid droops and the patient is unable to open

the eye as widely as before. There may also be a difference in the size of the pupil.

At other times the power of motion and the feeling of the skin are impaired. The patient may have certain spots on the body which are quite numb, and in which he has no feeling. In fact, there is no limit to the number and variety of the ailments which may affect different parts of the body and different organs, as the result of infection by syphilis. The disease may affect all the different organs and tissues, and may result in a great variety of disorders which often simulate other diseases, and whose nature may not be for a long time suspected.

A frequent manifestation of syphilitic infection is the occurrence of pains similar to those of rheumatism, which may be felt in any part of the body, but are especially liable to affect the legs between the knee and the ankle. Sometimes these pains are extremely acute, and render the patient restless and miserable; he is unable to obtain the necessary sleep by day or by night.

Sometimes these pains are accompanied by a perceptible swelling and thickening along the shin-bone; in this case the bone itself is tender upon pressure. The thickening and swelling may extend along the entire course of the bone, from knee to ankle, or may be perceptible only at certain points of the bone; sometimes lumps of considerable size, even as large as a hickory nut, are to be found at one or more points of the bone.

These pains are sometimes erroneously regarded as rheumatic; but from rheumatism they are readily distinguished by the fact that they are much *worse at night*, while the rheumatic pains do not follow this rule. Rheumatism moreover is usually worse during a change in the weather, and during rainy weather, while the syphilitic pains do not thus vary.

Hereditary Syphilis. — Syphilis is one of the diseases which is known to be transmitted from parent to child. It may be manifested in the child at the time of birth, or may become evident some months, or even years, afterward. The symptoms of syphilis derived from the parents — and therefore called *hereditary* or *congenital* syphilis — vary somewhat according to the stage of the disease with which the parents were affected at the time of conception.

Syphilis is a frequent cause of abortion and miscarriage, and in general it is true that the chances of abortion are greater if conception take place soon after the disease is contracted than if it be

postponed until a later period. If conception occur during the existence of the primary sore, or during the presence of the secondary symptoms — that is, within six or eight months after the disease is contracted — abortion almost invariably occurs; and if a pregnant woman contract the disease during the first six or seven months of her pregnancy, a miscarriage usually results. Thus it often happens that a woman will suffer two, three or four abortions, and finally bring into the world a living child at full term. In these cases it is usually observed that the later children are retained in the womb a longer time than those which were conceived immediately after the disease was contracted. Thus the first abortion may occur at the third month, a second at the fourth or fifth month, a third at the sixth or seventh, and so on. In other words, the ability to retain and nourish the fœtus to the full term increases when the virulence of the syphilitic poison wears itself out.

The symptoms of congenital syphilis which appear at or after birth, are usually seen on the skin and mucous membranes. Sometimes the child is brought into the world with a rash upon the skin, consisting of large blisters which may contain watery fluid, or may have pus (matter) in them. Such children are often born dead, though they may have lived until within a few days or weeks of birth, and if they are born alive, they rarely live more than a few weeks.

Many children born with the syphilitic taint are apparently healthy at the time of birth, and remain so for several weeks.

The appearance of the symptoms usually occurs within three months after birth, occasionally some weeks later. There are cases in which the first symptoms appear at or subsequent to puberty.

As to the source of the infection, it seems well established that the child can be tainted with syphilis by either the father or the mother. In the majority of cases it is apparent that the disease is derived from the father. And in general it is true that the more recently the father has suffered from the disease, the more probable is the outbreak of virulent syphilis in the child which he begets. Yet it must be remembered that the father communicates the disease to his child in the act of propagation, not by the contact of his person, but because a part of his body enters into the composition of the fœtus. This explains the fact that a man who has no symptoms whatsoever of syphilis, and who may have been apparently free from the disease for months or even years, begets, never-

theless, a syphilitic child. The fact is that the disease is still present in his system, though it may have been so controlled by treatment and by sanitary measures that it does not manifest itself in his own person. Many a man who has long been free from the signs of syphilis and congratulates himself that he is entirely cured of the disease, has been horrified to find that the skin eruptions and other ailments which affect his new-born child, are due directly to the taint derived from himself, which he supposed had been long before eradicated from his system.

Another curious feature in the matter — which is, however, explained by the fact just stated — is that the mother may remain entirely free from syphilis even though she bears several syphilitic children. This results from the fact that the wife contracts the disease only when the husband has some eruption, either on the skin or on the mucous membranes. Months may elapse at a time during which the man remains free from these eruptions and from sores in the mouth, etc.; and during this time he does not communicate the disease to another individual unless some of his blood be transferred to that person. Contact alone, no matter how intimate it may be, does not, therefore, transfer the disease; and the wife remains free from syphilis, although as the result of that intimate contact the fœtus exhibits the syphilitic taint derived from the father.

It may thus happen that a woman bears syphilitic children to one husband, and in after years brings into the world healthy children by a second husband; for the disease is entirely a *physical* one, and leaves no trace upon the woman unless it be communicated directly to her person.

Another curious feature about the diease is, that a woman may contract syphilis from her own child; for the infant is apt to develop in the first few weeks of life certain sores in the mouth, which are due to the syphilitic taint, and are just as capable of communicating the disease as the sores found in the mouth of an adult who has contracted the disease in the usual way. If the mother have some crack or abrasion on the nipple — and few mothers escape these annoyances — the disease will almost certainly be communicated from the child to the mother by the act of nursing. Hence this curious state of affairs: As the wife of a syphilitic man, and as the mother of a syphilitic child, during the nine months of pregnancy a woman may escape infection; and yet

as the nurse of her own child she falls a victim to the disease. Yet it is true that such women seem to have a certain protection against infection by their own children. Cases are known in which a syphilitic child has been nursed by its own mother and the latter has shown no signs of the disease, yet the same child has afterward communicated syphilis to a healthy wet-nurse. Hence it has been supposed that a woman who carries in her womb the child of a syphilitic father does really experience a mild attack of the disease, and that this attack may be so mild as to escape attention, while it is sufficiently intense to protect the mother from subsequently contracting the disease. The whole subject of the relation of the parents to syphilis in the child is summed up by Professor Neumann in the following words:

First—Syphilis occurs in the child the earlier if the father have contracted the disease at or about the time of conception; yet fathers suffering from advanced syphilis can also beget syphilitic children.

Second—Appropriate treatment applied to the father, or after conception, to the mother, usually exerts a favorable influence in protecting the fœtus from syphilis.

Third—A child acquires syphilis from the mother in most cases only when she has recently contracted the disease. It seems that if she become syphilitic after conception, she is not likely to communicate the disease to her unborn offspring.

Fourth—If both parents are suffering from syphilis at the time of conception, the child exhibits the most intense forms of the disease.

Fifth—The communication of syphilis from parents to their children is the rule, although exceptional cases occur in which the offspring are born healthy, notwithstanding the syphilis of the parents. (In these cases the syphilis of the parents is almost always of ancient date, so that it has worn itself out in their bodies and is no longer communicable.)

Sixth—Hereditary syphilis is generally communicated to the child by the father. Mothers who bear syphilitic children generally remain apparently healthy (when the syphilis is derived from the father); yet since such mothers are not usually infected by nursing their own syphilitic children, we must suppose that they have really experienced a slight attack of the disease which did not make itself sufficiently prominent to attract attention.

Among the symptoms which mark the hereditary syphilis of infants are various eruptions on the skin, to which reference has been already made. Sometimes the rash affects merely the palms of the hands and the soles of the feet; at other times it occurs chiefly around the buttocks; in other cases it is manifested by thickening and a discharge from the mucous membrane of the nose. These latter cases are those in which the child suffers extremely from "snuffles"; in consequence of the thickening in the mucous membrane, the infant is unable to breath through the nose unless he make considerable effort and noise.

As the child grows older the syphilitic taint is manifested by the peculiar shape of various bones in the body, as well as by derangements in different organs of the body.

Syphilis shows itself in these children especially in the shape of the head and of the nose. The forehead is apt to be quite prominent, especially the upper part, while the lower part above the eyebrows is somewhat sunken. The bridge of the nose seems in many cases entirely absent, so that there is no elevation of the skin between the corners of the eyes. The point of the nose is consequently considerably elevated; in fact, the impression derived from looking at such a nose is as if the entire organ had been revolved about an axis running through the nostrils, so that the base of the nose is turned backward and the tip of the organ upward. In consequence of this shape of forehead and nose, the upper part of the face looks in profile bow-shaped. The mouth is usually somewhat sunken and the chin prominent; the entire face has been described as "concave"—that is, the upper part of the forehead and the chin are the two most prominent points, while the intervening space is hollowed out. The nose of such an individual is apt to be short, thick and broad, and it widens rapidly toward the eyes, so that the base of the nose attains an extreme breadth. In many cases these individuals suffer from obstinate and troublesome catarrh.

Another feature which is characteristic of secondary syphilis is the peculiar shape of the middle teeth in the upper jaw. The edge of such a tooth is usually hollowed out in the middle, while the sides extend down into points; hence the tooth is described as being "chisel-shaped."

Another affection which is due to congenital syphilis, is an obstinate affection of the eyes. This does not usually manifest

itself until the period of puberty. The front of the eyes becomes somewhat white and opaque, or as the patient describes it, there is a "scum over the eye." The sight may be for a time almost lost, but is recovered again usually under proper treatment. In many cases the second eye is affected soon after the first, or after recovery in the first eye.

The subjects of hereditary syphilis are susceptible also to paralysis, and to other manifestations of disease in the brain; these may be manifested in childhood, and may occur without apparent cause. These children are also subject to various deformities of the bones, and to disease affecting the bone structures. Thus these children are frequently afflicted with *caries* or *necrosis*—diseases which consist essentially in the mortification of the bone, as a result of which the skin and flesh over the bones become ulcerated and produce matter. These affections are very obstinate, and may last for a considerable time unless the cause of the disease (syphilis) be recognized and appropriate treatment be employed.

Treatment.—Syphilis is practically an incurable disease. By this it is not meant that individuals once affected with syphilis never recover entirely from its effects or never cease to manifest evidence of its presence in the system. It is meant simply that the cases in which recovery occurs do not constitute the majority; on the contrary, they form a small minority. It is always possible, except in very much debilitated individuals, to cure the usual manifestations of the disease on the skin, mucous membranes and in the bones; and in many cases it is possible to relieve serious symptoms, such as paralysis, which result from syphilitic disease of the brain. In fact, the physician who is called to a case of paralysis or apoplexy is always rejoiced to find that the patient has had syphilis, since he knows that if the disease be caused by some change in the brain due to syphilis, the chances for the patient's recovery are much better than is otherwise the case.

While it is thus usually possible to cure the different outbreaks of syphilis, as they occur from time to time, the physician is never certain that the poison is completely eradicated from the patient's system. The individual may enjoy months and years of uninterrupted health; he may be entirely free from even the slightest manifestation of the disease; and yet five, ten, or even twenty

years afterward, he may be afflicted with an ailment which points unmistakably to the syphilitic poison as the source of the difficulty. Perhaps the most critical test of a man's freedom from syphilis is to be found in the condition of his children, for it often happens that the man himself may remain for a long time quite free from all evidences of the disease, and yet, at the end of that time, may beget children who illustrate the fact that the sins of the father are visited upon the children.

In view of this practical incurability of syphilis, or rather of the impossibility of determining that a man who has once contracted the disease is completely free from it, the question naturally arises, whether an individual who has once suffered from syphilis is justified in marrying at all. This question has been the subject of much observation and thought on the part of medical men, and opinions still vary because the facts observed in different cases also differ. There can be no doubt that the prevalence of the disease would be restricted if all men — and women too of course — who have once suffered from the disease, would refrain from marriage and from all unnecessary personal intercourse and contact with others. Yet this plan could not and of course would not be adopted; such a demand on the part of society would hardly be justifiable, since many cases do occur in which individuals recover so completely from the disease as to be quite free from it themselves and to beget children who exhibit no evidences of the poison.

Since, therefore, such individuals can not be asked nor compelled to refrain from marriage, the important question is, under what conditions may such a man feel justified in marrying?

To answer this question we must realize the risk which every man who has once had syphilis imposes upon a woman and upon unborn children by assuming the marriage relation. It must be remembered that the ability to communicate the disease does not cease when the primary sore is completely healed. It must be borne in mind, that for some weeks or months during the first year after contracting the disease, the touch of his lips is often sufficient to communicate the disease. Furthermore he does not know at what time in subsequent years sores may break out in his throat or mouth, or about the genitals, which are just as virulent and contagious as the original primary sore. If a man bears all these things in mind; if he realizes that his most affectionate caress may deal disease and even death to an innocent and trusting woman; if

he remember further, that his children and hers may rise up to curse the day and the man by whom they were brought into a world of disease, he will listen with more patience to the warning which the accumulated experience of medical men pronounces most emphatically for all those who have once suffered from syphilis.

It may be safely asserted that under no circumstances should an individual marry within *two years* after the last manifestations of syphilis have disappeared. And even at this time he should not take the risk unless his general health is such as to encourage him in the belief that there is none of the poison lurking unseen in his system. This period will, in most cases, be at least three years after the disease was contracted.

In order to determine so far as possible his freedom from the disease, the patient should of course submit himself to the most careful medical examination. More than that, he should, from the very beginning of the disease, keep himself under constant supervision by the best medical man at his service. The chances are great that if treatment be discontinued so soon as the first manifestations of the disease have disappeared, subsequent outbreaks of syphilis will occur. In order to secure the greatest possible assurance of success in getting rid of the poison, both treatment directed against the disease and the most careful attention to the general health should be maintained for months after the disappearance of the symptoms. By this it is not intended that the patient shall take medicine regularly every day during the entire time; in fact experience has shown that the best and speediest results are obtained by omitting medicines for a time and resuming them subsequently at intervals, but it is meant that the patient shall remember that the first object of his existence is to do everything possible to rid himself of the syphilitic poison. This will include the most careful attention to the ordinary rules of health, good diet and proper exercise. For it is abundantly shown that syphilis is the more dangerous and persistent as the general health of the body becomes depreciated. The worst cases of the disease are found in those who, either from hereditary taint or neglect, have become reduced in their general health; the ravages of the disease, even including the primary sore, are much less in healthy and robust individuals.

If the patient conscientiously observe the principles laid down in these lines; if he regards it as a *duty* to keep himself under the

direction of his physician so long as the least symptom of the disease remains; and if he have the moral courage and the self-control — the regard for the happiness of others which he would have them observe toward him under like circumstances—he may console himself with the assurance that, sooner or later he may, with a clear conscience, follow the natural instinct of a man and marry. Yet it must be admitted that even then there remains a *possibility* that disaster may follow; and in this case, if he have the least spark of manhood, the least grain of affection for his wife and children, he will regret with the keenest remorse that he did not choose the wiser, though perhaps less blissful lot, and remain single. Surely nothing could inspire a man with more bitter regret than to see in his own wife and family the results of his selfish course manifesting themselves by the most loathsome and incurable of diseases. Such sights are unfortunately common in the observation of physicians.

That an individual who is still suffering from syphilis should most carefully avoid all contact, direct or indirect, with other persons, seems so self-evident, that a statement of the fact appears unnecessary. Yet it is unfortunately the actual fact that such individuals are extremely careless, and even criminally negligent in distributing promiscuously the poison which emanates from their own persons.

The *prevention* of syphilis has occupied a great deal of attention on the part of law-makers as well as of medical men. The matter rests, of course, chiefly with the individual, since in the vast majority of cases the disease is contracted through the gratification of the sexual appetite. Since it seems impossible for men to restrain themselves from the unlawful indulgence in such gratification, the attention of those interested in preventing the disease has been chiefly directed to the regulation and supervision of prostitutes.

This question has, of course, a moral aspect, which should be considered before the means for executing it are discussed. It is not our purpose to consider this moral side of this question; it may however be proper to state that, from the medical point of view, the attempt to restrict the spread of syphilis by official inspection and regulation of prostitutes has not been particularly successful. It would be out of place to state in detail the reasons why this plan, which is apparently so complete, has failed. Yet the experience of Paris, Berlin, Vienna and other European capitals, has proven the

inefficacy of this procedure in limiting the prevalence and spread of syphilis. In this country this method has not received the sanction of public opinion, and has not been carried into effect to any great extent; yet we are thus far, as a community, less afflicted with the disease than most of the peoples of Europe.

Various plans have been proposed for protecting the individual from contracting the disease during intercourse. Without mentioning these, it may suffice to say that no reliance whatsoever can be placed upon any of them. The force of this statement becomes apparent without detailed discussion, when we remember that the disease is communicated by any discharge from the body, and by the matter contained in any sore of the individual suffering from the disease. Thus instances are known in which the disease has been communicated by the scratch of a finger nail, there having been a syphilitic disease around the nail at the time, some of the matter from which had been introduced into the skin by means of the nail.

It has been proposed to cut out the primary sore so soon as it becomes visible, in the hope that by removing this portal of infection the syphilitic poison might be prevented from getting into the body. This plan has been carried into effect in a large number of cases by different physicians. The results reported are almost unanimous in proving that this method is quite ineffectual in preventing the virus of syphilis from entering the body; since in nearly all cases the disease has been manifested in just the same way subsequently as in those cases in which the primary sore has not been cut out. The operation is a trifling one, and it may be well in every case to give the patient the benefit of the possibility, but the fact is that the primary sore does not exhibit the characteristic of a syphilitic sore until *after the poison has entered the body*. Hence, although the sore in the skin may be completely removed, it is already too late to prevent the access of the virus into the system.

The treatment of the disease should in no case be undertaken by the patient himself; his ability to manage the affair ends with the first manifestation of the disease. It is only proper to emphasize with all the weight of medical experience, that the only proper treatment of syphilis consists in a careful avoidance of exposure to it. This is not a mere question of morals or of religious observ-

ance; it is a matter which underlies the happiness of the community, individual and collective.

"He, therefore, who exposes himself to venereal disease does not endanger alone his own health, peace and happiness, but assumes a risk for posterity which is criminal on his part. The physician alone can understand the terrible nature of this disease, and could the people but see a tithe of what is witnessed by a physician who practises in this line, there would be such a wave of popular feeling and action that if it could not sweep prostitution far from the habitation of enlightened man, would at least restrain its ravages by sanitary laws even more stringent than those applied to small-pox and other contagious diseases. The opinion is strong among many medical men, that the person who communicates venereal disease should be punished as severely by the law, as he who would voluntarily spread small-pox, commit arson, or murder." —*Bulkley.*)

Wherever it is possible the patient should place himself under the care of a physician, and not attempt to treat himself. For in no other disease is it more important to remember that treatment is always directed to the *patient* and not to the *disease;* and the treatment in cases of syphilis varies extremely, according to the condition of the patient and his ability to withstand the ravages of this formidable affection. Since many sufferers from the disease are unable to place themselves under the immediate care of a physician, the general plans of treatment will be outlined here. It must be again remarked that the various manifestations of the disease are so numerous and so different that they can be recognized only after long observation and experience with such cases.

Treatment of the Primary Sore or Chancre.—The first thing to be ascertained is, whether the sore is really syphilitic or not. The treatment will vary greatly according to the nature of the sore, for several varieties of sores or *ulcers* often appear upon the genital organs; some of these are derived by contagion, others are perfectly innocent and harmless. It is, of course, important to distinguish the latter from the former, for the course and duration of the contagious sores can be materially modified by treatment. On the other hand, the simple and innocent sores are only aggravated, prolonged, and made worse by the treatment which is adapted to the contagious ulcers.

The primary sore or chancre of syphilis cannot be distinguished during the first few days of its existence from several other sores. It is well, therefore, to adopt certain measures of treatment which are applicable to them all. If any sore or pimple appear on the genital organs after exposure to the possibility of infection, the spot should be at once cauterized lightly. This may be done by touching the sore with a stick of *lunar caustic*. Considerable care should be exercised not to allow the caustic to touch the healthy skin around, and not to press it too deeply into the skin, for in these ways a large and ugly sore may be made where only a simple and innocent one existed. It will be best to apply this caustic lightly at first, so as to touch the entire sore surface. A small piece of fine lint, on which vaseline is spread, may then be placed over the spot, and held in position by strips of adhesive plaster, or in any other convenient way. In twenty-four hours the surface which was white after the caustic had touched it comes away in pieces accompanied with considerable matter. When this has occurred, it may be well to touch the surface once more, and dress it as before. In most cases it is not advisable to employ any further cauterization.

In a few days after the sore has been thus burned, it will heal entirely if it be not of a contagious nature. If, however, it be a true chancre, it will remain open for some days or even weeks. If this be its nature, the patient will soon observe that the base—that is the skin surrounding the sore—becomes very hard and elevated above the general surface of the skin. Under such circumstances it may be advisable to cut this sore and its hardened base out entirely; for, although there is but little probability of preventing constitutional syphilis by this procedure, yet it may be well for the patient to have the benefit of the doubt. Furthermore the wound which is left by the removal of the chancre often heals more rapidly than the sore itself would if it were allowed to remain.

In some cases it will be found, after the sore has been cauterized as already directed, that it remains obstinately open, although its base does not become hard and raised as in the former case. The sore is quite shallow, surrounded by a red line and covered with a dirty white layer of matter. This sore will probably be not the chancre of syphilis, but the *venereal ulcer*. This ulcer and the treatment appropriate for it will be described in subsequent pages.

There is a third form of ulcer which frequently appears upon

the sexual organs; this is the true *herpes*, or "fever blister," precisely similar to the fever blister which often appears on the lips. It often results in the formation of shallow ulcers which for a day or two closely resemble the venereal ulcer. If the patient has a guilty conscience, these ulcers may frighten him into the belief that he has contracted the disease. If, however, he abstain from further treatment than a single cauterization with lunar caustic, and then await developments, he will see that in three or four days the ulcer has healed entirely.

If the patient have a true chancre — and he may rest in that belief if it persists for two weeks after the use of the lunar caustic, and if the skin around it becomes thickened and hard; if he be satisfied from these signs that the sore is of syphilitic nature, he may dress it simply by dusting upon it powdered *iodoform*. This will be found the most serviceable of all dressings for contagious sores on this part of the body.

The iodoform may be applied by simply sprinkling it upon the part from the point of a knife-blade until the sore is thickly covered with the powder. This substance is not of the nature of a caustic, and occasions no pain; a very slight smarting, which lasts but a few minutes, is the most serious effect to be anticipated. After the sore is covered with the powder, a piece of lint or of cotton wool may be laid over it so as to keep the powder from falling off; and this lint or cotton may be bound on by means of adhesive plaster.

This iodoform dressing may be renewed morning and night; in a few days the surface of the sore, no matter what its nature may be, will be clean and red, and look as if it were healing.

The sole objection to the use of iodoform is the fact that it has a most pungent and by no means pleasant odor. For this reason the patient should be extremely careful in handling it, not to get any of the powder upon his fingers or clothing. The odor will attract attention, and excite the curiosity of the inquisitive; and for those who have had a similar experience, the odor of iodoform suffices to betray the patient's secret. This odor can be obscured to a great extent by the use of the *attar of roses*, two drops of which are usually sufficient to mask the smell of a drachm of the drug.

Sometimes the sore gives considerable pain and uneasiness; in

this case it may be dressed for a few days, until it becomes less irritable, with the following ointment:

Wine of opium, - - - -	Half an ounce.
Simple ointment, - - - -	Eight ounces.

This may be spread upon lint or soft cloth, and laid upon the surface, where it is kept in position by adhesive straps. Instead of this, the following lotion may be found more soothing:

Wine of opium, - - - -	Four drachms.
Lead water, - - - -	Four ounces.

Mix and apply upon soft cloths.

By means of one or another of these applications, the chancre can be finally healed. Soon after this occurs, if not before, the sore has become entirely healed, the first manifestations of *constitutional syphilis* appear and demand attention. It is sometimes possible to avert some of these manifestations by beginning constitutional treatment early; but in nearly all cases the eruption on the skin and the soreness of the throat appear, no matter how early treatment may be begun.

As is generally known to the public, there are two remedies which are commonly used in the treatment of syphilis by *all* physicians. It matters not how emphatically a medical man may protest that he does not use any mineral remedies; that he employs only vegetable substances; the fact is, that without *mercury* and the *iodide of potassium* syphilis would be to-day as intractable as it was five hundred years ago, when it devastated certain countries in Europe like a plague.

There is, of course, a popular hue and cry against mercury; in fact, this objection to the use of the drug has become such a strong prejudice that many physicians are careful to conceal the fact that they employ mercury in the treatment of syphilis. This objection has sprung from the abuse of mercury, which was so common among medical men a century ago. There is no doubt that many individuals have been injured seriously and permanently by the preparations of mercury administered by their physicians; but this does not alter the fact that mercury, properly used, is one of the most valuable drugs, as well as one of the most innocent remedies that we possess. The excessive use of this substance and the abuses that accompanied it, caused physicians to employ more caution and to study its effects more carefully. The result is

that it is now possible to employ the various medicines containing mercury without the least danger of causing any injury to the patient. This successful and safe use of mercury requires skill and experience on the part of the prescriber. It follows therefore that the non-professional person cannot be too cautious in administering any preparation of mercury, and that with the exercise of all possible caution he is very apt to inflict damage. There are no rules which can be laid down for the use of mercury, which will apply to all cases. Hence only an outline of treatment will be given in this work.

Mercury may be administered in any one of four ways. The most usual and convenient mode of administration is by the stomach, in the shape of pills, or of liquid preparations. Yet this method is not always practicable, since some of the forms of mercury are apt to cause irritation of the stomach and bowels. In such cases it is customary to resort to the second method—the use of mercury by anointing the skin with ointments containing the drug. This method has certain advantages, but is extremely tedious, wearisome and unpleasant. In other cases the drug is administered by hot air baths impregnated with the vapor of mercury. The fourth method consists in the injection of some form of the drug under the skin.

The only one of these methods which can be entrusted to the non-professional is the usual one, which consists in taking mercury in the shape of medicines by the stomach. For this purpose one of the following prescriptions may be employed :

Red iodide of mercury, - - -	One grain.
Extract of gentian, - - - -	One scruple.
Extract of nux vomica, - - -	Four grains.

Make twelve pills, and take one after meals morning and night.

Another form is the following :

Bicyanide of mercury, - - -	One grain.
Quinine, - - - - - -	Twenty grains.
Extract of gentian, - - - -	Twenty grains.

Mix, and make twenty pills ; take one morning and night.

This latter prescription is especially useful in those forms of syphilitic skin eruptions which are characterized by the presence of

scales or of *pustules*. In other cases it may be well to use the following prescription :

Bicloride of mercury, - - -	Half a grain.
Extract of gentian, - - -	Twenty grains.
Extract of nux vomica, - - -	Four grains.

Mix, and make twenty pills ; take one three times a day after meals.

Whenever the patient takes mercury in any form whatsoever, he must keep his attention fixed upon the condition of his mouth ; for the earliest manifestations of the injurious effects of the drug occur in the shape of an excessive secretion of saliva, and of sponginess and bleeding of the gums ; in fact, the teeth may become loosened and fall out. This is the condition known as " salivation." Until this occurs the patient may rest assured that the drug has not been taken in excess, nor in such quantities as to do him harm.

It is, of course, desirable to avoid salivation ; and this can be easily accomplished if the patient will take pains to keep the mouth clean, and to note every day whether or not he experiences the least tenderness in the gums when the teeth are firmly pressed together. He should be scrupulously careful to use the tooth brush at least twice a day ; should rinse the mouth out after eating and after taking the medicine ; and he should avoid excess in the use of tobacco, since this irritates the mucuous membrane of the mouth, and predisposes to salivation. So soon as the patient feels the least tenderness when he presses the teeth firmly together, he should discontinue the use of the drug or medicine which contains mercury for at least ten days. The tenderness in the mouth will usually subside in two or three days after the mercury has been stopped ; and a week subsequently he may resume the use of the pills again. In fact it is desirable to stop the use of any medicine which may be employed in the treatment of syphilis after it has been faithfully used for five or six weeks, even though no symptoms be produced by it ; for experience has shown that the best results are obtained by giving the patient an intermission of a week or ten days occasionally, after which the medicines may be resumed.

Mercury is extremely valuable, in fact indispensable, in the treatment of those forms of syphilis which occur during the first five or six months after the disease has been contracted. It is during this time that certain rashes appear upon the skin, in the treatment of which mercury is especially valuable.

After the expiration of six months mercury is not so frequently employed nor required. After this period, reliance is placed upon the *iodide of potassium*. This remedy may be used with far more freedom than mercury, since it may be employed in excessive doses without causing any other ill effects than a rash upon the skin. The iodide of potassium is especially valuable in the treatment of syphilitic affections of the *internal organs*. Thus one of the most frequent and annoying symptoms of secondary syphilis is *pains in the bones*, felt especially at night. This symptom can be relieved only by the iodide of potassium. By the use of this drug these pains, which often deprive the patient of sleep, hence impair his strength materially, can be speedily and surely relieved.

The iodide of potassium is almost always taken in solution. Its efficacy seems to depend chiefly upon the iodine which enters into its composition; hence it is customary to prescribe some iodine at the same time with the iodide of potassium. The following formula proves very agreeable and efficient:

Iodine, - - - - -	Eight grains.
Iodide of potassium, - -	One ounce.
Syrup of sarsaparilla, - -	Eight ounces.

Mix and take a teaspoonful after meals.

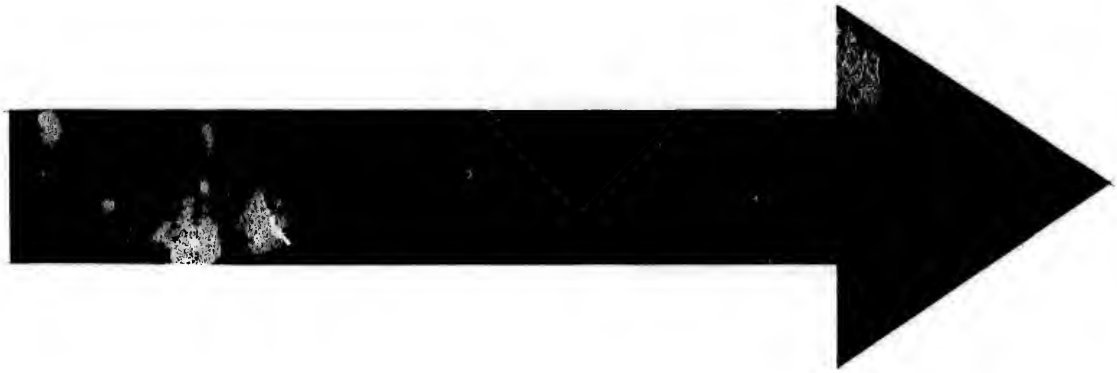
The sarsaparilla is used in this prescription, not for any effect of the drug upon the disease, but merely because it forms a pleasant medium for administering the iodide of potassium and the iodine.

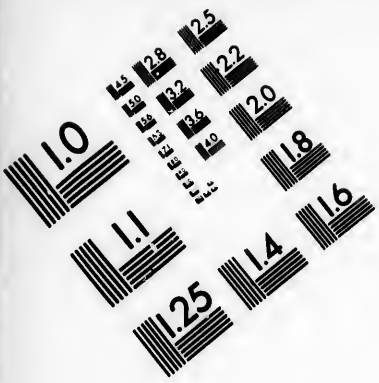
In most cases it is desirable that the patient should take both mercury and the iodide of potassium for a considerable time. The following prescription may therefore be administered so soon as it becomes evident that the patient has contracted syphilis, though in most cases the benefits of the iodide of potassium become evident only after several months have elapsed.

Bichloride of mercury, -	One grain.
Iodide of potassium, - -	Four drachms.
Syrup of sarsaparilla, - -	
Water, - - - -	Each two ounces.

Mix and take a teaspoonful after meals.

It is the practice of many eminent physicians in this department of medicine to begin the treatment of syphilis by rubbing mercurial ointments into the skin. The disadvantages of this method are the trouble and time necessary to accomplish the rub-





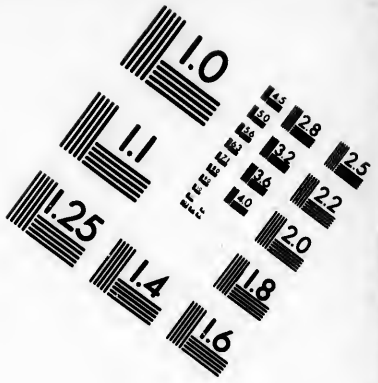
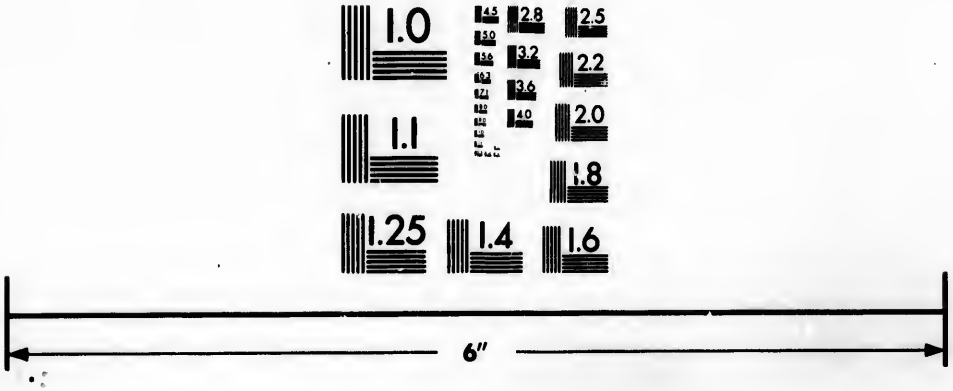


IMAGE EVALUATION
TEST TARGET (MT-3)



Photographic
Sciences
Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

bing, and the unpleasantness to the patient. Yet in some instances it is necessary to administer remedies by some other means than as medicines to be taken into the stomach, for some individuals cannot endure the preparations of mercury upon the stomach; they are troubled with vomiting and diarrhea whenever these medicines are taken.

In order to rub mercury into the skin a preparation is made in the shape of an ointment. For this purpose the ordinary *mercurial salve* is used.

The patient should take a warm bath and wash himself thoroughly with soap; these baths should be repeated after every fifth or sixth time that the salve is rubbed into the skin. As much of the salve is taken into the hand as will comfortably fill the palm — say a quantity as large as a hickory nut. This should be spread around upon the hand and then rubbed into the skin. It is well for the patient to anoint himself in this way in a well-ventilated room at such hour of the day as will permit him to rest for an hour or two afterward. The patient should select different parts of the skin for the inunction (as the rubbing process is called) on successive days. Thus he may on the first day rub the salve into the inner surface of both thighs; on the second day the inner surface of both legs (below the knees); on the third day the front of the body, chest and abdomen (avoiding the nipples and armpits); on the fourth day he may anoint the loins and the sides of the chest; on the fifth day the back, and so on. The object of this change is the avoidance of unnecessary irritation of the skin. After he has gone over the entire body in this way (excepting, of course, the head), he may begin again with the thighs.

It will be well for the patient to make these inunctions in a warm room, so that the skin may be active and the ointment may penetrate thoroughly into the pores. In rubbing he should so far as possible rub in the direction of the hairs, so as to avoid irritation of the skin.

These inunctions may be continued until the syphilitic rash for which they are used has disappeared; this usually occurs by the time twelve or fifteen inunctions have been made. It must not be forgotten that whenever a patient is using mercury as a remedy he must *always* watch carefully the condition of the mouth, and must stop the use of the drug so soon as the slightest tenderness of the gums upon pressing the teeth together is observed. He will also

remember that unpleasant symptoms in the mouth can be avoided to a great extent by careful cleansing of the teeth and rinsing of the mouth; it may be advisable also to harden the gums and the mucous membranes by frequently rinsing the mouth with brandy and by using one of the following gargles:

Alum,	Two drachms.
Chlorate of potash,	Three drachms.
Water,	Half a pint.

Or a gargle of tannin solution may be used, after the following formula:

Tannic acid,	One drachm.
Tincture of opium,	Twenty drops.
Water,	Ten ounces.

These inunctions are especially valuable in those skin eruptions in which scales are formed; for cases in which syphilis is manifested in affections of the eyes; in congenital syphilis; and in short, wherever it is desirable to secure the effect of mercury rapidly.

The *oleate of mercury* constitutes an admirable ointment for inunctions in syphilis; it is said to be absorbed and to produce the effect of the mercury more speedily than other ointments.

One of the troublesome symptoms of syphilis during the first few months after the disease is contracted, is the occurrence of sores in the throat; these may also be present at subsequent periods, even several years later. This difficulty is often overlooked by the patient, who imagines that he has simply an ordinary sore throat from cold. Yet if the throat is carefully inspected there will be seen not only a general redness, but also numerous white patches scattered here and there upon the tonsils and in the mouth.

The treatment of this sore throat consists in touching the sores occasionally with a stick of *lunar caustic;* this may be repeated if necessary on the third or fourth day subsequently. Meanwhile the patient should use a gargle consisting of borax or the chlorate of potash, as follows:

Borax,	Three drachms.
Water,	Eight ounces.

A strong solution of alum will also be beneficial.

It must not be forgotten that the patient should always take constitutional treatment, as already described, whenever he has a manifestation of syphilis in the throat or elsewhere. If he use local applications alone, he will perhaps fail to heal the sores, or at best will succeed after long and tedious effort.

The small tumors, *condylomata*, will sometimes disappear by the use of the constitutional treatment, without local application; but it is advisable to place cotton wool around them and in the folds of the skin where they are usually situated. Their disappearance can be hastened by using in addition to medicines taken internally, some remedy which is applied directly to them. For this purpose we may use the following mixture:

Corrosive sublimate,	Two grains.
Alum,	One drachm.
Camphor,	Half a drachm.
Alcohol,	Two ounces.
Glycerine,	One ounce.
Water,	One ounce.

The condylomata and the skin surrounding them should be carefully washed, and the above lotion applied by means of cotton wool or a soft cloth which is dipped into the lotion and then dabbed upon the tumors. If the tops of these little tumors be ulcerated it will be better to employ the following wash:

Corrosive sublimate,	One grain.
Alum,	One drachm.
Alcohol,	One-half ounce.
Ether,	One-half ounce.
Collodion,	One-half ounce.

After the condylomata have been washed and dried this liquid should be applied with a camel's hair brush.

In all dressings of syphilitic sores it should be remembered that the matter from these sores is highly contagious and can communicate the disease; therefore it is very important that all cotton, lint, cloth and the like, which has been in contact with the sores, should be burned immediately when removed from the skin, and care should be taken that the brushes and instruments used for the same purpose be kept apart from everything else, to prevent the possibility of accidental contagion.

Soft Chancre—(Venereal Ulcer.)

As has been already stated, there are at least three kinds of sores which appear upon the genitals. One of these is the primary sore of syphilis—the chancre—which is characterized by its indolent course and by the hardness which surrounds the sore. This

variety of ulcer is almost invariably followed by constitutional syphilis—that is, by a disease which affects the entire body, may be manifested in any or all of the organs, may be communicated by contact even years after the sore has healed, and is transmitted to the individual's children.

There is a second sore which is also usually found upon the genitals, where it is produced by impure sexual contact. This sore —which is technically called a *chancroid* or *soft chancre*—is entirely different from the chancre after the first week or ten days, though during the first few days it may be impossible even for a practiced eye to say which of the two varieties it is. It is, however, important that the distinction between the two should be made, for the venereal ulcer is in the vast majority of cases a *local*, and *not* a constitutional affection; the poison does not seem to enter the system, or if it does, it exerts no injurious effect upon the body generally. After the sore is healed, the individual is just as sound in every respect as he was before he contracted the disease; he need fear no subsequent manifestations of the affection, and his children will show no evidence of hereditary taint derived from this disease.

It is not necessary to enter into any discussion upon the different views which have been in times past entertained by medical men as to the nature of the respective venereal poisons. It will suffice to repeat what has been already stated, that while the chancre — the *hard* chancre — is almost invariably the first symptom of constitutional syphilis, the venereal ulcer or *soft* chancre is very rarely followed by any evidences of constitutional infection.

The soft chancre or venereal ulcer is characterized by a sharp, abrupt edge, which often seems to have been cut out with a punch, so regular and steep is the border of the ulcer. Sometimes this edge is undermined so that a little border of skin projects from the side over the ulcer. The depth of the ulcer varies extremely, being sometimes quite shallow, and at other times deeply excavated. The bottom is covered with a grayish or dirty yellow layer which is composed of matter. In a few days there is usually considerable discharge of matter or pus from the ulcer — a point of difference between the soft and the hard chancre, since the latter rarely discharges matter in considerable quantity.

There are two features by which the soft chancre can usually be distinguished from the hard chancre or primary sore of syphilis,

The first and most important point of distinction is, that the skin around the soft chancre is not *hardened* nor *elevated;* the sore appears to be simply an excavation in the skin, without any swelling around it, as is the case in the hard chancre. This is one of the symptoms which is relied upon chiefly by physicians in predicting whether or not the sore will be followed by constitutional syphilis. If two or three weeks elapse without the production of any hardening around the sore, it may be confidently expected that the disease will remain a local one, without any infection of the blood.

Another feature characteristic of the soft chancre is the *early period* at which it appears after impure contact. This sore is sometimes apparent within 24 hours after exposure, while several days commonly elapse before the true chancre is seen, and two or three weeks pass before the chancre becomes well developed.

A third feature which is quite characteristic of the soft or venereal ulcer, is the fact that *several* of these sores usually appear at the same time. Sometimes there may be a dozen or more situated near each other, or scattered about on different parts of the genitals. If the infection be a hard chancre, on the other hand it rarely happens that more than one sore is discoverable. Furthermore, it will often be observed that new sores appear in the neighborhood of a soft chancre ; this seems to result from the escape of the matter from the original sore into cracks or abrasions of the neighboring skin ; for wherever this matter enters the skin a new sore is produced, which resembles, in all particulars, that which was contracted during the venereal contact. The hard chancre, on the contrary, does not produce similar sores in its vicinity ; even when the matter from it is intentionally inoculated in the skin of the individual, no such sores are produced.

This fact may often aid the uninitiated individual in distinguishing between the hard and the soft chancre. It may be stated in general, that if only one sore makes its appearance within a week after exposure, it is in all probability the hard chancre, the forerunner of constitutional disease ; while if numerous sores are formed within a few days, they are in all probability chancroids, and will not be followed by a disease of the blood.

This fact that the soft chancre can be reproduced in different parts of the same individual by transferring the matter from the original sore, while the hard chancre is not so reproduced, has been often used by physicians in deciding a doubtful case. The

plan consists simply in inoculating the individual at different points of the skin with matter from the sore; if a new sore similar to the original one is produced at each of these points, the disease is the venereal ulcer and not constitutional syphilis; if on the other hand these inoculations are not followed by the production of similar sores, the disease is probably hard chancre, which will be followed by general disease of the system. This artificial inoculation has sometimes been carried to extremes; thus one physician produced over 8,000 sores on his own body by inoculating himself with the matter from a soft chancre.

Soft chancres may appear on any part of the body; they are, of course, most frequent on the genitals of both sexes, but may also be found upon the tongue, the lips, the nipples, etc. When they occur in and around hair follicles, they often produce sores which resemble boils. When they are located in parts where the skin is loose — as in the web between the fingers — the soft chancres are often surrounded by a swollen base which may resemble the hardness of the true chancre; yet this base is never so hard and firm as that which surrounds the hard chancre.

Bubo. — This affection — vulgarly known as "blue-ball" — is an incident in the course of a soft chancre. It consists in an inflammation of one or more of the glands in the groin, which is due to the absorption of the matter from the sore. This matter travels along the little channels which are known as *lymphatic* vessels, until it comes to the gland, where it is stopped and excites an inflammation; sometimes indeed a red line can be seen along the skin from the sore to the vicinity of the gland, indicating the course of the lymphatic vessel.

The swelling of the gland rarely appears before the second week after the formation of the sore. It may be ushered in by shivering and fever, accompanied by tenderness in the groin; but in most cases the attention of the patient is first attracted by stiffness and pain felt in the groin upon walking. When he examines the tender spot he finds a little lump or tumor, which is quite painful upon pressure. This tumor rapidly increases in size and occasions the individual great pain, especially when he walks or indulges in other exercise; in a week or ten days the swelling and pain are so great that he is compelled to keep the recumbent posture as much as possible. The skin over the swollen gland becomes red

and tender, and if the inflammation be severe, the skin often assumes a livid or bluish color.

In rare cases the swelling will gradually subside without further difficulty; but in the vast majority of instances it will be observed, within two or three weeks, that the central part of the swelling is not hard as before, but has become quite soft and less painful. This softness is due to the formation of *matter* in the tumor; and nothing can be done after this except to open the abscess without delay. Patients often make a mistake in refusing to have the swelling opened, thinking that they can thereby avoid the unpleasantness as well as the pain. In this they are greatly mistaken, since if the tumor be not opened it will break of itself. It is, therefore, far more desirable, in every way, to have the abscess opened promptly: 1st, because the pain is thereby relieved and the patient saved several days, or even weeks of suffering; and 2d, because the abscess will be smaller and easier to heal if the matter be let out early. For when the abscess is permitted to break spontaneously there is always produced a ragged sore with undermined edges, which often needs trimming with the scissors before it can be persuaded to heal.

After the buboes are finally healed, the individual need expect no further difficulty from the venereal ulcer. In most cases the ulcer is healed in two to six weeks; but the bubo may remain open for months unless carefully treated.

Physicians distinguish several varieties of soft chancre, according to the characteristics of the sore itself. Thus we recognize a *phagedenic* ulcer, which is characterized by its tendency to progress and extend indefinitely. This ulcer sometimes causes extensive destruction of tissue, and even the loss of a part of the genital organs. It is accompanied by extreme pain and tenderness. This variety occurs with especial frequency in debilitated individuals, particularly those who are afflicted with scrofula or tuberculosis, and those who are addicted to excess in drink.

The *serpiginous* ulcer is so called because of its form; it heals in the center, but progresses irregularly around the edges. It is apt to spread with extreme rapidity, and to cause great destruction of the organs attacked. This, like the former variety, occurs chiefly in individuals suffering from depraved constitutions.

The venereal ulcer, unlike the hard chancre of syphilis, can be communicated to the lower animals, where it produces sores similar in appearance, and in other characteristics, to those found upon the human subject.

Such are the characteristic differences between the primary sore of syphilis and the venereal ulcer. As has been stated, these differences are visible usually only after several days have elapsed since exposure to contagion. At the very beginning it is impossible to say positively which of the two diseases — syphilis or the venereal ulcer — is present. In every case the sore is apt to begin as a pimple, which merely causes a slight itching for a time until the top is scratched off, leaving the bottom of the ulcer exposed to view.

Treatment.—The treatment of a venereal ulcer is always a purely local one; that is to say, it consists in applications which are intended simply to heal the sore and to prevent, if possible, the formation of a bubo. There is in this disease no infection of the system, and hence no necessity for agents which shall "purify the blood." In fact, no medicines need be given internally in this disease, so far, at least, as the affection itself is concerned. It sometimes becomes necessary to administer remedies which shall build up the patient's health and thus prevent the sore from enlarging; but these remedies are not intended to exercise any influence in counteracting the poison, since this poison does not remain in the blood nor cause any constitutional disease.

The local applications vary according to the condition of the sore itself, as well as the general health of the individual.

If a suspicious pimple, which causes considerable itching, be discovered on the genitals within a few days after impure contact, it will be advisable to cauterize it thoroughly once with lunar caustic

If the matter be not discovered until the sore is already ulcerated, one of the following plans should be pursued:

If the patient be in good general health, the ulcer should be thoroughly cauterized once either with lunar caustic, nitric acid or carbolic acid. It will be better for any other than a professional man to employ the lunar caustic for this purpose, since the acids named are liquid and cannot be so easily controlled; unless extreme care be taken, these acids will run over the sore and destroy the sound flesh around, making an extensive and painful ulceration.

After the sore has been cauterized with lunar caustic, it may be dressed for twenty-four hours with a little vaseline spread upon lint. At the end of this time the cauterized surface will come away as a dirty white or grayish layer, leaving a red base. This

may now be dressed by pouring upon the sore powdered iodoform, over which a piece of soft rag may be applied. At the end of twenty-four hours the sore may be washed and closely inspected. The bottom of it should now be uniformly red and clean; if grayish patches be noticed which stick closely to the bottom of the sore, the ulcer should be cauterized a second time; that is, those parts which are still covered with grayish matter should be burned again. It will not be necessary to cauterize the entire base if the surface generally be clean and red. In all cases the cauterization should be done, not by the patient himself, but by a second individual; because the application of the caustic causes considerable pain, and the patient himself will flinch and fail to apply the caustic thoroughly to all parts of the sore.

On the second day the iodoform dressing may be renewed; this will indeed constitute the best dressing for the entire duration of the sore. The iodoform may be applied morning and night; since it is a solid, and comparatively insoluble, it lasts for several hours. The one objection to the use of iodoform is its unpleasant odor, which clings to the fingers and the clothing for hours. The patient must, therefore, be careful that the powder touches no part of his person except the sore. It may be advisable to apply the iodoform only at night and wash it off in the morning, since the odor will thereby be less perceptible during the day. Or, better still, the odor of the iodoform may be masked by adding two drops of the attar of roses to every drachm of the drug.

If the sore be thoroughly cauterized at first, as has been directed, and the patient be in good condition, the ulcer will usually heal under this simple treatment in one or two weeks. If, however, it be not thoroughly cauterized at first, it may last a much longer time and finally require to be cauterized again before complete healing occur.

After it becomes evident that the ulcer is healing, that is, after the bottom has become and remains clean and red, and the sore is observed to become shallower day by day, it will be necessary to use only a simple salve of carbolic acid or vaseline. The iodoform does no harm, and the substitution of the vaseline or carbolic acid ointment has merely the advantage of dispensing with the odor of iodoform.

If the patient be debilitated, and suffer from scrofula, tuberculosis, or any other constitutional taint which interferes materi-

ally with his general health, it becomes necessary to administer some remedies which shall improve his condition. This is an important part of the treatment; without it great difficulty will be experienced in preventing the ulcer from spreading extensively and destroying considerable skin. Such individuals should take the following prescription:

Tincture of the chloride of iron, - Six drachms.
Tincture of nux vomica, - Five drachms.
Compound tincture of gentian, - To make four ounces.

Mix, and take a teaspoonful in half a wineglassful of water before meals.

The local treatment in such cases must be conducted with caution, for in such individuals the use of caustic will cause severer effects than in robust persons. During the first few days it will be better not to cauterize the sore, but simply to dress it with the *ointment of mercury*, which should be applied upon a soft rag. After a few days the sore will probably be clean and red if the internal treatment have also been followed. If the progress of the ulcer be not satisfactory the patient should take cod liver oil — a teaspoonful after meals; in these cases it may also be necessary to cauterize the sore with lunar caustic. These individuals require the most careful management, and should always place themselves in the hands of a physician.

In every case of venereal ulcer it should be remembered that a bubo may result, and this constitutes one of the worst, if not the worst, feature of the case; care should, therefore, be taken to avoid the occurrence of buboes. The most important measure to secure this result consists in the careful avoidance of unnecessary effort on the part of the patient, as well as in the improvement of the general health. A patient suffering from venereal ulcer should, therefore, be upon his feet as little as possible; should ride and not walk whenever he can in performing his daily duties. At the first sign of tenderness in the groin the patient should take to his bed, or at least keep the recumbent posture. He may rest assured that the occurrence of a bubo terminating in an abscess is almost inevitable.

The next most important measure for the prevention of buboes consists in attention to the general health. Among individuals who are in robust health at the time when they contract the disease, buboes are far less numerous, and their effect far less severe

than among those whose general condition is unsatisfactory. It is therefore advisable for the patient to use a generous diet, to have plenty of sleep and to enjoy the best possible conditions for the maintenance of health.

Various remedies have been employed and recommended in order to prevent the formation of matter in the bubo. The most frequent remedy consists in painting the skin over the bubo with the *tincture of iodine*, or by applying a tight bandage around the waist and the thigh so as to compress the bubo. In recent years it has been claimed that the *sulphide of calcium*, when administered internally, will also prevent the formation of an abscess. Yet we have no definite grounds for believing that any or all of these remedies combined have any marked effect in preventing the formation of matter.

After it becomes evident that matter is forming—a condition which is made manifest by a softening in the middle of the swelling and perhaps by blueness of the skin—there remains but one thing to be done: the bubo must be opened; the sooner this is done the better; the pain is thereby relieved and the abscess will heal far more readily and easily than if the bubo be allowed to break of itself.

After the bubo has been opened it should be carefully washed out three or more times a day, according to the amount of discharge. Extreme care should be taken that all the matter be removed at every dressing; for this purpose a small syringe with a narrow point may be employed in order to inject the water into all the crevices of the abscess. After it has been thoroughly cleansed, powdered iodoform should be dusted into the cavity. A still better way is to pack the cavity full of gauze, such as surgeons use, which has been saturated with iodoform powder. If this cannot be procured, some fine lint may be impregnated with iodoform by rubbing the powder thoroughly into the cloth; this is then cut into narrow strips, say half an inch, wide and tucked into the cavity; it should be packed tightly down so as to bring the gauze in contact with the raw surface.

One of the most important items in the treatment of bubo is that the patient should remain quiet; if he can maintain the recumbent posture, so much the better. At any rate the healing of the wound will be very slow and troublesome unless the patient avoid walking and standing.

Clap—(Gonorrhœa.)

Gonorrhœa consists in an inflammation of the mucous membranes of the genital organs in male or female, accompanied by a discharge of matter or pus. In males the matter comes from the inside of the passage to the bladder—a channel called the *urethra*. In females the inflammation and discharge are located in the *vagina* as a rule, though it may also spread to the urethra. This inflammation is excited, in the vast majority of cases, by contact of the parts with the organs of another individual who is already suffering from the disease. In almost all cases, therefore, it results from impure intercourse. For a long time it was supposed that this was the only possible source of the discharge, so that the existence of a gonorrhœa was regarded as positive proof that the affected individual had indulged in such intercourse. For practical purposes we may still adhere to this rule; yet there are cases in which it is necessary to bear in mind that the disease may originate without impure contact, or even without any indulgence whatsoever in sexual intercourse. For it is now well ascertained and understood that a man may contract the disease from a perfectly pure woman, even from his own wife. The circumstances under which this annoying accident may occur are these: The discharge from the genitals at the menstrual period is, in some women, even though they be suffering from no disease of the parts, extremely irritating. As a result of this it sometimes happens that intercourse during the menstrual period will be followed by gonorrhœa of the severest type. Some women, too, who suffer from the whites (leucorrhœa) cause the disease to appear in men who have intercourse with them; this seems to result from the irritating nature of the discharge with which such women are affected. Then, again, gonorrhœa may arise from simple excess in sexual indulgence, that is, from frequent repetition of the act within the course of a few hours. The physician is sometimes called in by the husband of a few weeks' standing to determine whether or not the bride has communicated the gonorrhœa which has attacked him in the second week of his wedded life. In such cases no rash decision or action should ever be permitted until the situation has been explained to the irate husband, who is apt to feel himself outraged in feelings as well as in person. In the great majority of such cases it will be

found upon close examination that the disease is merely the result of the youthful husband's impetuosity.

While, therefore, we must always remember the possibility that gonorrhœa may be contracted in other ways than by impure sexual intercourse, yet we may lay it down as a general principle, that this latter is the almost invariable source of the affection.

Symptoms.—For a few days after indulgence in suspicious intercourse, no signs of disease will be manifest. Usually at some time between the fourth and eighth days after exposure the patient notices an itching at the end of the penis, usually accompanied by a slight burning sensation upon passing water. After this has lasted a few hours, there will be noticed a slight discharge from the urethra, which at first appears only in drops. This discharge is in the beginning of a watery or milky appearance, but in the course of a day or two after its commencement it becomes quite yellow and creamy. If the inflammation be severe, the matter often has a greenish tinge, and there may even be a few drops of blood mixed with it. By this time the passage of urine causes a severe scalding pain, which soon becomes so acute that the patient dreads the necessity for passing his water; his distress is aggravated by the fact that he feels the desire to urinate more frequently than is the case in health.

In the majority of cases, the inflammation extends only two to four inches up the urethra; this part of the organ is apt to be quite tender upon pressure and the orifice of the urethra at the end of the penis is usually red and swollen. The pain during the passage of the water is felt most keenly at the point about an inch from the end of penis, though it must not be supposed that the disease is limited to this part of the urethra. If the inflammation extend further back along the urethra, the patient usually suffers considerable pain and a sense of heat around the neck of the bladder; there is also apt to be a considerable discharge of blood at the end of the act of urination. This discharge of blood is apt to alarm the patient unnecessarily, as the appearance of blood from the inside of the body usually does. He should, however, feel assured that this blood does not indicate that his disease is especially severe, since it merely comes from the inflamed mucous membrane, just as a patient suffering from severe catarrh of the nose often observes a little blood in the discharge upon his handkerchief.

One of the most troublesome and painful incidents of gonorrhœa is the obstinate tendency of the penis to erection. This happens without any provocation whatsoever, and is especially frequent at night. In consequence of the inflamed condition of the parts, the increase in size of the organ renders an erection extremely painful. This condition is commonly termed *chordæ*. In consequence of the pain the patient's rest is broken, so that his health and strength are thereby seriously impaired; in fact chordee is one of the most painful and annoying features of the disease, though it does not indicate any particular gravity.

The other feature of gonorrhœa which renders the affection a troublesome one is the necessity for a frequent evacuation of the urine. The bladder is so irritable that the patient cannot retain his urine as long as usual; in fact he is sometimes compelled to pass his water every two or three hours, every hour, or even every half hour If he fail to do so, or for any reason is unable to empty the bladder, he experiences the most severe pain in and around the root of the penis and a most intolerable and irresistible desire to empty the bladder. When we remember that the passage of the urine along the inflamed urethra is accompanied by sharp pain, we can readily appreciate the unpleasantness of the situation.

Several complications may arise in the course of a gonorrhœa; the most common of these are *inflammation of the testicle* and a swelling of the end of the penis. The former complication rarely happens until the fourth or fifth week of the disease. It is indicated by pain and swelling of the testicle, while the skin over this organ becomes red. This condition of the testicle is extremely painful, since unless the organ is supported by a bandage or otherwise the patient experiences a sense of dragging in the groin which is sufficient to compel him to lie down, and even make him faint. In addition to this the testicle is extremely tender, so that the pressure of the clothing is sufficient to keep up constant pain.

The swelling at the end of the penis occurs in most cases of gonorrhœa, especially in those in which the patient neglects to keep the parts clean. Unless he is careful to pull the foreskin back and wash the part thoroughly every day, matter collects under and around the foreskin and occasions irritation of the organ. There may also be some swelling of the parts from the spread of the inflammation to the tissues of the penis outside of the urethra. This swelling may be inconsiderable, and occasion only slight puffi-

ness of the foreskin; but in some cases this skin is so enormously swollen that it cannot be moved in the natural way. If the skin be once drawn back, while in this swollen condition, the patient is often unable to bring it forward again — a condition technically known as *paraphimosis*. This condition occasions the patient considerable pain and great alarm; it is in fact a matter to be attended to, since, if not relieved, the skin may ulcerate or even mortify, so that serious loss of tissue may occur. This dangerous condition of the foreskin will be recognized through the fact that the skin behind the end of the organ is drawn tightly around the penis like a string.

Sometimes there occurrs in gonorrhœa a complication similar to that which regularly happens in connection with the venereal ulcer — a *bubo*. The glands in the groin become swollen and painful, and may even proceed to the formation of matter. This is a comparatively rare complication of gonorrhœa, and happens almost always only in individuals who are suffering from a debilitated condition of the system, or who neglect to keep quiet as much as possible during the course of the disease.

In *women* the symptoms of the disease are quite different in many respects from those observed in men. These differences result from the fact that in women the inflammation affects primarily and chiefly the vagina, and not the urethra as in the male. Hence it happens that women do not usually experience the same pain and difficulty in passing water as men who are afflicted with the disease; and furthermore the channel from the bladder is so short in the female, and its calibre so large, that even when this passage also becomes affected, as it sometimes does, there is less pain and soreness about the bladder.

In many cases gonorrhœa seems to affect only the vagina in women; this part becomes inflamed, hot, tender to the touch, and to the eye seems red and swollen; the external parts surrounding the orifice of the vagina may also become greatly swollen. This condition is accompanied by considerable pain, often felt in the back and thighs. After a day or two a discharge begins to issue from the vagina, at first somewhat thin and yellowish, then becoming thick and greenish.

If the disease spread to the passage into the bladder — the *urethra* — the woman experiences, though in a less intense degree, many of the symptoms which have been described as occurring in

the male. There is a frequent desire to empty the bladder, and the act is accompanied by considerable smarting and burning pain. If the inflammation remain limited to the vagina, gonorrhœa is not an especially serious disease in the female. But in some cases the inflammation extends upward into the womb and may even proceed from the womb along the tubes which lead to the ovaries—the *fallopian tubes*. In this case the affection becomes a grave one; it may even cause death within a few days, and in other cases induces long and obstinate diseases of the womb which may render the patient's life miserable for years. Sometimes the discharge become much diminished but does not cease entirely; these are then cases of leucorrhœa, or "the whites." It must not, however, be supposed that all cases of "the whites" have begun as gonorrhœa, since there are many other causes, especially diseases of the womb, which frequently produce a white discharge from the vagina.

Gonorrhœa usually lasts four or five weeks. It is possible, if the patient place himself under treatment immediately upon detecting the disease, to cut short the course of the affection to two weeks or even ten days. In most cases, however, the inflammation lasts six or eight weeks; and in many instances the discharge continues for months, or even years. In these instances the inflammation is not so severe as it was at first; there is no pain upon making water, nor is the individual troubled with the erection at night, which constitutes such a painful feature of the disease during the first month. The discharge is slight in quantity, and usually of a thin, watery appearance; this discharge is generally observed only in the morning upon rising, and is not visible at any time during the day. This obstinate affection is called the *gleet*, and is one of the most annoying and discouraging features connected with gonorrhœa. The gleet occurs far more frequently in men than in women, a fact which is easily understood when we remember the structure of the genital organs in the two sexes. For in the male the urinary passage is long and narrow, and the escape of the discharge is impeded by various anatomical peculiarities of structure; in woman, on the other hand, the matter finds free exit, and is not retained as in the male. Hence the obstinate and chronic forms of the disease are less frequent in the female than in the male.

Treatment.—When properly and carefully treated, gonorrhœa is a by no means serious affection. Yet practically, it is one of the gravest diseases to which men are subject. This serious

character of the affection is largely due to the carelessness and neglect of patients. Most men pay but little attention to a gonorrhœa, or at least but little attention compared with what the affection really demands. Patients do not permit the disease to interfere with the performance of their daily duties; they regard it as something to be endured for a few weeks, and seem to think that it will take care of itself, and that recovery will necessarily occur without any particular care or attention on their part.

It cannot be too emphatically stated that gonorrhœa, when neglected, is a most serious and dangerous affection; for it is apt to induce not simply the various complications which have been already mentioned as occurring in the course of the disease; if these were all the danger to be apprehended, the patient might feel reasonably sure of ultimate recovery. But the most serious result of gonorrhœa — one that happens almost always in cases in which the discharge has been permitted to continue for several weeks or months — has not yet been mentioned; this danger is the formation of a *stricture of the urethra*. This affection will be described in the appropriate chapter; it will suffice to say here that strictures are, in the vast majority of cases, the results of gonorrhœa; and that they constitute a serious menace to a patient's comfort, and even to his life. The stricture develops insidiously, rarely showing itself within two years after the gonorrhœa, and sometimes causing no trouble until five, ten or even more years have elapsed. Yet a stricture is none the less certain to cause the patient much pain and annoyance in the later years of his life. Many a man has died of a stricture which was the result of a gonorrhœa contracted twenty, thirty or forty years previously. These facts are mentioned here to emphasize the possible gravity of gonorrhœa, and hence to impress upon the patient's mind the importance of the most careful attention in the treatment of this affection. It will not do to suppose that the disease will be all over in a few weeks any how, and that it is not worth while to trouble one's self particularly about the treatment. A patient suffering from gonorrhœa should never lose sight of the fact that, however well he may feel, he is the subject of a serious disease which may render his life miserable and even cause his death.

The first item of treatment is bodily *rest*. The prime importance of quiet during the early stages of gonorrhœa can not be overestimated, and is not generally appreciated, even by physicians.

Patients continue their usual employment, even when this compels them to be upon their feet, and even to perform hard manual labor. It may safely be said that if a patient works hard, he cannot expect to recover from gonorrhœa in a short time. The importance of bodily rest has been often impressed upon the writer by observing cases in which men suffering from the disease had sustained some accident or injury which compelled them to keep their beds. In such cases gonorrhœa usually subsides in a few days under the most simple treatment, although up to the time of the accident the disease may have been quite severe and obstinate.

Another item of extreme importance in the treatment of gonorrhœa is the careful avoidance of everything which can cause sexual excitement. Unless a man can refrain from all indulgence of the sexual appetite he cannot expect that an inflammation affecting the sexual organs can be soothed into recovery.

A third object to be attained is the regulation of the diet so as to render the urine as unirritating as possible. It is therefore desirable to avoid stimulating food such as meats and condiments, and it is absolutely necessary to abstain from beer, wines and liquors. Indulgence in a slight carouse has often caused a gonorrhœa which had been nearly cured to return in full force on the following morning. The patient must therefore make up his mind at the very beginning of the disease that he must be a teetotaler not only until the discharge has ceased entirely, but even for two or three weeks afterward.

The diet should consist of bland, unirritating articles such as milk, eggs, starchy and vegetable food, and plainly-cooked meat in small quantity. Tea and coffee may be used in moderate quantity without aggravating the difficulty.

If the urine can be made unirritating, the patient's suffering will be much diminished, and his recovery correspondingly hastened. To accomplish this he should take a great deal of liquid diet; he should drink water freely, especially some alkaline water. It is also beneficial, though not absolutely necessary for him to take certain bland liquids, such as flax-seed tea or slippery-elm tea. These articles are unpleasant to most palates, and need not be taken unless agreeable to the patient; but it is his duty to himself to take an abundance of water, and he will find advantage in using some effervescing drink, such as soda water, or some alkaline mineral water.

If the measures which have been already mentioned—rest of the body, avoidance of all sexual excitement, the use of a bland diet and care in drinking plenty of water—if these measures were faithfully and conscientiously observed, most cases of gonorrhœa would recover within two to three weeks without further treatment.

Yet many patients are unable to take the time necessary for following out these directions. The requirements of their business prevent them from remaining in bed for two weeks. Yet they should be careful and refrain from all exercise or excitement wherever it is possible so to do.

For such persons it becomes necessary to employ certain medicines. These medicines are taken not for the purpose of "purifying the blood," since gonorrhœa is not a disease of the system, but merely a local inflammation in the urinary passage; the object of these medicines is to render the urine less irritating and to soothe the mucous membrane of the urethra. To accomplish these ends two drugs have been for many years almost universally employed; these two drugs are *copaiba* and *cubebs*. Both of these medicines have one extremely unpleasant feature—their nauseating taste. To overcome this, many devices have been employed; the most successful is the use of gelatine capsules, by means of which the taste of the medicine can be concealed and yet the good effects of the drug can be obtained. These capsules come already prepared and can be obtained at the drug stores. The taste of copaiba can also be partially concealed by the use of the following prescription:

Balsam of copaiba, - - - -	One ounce.
Peppermint water, - - - -	Two ounces.
Compound spirits of lavender, -	- Two ounces.
Mucilage of gum arabic, - -	- One ounce.

A tablespoonful may be taken three times a day.

The good effects of this drug are most apparent during the first week or ten days of the disease; at the end of this time, unless the patient has neglected to observe the precautions which have been already mentioned, the smarting pain during the passage of the water will have ceased. After this stage is reached, that is when the smarting is no longer felt, the copaiba will not accomplish so much good, and may be discontinued. Indeed the drug may be stopped earlier, or the dose of it diminished if the patient com-

plain of sickness at the stomach; for copaiba is apt to cause loss of appetite and nausea.

After the use of copaiba is discontinued, the patient should take some alkaline remedy, in order to keep the urine bland and unirritating. If he prefer, he may employ some of the usual mineral waters which are kept on sale in the drug stores. A less expensive and pleasant, though equally efficient remedy, consists in dissolving one or two teaspoonfuls of baking soda in a glass of water. This may be taken four or five times a day.

If the discharge be still profuse at the end of eight or ten days, the patient may and should employ *injections into the urethra.* These should not be used during the first weeks of the disease, since they will only aggravate the inflammation. Much unfounded prejudice exists as to the use of injections. They have been charged with causing many of the evils that accompany the disease. It is certainly true that in ignorant and unskilled hands injections can cause and have done much mischief. Patients who treat themselves without consulting a physician, and those still more foolish individuals who patronize advertising quacks and "specialists," frequently suffer much unnecessary pain and injury. A favorite device of such individuals is to stop the discharge in a few days, thus displaying their extraordinary skill to the admiring patient. The fact is that it is a very simple matter to stop the discharge of gonorrhœa by using a sufficiently strong injection; but this measure will certainly be followed by inflammation of the testicle, and possibly by a stricture. Although such injury can be done by the improper use of injections, yet it is no less certain that when properly used these measures constitute a most important and even essential feature of the treatment of gonorrhœa.

So soon as the acuteness of the pain and the smarting have subsided — and this usually takes place, if the patient has been cautious, at the end of eight or ten days or even sooner — the following injection may be used:

Sulphate of zinc, - - - -	Eight grains.
Laudanum, - - - -	One ounce.
Glycerine, - - - - -	Three ounces.
Water, - - - - -	Four ounces.

This may be used as an injection four times a day.

The patient must always be instructed as to the method of using an injection. In the first place, it is important that he secure

the proper syringe. The articles which are commonly sold for the purpose are made of glass and have a long, thin nozzle; nothing less appropriate could be devised. The only syringe in the market which can be recommended is the one universally employed in the large German hospitals; it is made of hard rubber, with a conical end, and holds about half an ounce.

When the patient is about to take an injection he should first pass his water, and should then inject the urethra with simple warm water of a temperature which feels agreeable; after this he may fill the syringe with the medicine, inject it and hold it in the urethra for three or four minutes. In using the injection the piston of the syringe should be gently though firmly pressed. If too much force be applied the urethra will be forcibly distended and the inflamed membrane damaged; if not enough force be used, on the other hand, the fluid will not come into contact with the inflamed surface throughout its whole extent. Probably the best guide as to the amount of force to be used is the feeling of the patient himself; he should use sufficient force to cause a slight feeling of uneasiness, but not enough to provoke pain. There is no danger of forcing the fluid into the bladder, as many suppose.

This injection should be used for five or six days. If at the end of this time the discharge has decreased considerably, the strength of the injection may be increased by employing the following prescription:

Sulphate of zinc,	Twelve grains.
Alum,	Twelve grains.
Glycerine,	Three ounces.
Water,	Three ounces.

This may be injected as before.

The various complications of gonorrhœa also require treatment. First among these is the condition which has been already described as *chordee*. This is an extremely painful incident of the affection, and one which probably undermines the patient's strength more than anything else, since it interferes so seriously with his rest Chordee can generally be relieved at once by using the following prescription:

Bromide of potassium,	One ounce.
Syrup of orange peel,	One ounce.
Water,	One ounce.

Dissolve thoroughly and take a teaspoonful in a little water half an

hour before retiring. If the patient be awakened during the night by the pain, he may repeat the dose. The *ointment of mercury* may be rubbed along the under surface of the organ every night and morning. If the irritation extend to the bladder, and cause frequent desire for making water, the following prescription may be taken every four hours during the day:

Extract of hyoscyamus, - -	Four grains.
Bicarbonate of potash, - -	Four drachms.
Camphor water, - - -	Four ounces.

Take a teaspoonful every three or four hours during the day.

In all cases care should be taken to secure regular evacuations from the bowels. It will often be found that the severity of chordee and the frequent inclination to pass water will disappear if a free movement of the bowels be secured at least once every day. For this purpose the patient may take a tablespoonful of the liquid citrate of potash, or a teaspoonful of the "compound licorice powder." If constipation occur, it will be better to relieve the rectum by a copious injection of warm water than to take a strong cathartic; for the latter would result in severe straining at stool which causes congestion of all the organs in the pelvis, and tends to aggravate the inflammation in the urethra.

The inflammation of the testicle does not usually occur until the third or fourth week of the disease. The best means for preventing this painful and serious accident are absolute rest, the avoidance of sexual excitement, and care in the employment of injections. No medicines can be taken with the hope of preventing this complication. The beginning of this affection is indicated by the occurrence of pain in the testicle, and by a sense of weight and dragging in the groin. So soon as it becomes evident that the inflammation has begun, the patient should remain flat upon his back, if possible, keeping the testicle supported by a band of adhesive plaster, upon which the organ may rest. If he be compelled to remain upon his feet, the testicle should be carefully supported by a bandage. The so-called "suspensory bandages" sold in the shops are mostly worthless; if the patient have a soft handkerchief and a little ingenuity, he can devise a bandage which will answer the purpose. The point is simply that the testicle should be supported by the bandage so that none of its weight is suspended in the natural way. The organ should, therefore, be held closely

against the body. Some soft cotton should be placed between the skin and the handkerchief or bandage, so as to protect the inflamed organ from injury. During the early days of the inflammation but little can be done to arrest its progress. The patient should remain quiet, as has been already directed, and the inflamed organ should be wrapped in soft cloths wet with hot water. If the pain be severe, the patient may take twenty drops of laudanum in water every four hours. After the acuteness of the inflammation has subsided, that is, after the pain and tenderness are somewhat diminished, the organ may be wrapped in straps of adhesive plaster. It is scarcely possible to direct in words how this strapping should be done. It may be said in general that strips of plaster about five-eighths of an inch wide and eight inches long may be prepared; the testicle is then firmly grasped and forced downward from the body until the skin over it is tightly stretched; one strap is then passed around at the upper end of the organ so as to hold it firmly in position. The other straps are then applied from above downward, each one overlapping slightly the one next above. This operation must be done with great care, and should always be performed by a physician.

The swelling of the glands in the groin is an occasional incident in this disease. A slight amount of swelling is not infrequent in any case of gonorrhœa, and the lumps in the groin may even become somewhat tender, especially if the patient is constantly feeling and pinching them to see how much it hurts. But at times one or more of these glands in the groin become actually inflamed; a lump of considerable size forms, tender upon pressure, and causing acute pain especially when the patient walks or stands.

In every case the first intimation of inflammation in a gland of the groin should be the signal for the patient to take to his bed and remain there. The treatment of the enlarged gland is just the same as that of *bubo*, which has been described in connection with the venereal ulcer.

Gleet.

By this name is designated a chronic discharge from the urethra, which occurs as the sequel to gonorrhœa. In many cases the discharge does not cease after the gonorrhœa has lasted four or five weeks; it becomes gradually less and finally amounts only to

a few drops in the course of the day. These drops are thin and watery, and the discharge occasions the patient no other annoyance than the mental anxiety and uneasiness.

In many cases the discharge will be noticed only when the patient rises in the morning. There is no pain when the bladder is evacuated, no frequent desire to pass the water, in fact nothing wrong except the slight watery discharge. This is, however, most obstinate and difficult to get rid of; it frequently lasts for months, and in many instances even years may elapse before the patient may become entirely free from this last vestige of his indiscretion.

One of the uncomfortable features about gleet is the fact that excesses of various kinds are apt to increase the discharge so that its quantity becomes almost as great as during the original gonorrhœa. This is especially often the case after excessive sexual indulgence, but it may also follow immoderate use of liquors, especially of beer, or even physical or mental exhaustion from overwork. After the discharge has thus broken out a few times it becomes extremely difficult to check it completely.

One of the popular misapprehensions with regard to gleet is the general belief among young men that the watery liquid which escapes from the urethra is the seminal fluid. Such men are tormented with the idea that they have "emissions," and in consequence often become despondent and melancholy. A positive opinion can be, in every case, made by a microscopic examination of these drops of fluid. In the majority of cases it will be found that the fluid does not come from the organs of generation, but is merely the continuation of the inflammatory discharge of gonorrhœa.

Treatment.—The treatment of gleet should never be undertaken by the patient himself. It is in fact, even in the hands of the ordinary physician, a most obstinate and puzzling affection. Cases frequently run for years under treatment of various kinds, and fail to improve until they come into the hands of one who has devoted especial attention in the most scientific schools to this class of diseases. It is scarcely necessary to say that such properly educated and competent physicians *never advertise*, since no medical man who can attain an honorable position ever resorts to means which are practiced only by quacks.

Gleet often depends upon the existence of a stricture, and can be relieved only when the stricture has been cured. At other

times there is an ulcerated spot somewhere in the course of the urethra from which the discharge comes. In still other cases there is a chronic inflammation of the gland situated at the neck of the bladder called the *prostate gland*. In none of these cases can any benefit be derived from injections into the urethra. The detection and treatment of stricture in the urethra requires a most expert and experienced surgeon; the detection and treatment of an ulcerated spot requires the use of special instruments whereby the surgeon is enabled to see the entire surface of the urethra, even into the bladder; an inflammation of the prostate gland can be recognized and treated only by the physician. We shall therefore refrain from giving descriptions and directions which would be unintelligible and impracticable to any one but a physician.

In many cases the patient suffering from gleet is in a weak and debilitated condition, and will be benefited materially by tonics. In fact cases occur in which the gleet breaks out afresh whenever the individual becomes exhausted and disappears without further treatment when his general health is improved. Such patients will derive benefit from the following prescription:

Tincture of the chloride of iron,	Six drachms.
Tincture of nux vomica,	Six drachms.
Compound tincture of gentian,	To make four ounces.

Mix and take a teaspoonful in half a wineglassful of water before meals.

The treatment of gonorrhœa in the female varies somewhat in details, but follows the same general principles. If the inflammation affect the vagina only it will not be necessary or advisable for the patient to take any medicine internally. She should take a hot hip bath four or five times a day, remaining in the bath fifteen or twenty minutes each time. She should also use an injection after the following formula:

Alum,	Four drachms.
Glycerine,	Four ounces.
Water,	Four ounces.

Half of this may be injected into the vagina at the conclusion of the hip bath. At night a tampon may be introduced, saturated with the following lotion:

Tannin,	Four drachms.
Glycerine,	Two ounces.
Water,	Two ounces.

A piece of cotton as large as a small lemon may be saturated

with water and squeezed dry; a piece of string is then tied around the middle of this, and it is then thoroughly saturated with this lotion. The tampon thus prepared may be introduced high up into the vagina and allowed to remain during the night; it is to be removed in the morning by means of the string, which should project from the vagina.

If the inflammation affects the urethra also, the same measures should be adopted for rendering the urine unirritating as have been recommended in the treatment of gonorrhœa in the male. It will be advisable to administer copaiba and to drink water freely. The urine may be kept bland by the use of mineral waters, or by dissolving a teaspoonful of baking soda in a glass of water, as before mentioned.

There are certain facts to be borne in mind whenever a patient, male or female, suffers from gonorrhœa. First, it should never be forgotten that the matter composing the discharge is highly contagious, not only when it comes in contact with the genital organs of another individual, but also for other mucous membranes of the patient himself as well as of others. Thus it sometimes happens that some of this matter is introduced into the rectum, causing a severe inflammation of this organ. In some instances it has been known to cause a violent inflammation of the nose, having been introduced into the nostrils by means of handkerchiefs soiled with the discharge. But the most susceptible of all the mucous membranes of the body is that of the eye; and this is the one which is most frequently inflamed by the contact of gonorrheal discharge. The patient neglects to wash his hands carefully after performing the necessary manipulations of the diseased organs; or he carelessly rubs his eyes even before he has washed his hands, and thus introduces some of the matter into the eye. In some instances the contagious matter is conveyed by towels which have been used by the patient about the genital organs and are subsequently employed to dry the face.

The patient cannot be too careful to avoid every possibility of conveying the matter from the urethra to the eyes, for if the latter become inflamed there will result almost certainly a serious deformity of the eye, and in many cases partial or complete loss of sight. This inflammation of the eyes produced by the contact of gonorrheal matter, is one of the severest and most rebellious diseases which the eye-surgeon is called upon to treat. The sight may be

completely lost in a day or two, and there is no means for restoring it in such a case.

It seems scarcely necessary to remark that a patient suffering from gonorrhœa should carefully abstain from sexual indulgence until several weeks have elapsed after the cessation of the discharge. His own welfare, as well as that of the other individual concerned, demands that he shall be strictly continent until there is no further possibility of communicating the disease.

Impotence.

An inability to perform the sexual act is one of the commonest derangements of the genital organs in the male. It is due either to some unnatural formation of the parts, or to deficiency in the power of erection, or to some disease in those organs where the essential part of the male fluid is secreted.

In order that a man shall be capable of propagation, it is necessary that certain microscopic elements, called *spermatozoa*, shall be produced in his body and shall reach the womb of the female. It is evident, therefore, that an inability to propagate may be due to defects in any one of three ways:

First—There may be some disease of the testicles, as a result of which the spermatozoa are not produced, or are but imperfectly formed, so that they are incapable of performing their functions when they arrive in the genital canal of the female.

Second—There may be some impediment or obstacle to the escape of the male fluid, so that it cannot be projected in the usual way.

Third—There may be an inability of the male organ to assume the changes of form and position necessary for the proper performance of the sexual act.

It would be extremely interesting to follow in detail the relation and connection between the sexual organs and the other parts of the body, especially of the brain, for these organs are connected by a delicate and complicated nervous apparatus with the brain, so that they are largely under the influence of the mind. It is, of course, a familiar observation, that while no exercise of the will can affect the digestion or the beating of the heart, yet the manifesta-

tions of sexual activity can be provoked by voluntary effort through the influence of the imagination.

While it is out of our province to enter into any detailed discussion upon this point, we can merely point out some of the most important facts for practical application.

First—It is a fact that certain diseases of the nervous system manifest themselves early in their course by interference with the genital functions. A patient who is suffering from *locomotor ataxia* or *diabetes* usually loses the power as well as the desire for sexual gratification; sometimes, indeed, this loss of sexual power is one of the earliest symptoms of the disease.

Just as the influence of the mind is powerful in inciting the individual to sexual excitement and gratification, so it may be equally powerful in restraining the natural manifestations of sexual power, even though there be nothing wrong with the genital organs themselves. None of the bodily functions are so completely under the influence of the mind as this one. The most curious and remarkable instances are recorded in the annals of medicine, showing how a sudden emotion or a sudden conviction can render a man impotent for the time being. It would be out of place to record upon the pages of a popular work incidents illustrating the facts upon this delicate topic. But one point should be emphasized in this connection, namely, that impotence is often a disease of the *imagination* and *not* of the genital organs. Every physician who has had much experience in this department of medicine knows how many cases there are in which the patient fails to perform the act merely from lack of confidence; and how many instances occur in which the use of some mysterious remedy, or the application of instruments in parts of the body which are to the patient mysterious, results in perfect cures of impotency, even though these medicines and these instruments have really not affected the individual in the least. The fact is that these patients suffer from diseased imagination, and not from diseased sexual organs. They have in many cases failed during the first attempt at sexual congress, and have in consequence become so thoroughly disheartened and demoralized that they believe themselves to be impotent, and are afraid to repeat the experiment. The difficulty is increased by the privacy which always surrounds sexual matters; a man who suspects himself to be impotent does everything in his

power to conceal his supposed condition from others, and hence does not get the benefit of the experience of other men.

For the benefit of such individuals, and indeed of all who are suffering in secret from doubts and fears as to their own sexual capacity, it should be stated that very few men meet with complete success in their maiden efforts in this direction. The excess of emotion is usually such as to defeat its own object; but this defect disappears with time and experience. No man, no matter how often he may have failed, should believe himself incapable of the perfect performance of this function until he has been carefully examined by a physician. The fact is that cases of impotence are rare, except in those who have exhausted their powers by excessive indulgence. Nearly all of the cases in which persons inexperienced in this matter fancy themselves impotent, are merely instances of diseased imaginations, which are easily improved and cured with or without medicine.

There is also a form of impotence which depends upon actual disease of the genital organs and of their appendages. Such disease is caused by sexual excesses, by masturbation, by deterioration of the general health, by nervous exhaustion, and may follow attacks of gonorrhœa. Then, again, there are cases which are caused by some deformity of the genital organs. This deformity may be congenital — that is, a defect of development which was present at birth — or it may be acquired. Thus it sometimes happens that wounds or injuries to the part occasion such change as renders the sexual act impossible.

It is unnecessary, and would be improper, to enter into the details for recognizing the cause in each particular case of impotence, or to outline the treatment to be adopted. When this condition actually exists; when the individual is convinced that the obstacle to the successful performance of the sexual act is not a mere effect of the imagination, nor the result of excessive timidity or anxiety on his part, he should, at any cost, place himself in the hands of a competent physician.

Sterility in the Male.

Every man who is really impotent — that is, incapable of performing the sexual act — is of course sterile, incapable of begetting offspring; but there are also individuals who are apparently in the

perfect enjoyment of sexual power, and yet who are incapable of propagation. Such instances are more frequent than has been generally supposed. The popular impression is that a failure to beget children is due to a fault of the wife. The husband usually escapes suspicion, unless his past life has been such as to encourage a doubt of sexual capacity on his part. Many a woman bears unjustly one of the greatest stigmas that can be attached to her — that of barrenness.

Sterility on the part of the male is just as certain, though not so frequent a condition, as barrenness of the female. The affection may result from any one of several causes, and these causes are of such common occurrence that about one case in six in which marriages are unfruitful is found to be due to the fault of the husband.

It would be out of our province to enumerate all the causes which may result in steriiity in the man, and just as foreign to our purpose to mention the treatment which is necessary for the relief of this condition. Sometimes it is quite possible to cure the affection, though recovery is not so frequent in these cases as in those in which there is simply inability to perform the act. The causes which result in actual sterility are in most cases beyond the reach of medicines or of surgical operations. A few causes may be mentioned here ; these are cases in which the active ingredients of the male fluid — the *spermatozoa* — are absent from this fluid temporarily.

This condition occurs frequently in those who have been addicted to excessive sexual indulgence for years. In such cases the sexual power is apparently not impaired, though the capacity for propagation is lost. In many of these cases of confirmed debauchees this condition is followed in a short time by actual impotence — that is, inability to perform the sexual act.

In other cases the absence of spermatozoa is a merely temporary one which may be due to excesses of short duration ; the cause is nervous exhaustion, which may occur in a perfectly continent individual who has never been addicted to excessive sexual indulgence. In such cases the sexual capacity returns when the condition upon which it depends is removed by rest and treatment.

It has been already mentioned that certain diseases of different organs in the body are apt to cause sexual incapacity. Various diseases of the nervous system are especially often accompanied

with this symptom; and diseases of the kidney are also apt to be followed by loss of sexual power. One of the most frequent of these general diseases which has this depressing effect upon the formation of spermatozoa, is *consumption*. The interference with sexual power seems to occur before the disease has made serious inroad upon the patient's health.

The use of certain stimulants in excess is also followed by this loss of sexual capacity; among the agents which are now so commonly abused are *morphine* and *chloral*.

In every case in which doubt exists whether the fluid actually contains the elements necessary to propagation, the matter can be solved at once by submitting this fluid to microscopic examination. This is in fact the only way to ascertain whether the barrenness of a marriage is to be charged to the husband or to the wife.

Seminal Emissions—(Spermatorrhœa.)

This affection is the greatest bugbear of young men. It is the source of immense revenue to self-styled "specialists" and others who advertise in the daily press their ability to cure the disease, and present a most appalling and gloomy picture of the present condition and future misery of individuals who suffer from seminal emissions. There are probably comparatively few young men who have not at some time been alarmed by reading the newspaper advertisements, pamphlets and handbills with which the country is flooded, offering relief in the name of pure philanthropy and humanity to the thousands of young men who must otherwise go down to a wretched and early grave. These pamphlets and circulars emanate generally from "victims of self-abuse," who have after long years of unsuccessful treatment at the hands of physicians discovered accidentally a sure cure for the affection, which they are willing to impart—for a consideration.

The business of these men would be destroyed, and much unhappiness, misery and despondency would be avoided by young men generally, if the actual facts with regard to seminal emissions were known to the public.

The fact is that seminal emissions occur naturally in men in good health who do not indulge in sexual intercourse. Within a

certain limit it is perfectly natural and healthy for the fluid to escape without the usual provocation. The question then arises, what is the limit at which these emissions cease to be healthy and become injurious? It would be a source of much satisfaction to the writer, as well as to other physicians, if there were some fixed law by which this question could be answered. But there is no such law; indeed, when we consider the matter, it is evident that there can be no rule which shall apply to all individuals. It is impossible to state definitely just how much beefsteak a man should eat or can eat without injury; he can easily ascertain for himself by experiment. So it is with regard to the frequency of seminal emissions; the interval which elapses between them varies extremely in individuals who remain nevertheless in equally good health. Some men suffer such an emission once in two weeks, while others have several in a week, and yet maintain perfect health.

While we cannot, therefore, predict just how many emissions can be borne without injury to the health, we can say whether they are injuring any given individual. They cannot be accused of any injurious effect unless they are followed by headache, backache, sleeplessness, mental depression, and bodily lassitude. Even in these cases it is quite possible that other causes, such as excessive devotion to business or pleasure, are largely responsible for the symptoms just mentioned; in every case the patient should take a calm and reasonable view of the matter, and not jump to the conclusion that his health is being undermined by seminal emissions when there are actually other causes which are in themselves sufficient to account for his difficulties. It is a fact that seminal emissions may be a *result* as well as a *cause* of general debility; and much effort is sometimes wasted in attempts to cure seminal emissions, which should be directed to improvement of the general health, since this improvement would be the surest way of checking the symptoms complained of.

The occurrence of these emissions *by day* is always a symptom of disease, either in the sexual organs themselves or elsewhere in the body. If they be provoked by slight excitement or irritation of the skin, or by lascivious thoughts, it is highly probable that the difficulty originates in the sexual organs themselves.

Most cases in which the patients believe themselves to be afflicted with seminal emissions by day, are really not cases of spermatorrhœa at all. Unless the discharge be accompanied by

the usual symptoms, it is highly probable that the fluid which escapes is not the seminal fluid at all, but merely an increased secretion from the urethra and from the prostate gland. The question can be decided at once by submitting the fluid to microscopical examination; until this is done the patient should remember that the probabilities are against the supposition that this fluid is the true seminal discharge. It should also be remembered that in certain conditions of the general system seminal emissions occur as a rule, and have no other significance than that of a symptom of the disease. It is not uncommon for patients who are recovering from exhausting diseases — such as the infectious fevers, small-pox, typhoid fever, etc., — to have emissions by day as well as by night. These may occur at short intervals for several weeks and yet disappear permanently when the patient finally recovers his health.

One of the most frequent complaints which are made to physicians by young men in connection with this matter, is that they suffer seminal losses during the evacuation of the bowels. It should be stated that the fluid which the patient regards as semen is rarely of this character; in most cases it has nothing to do whatsoever with the seminal fluid. Such patients complain that this discharge is more frequent and profuse when the bowels are constipated — a fact which of itself indicates the harmlessness of the symptom.

Symptoms.— Although the symptoms of true spermatorrhœa vary according to the general condition, disposition and age of the patient, yet the general course is somewhat as follows:

Among the earlier symptoms which indicate that the pollutions are becoming more frequent than is compatible with perfect health, are pain in the small of the back, pain in the head, a sense of fatigue and inability for exertion, and a certain incapacity for mental effort. As the emissions increase in frequency, the patient observes a diminished capacity for sexual enjoyment; the general symptoms are made worse, and include dizziness, weakness of sight, trembling in the limbs, a sense of weight in the chest, palpitation of the heart, and signs of dyspepsia. After a time he begins to have emissions by day also, and he now usually becomes the prey of despondency. His mental depression may be so great that his thoughts are constantly directed to the one subject — a condition which aggravates the difficulty. His gait becomes unsteady; he feels wandering pains in various parts of the body; his rest is disturbed by frightful

dreams; he shuns society, because he imagines that others see and recognize the cause of his difficulty. In fact, his mental condition approaches finally a mild type of insanity. It must be said, however, that there but few, if any, cases in which insanity can be traced to excessive seminal losses. There are numerous instances in which an individual suffering from seminal emissions has become insane, and such cases are commonly ascribed to the seminal losses. A closer scrutiny of the case usually shows that the patient had a tendency to insanity, and that the seminal losses are to be regarded rather as one of the symptoms of the general nervous depression which resulted in insanity — as an effect, therefore, rather than as the cause of his mental derangement. Certain it is that those who have inherited a disposition to certain nervous diseases — epilepsy and insanity for instance — are far more frequently affected with seminal emissions than others.

Cause.— Spermatorrhœa is not usually a separate disease by itself, but is a symptom of several affections which may be located in the genital organs or may affect other parts of the body, especially the nervous system. In most cases it is simply a nervous disease, and is accompanied by numerous other symptoms which indicate feebleness of the nervous system. The subject of it is commonly of a nervous, excitable temperament; and as first pointed out by an eminent French physician, he has usually suffered in earlier life from some manifestation of weakness in the genital or urinary organs, such as inability to retain the urine. It has been noted that children afflicted in this way often suffer in later life from weakness of the genital organs.

Among the causes which predispose to this affection is constant indulgence of the imagination in licentious thoughts. This especially when combined with unsatisfied sexual excitement, induces an irritability of the organs which finally results in the escape of the seminal fluid upon slight provocation.

Spermatorrhœa is most frequently induced by the habit of self-abuse. When this habit is stopped the individual usually suffers from involuntary emissions instead of those which he had formerly excited voluntarily.

It must not, however, be supposed that every individual who has once indulged in this habit must suffer from incontinence of semen afterward. In many cases the habit is practiced to only a limited extent and is not followed, to any particular degree, by

seminal emissions; that is, these emissions do not occur with more frequency than is natural for individuals who have not practiced self-abuse.

There are several causes which may act in exciting seminal emissions in cases where no disease of the sexual organs exists. Sometimes an unusual formation of the organ is a source of constant irritation which provokes seminal emissions. One of the most frequent of these is an unnatural tightness of the foreskin, whereby the secretion formed beneath it cannot escape, and being retained irritates the inner surface. An unnatural narrowness of the urethral opening may also cause constant irritation and seminal losses.

Cases have been known in which spermatorrhœa has followed several ordinary derangements of the rectum; thus piles, fissures, worms and skin eruptions in these parts have all been known to cause seminal losses, which disappeared when the original affection was removed. Habitual constipation may also cause the same effect by constant pressure upon the parts.

Treatment.—In all cases of involuntary seminal losses certain rules of hygiene and of moral conduct must be complied with. The diet should be bland, easily digestible, and yet nourishing; in fact particular care should be taken that the patient is provided with abundant food of the best quality. He should take but little food in the evening, and should carefully avoid the use of liquors. The bladder should be emptied before retiring, and the patient should sleep upon a hard mattress—hair, for instance—without much covering. The emissions occur with especial frequency in the early morning hours; hence the patient can often prevent them by setting an alarm-clock, which shall awaken him about an hour before the time at which the accident usually occurs. If the patient will then empty the bladder the liability to seminal loss will thereby be much decreased.

The attention should also be directed to the general state of the bodily health; care should be taken to secure abundance of air and exercise, and to interest the mind in some pursuit which will divert the attention from sexual matters. Perhaps the most important item in the treatment of spermatorrhœa, generally speaking, consists in persuading the patient to devote his entire energies to some occupation which will leave him no time, and but little energy for thinking about his condition.

Yet it should not be forgotten that since seminal losses are oftentimes a mere sign of general debility, excessive exercise may aggravate rather than benefit the difficulty. The patient should never push his employment to an extent which causes him to feel exhausted.

The genital organs and the skin in the vicinity should be carefully scrutinized, in order to detect and remove any of the irritating causes which are known to induce seminal losses. In some cases simple attention to cleanliness, and care to avoid the retention of any secretion under the foreskin will be sufficient to remove the affection. In other cases an operation will be necessary whereby a portion of the skin is removed—circumcision. At other times it will be found that piles are keeping up constant irritation, and that the removal of the piles will cure the affection of the sexual organs.

Again, the entire difficulty may result from habitual constipation. Measures which cure this affection will also relieve the patient of the seminal weakness. For this purpose the individual may employ the usual mineral waters, or he may take a teaspoonful of Rochelle salts in a glass of water before breakfast every morning. If this does not suffice to secure regular evacuation of the bowels, the following prescription may be employed in addition:

Extract of belladonna, - - -	Four grains.
Extract of nux vomica, - - -	Five grains.
Compound extract of colocynth, -	Thirty grains.

Mix, and make twenty pills; take one of these at bedtime.

A word may be added here with reference to the habit of self-abuse. There is no denying the fact that this custom is alarmingly prevalent among children of both sexes. Parents cannot be too careful in supervising the habits of their children, for these often acquire the habit of self-pollution without knowing what they do. In fact, the habit is practiced in many instances at an age when the child would not be supposed to be deriving any gratification from it. It has even been practiced by infants in arms. Every association of boys or girls, such as occurs in boarding schools, public schools and the like, is a hotbed for the propagation and dissemination of this habit among innocent children. Every child who is entrusted to the care of hired servants also runs a risk of contamination. This is of course a matter for parents, guardians and

teachers of children to detect and to prevent; it lies beyond the reach of the physician.

A few words of information may, however, be comforting and profitable to parents who discover that their children have been taught this habit.

In the first place, the evils which are popularly attributed to the habit are grossly exaggerated. The medical profession has been singularly lax in instructing the people as to the actual facts in the case; hence the popular information on the subject is derived largely from the advertisements of quacks, whose interest is furthered by exciting the fears and anxiety of those who have at some time been guilty of the practice. From such sources people have derived the belief that one who has been addicted to self-abuse is marked as a victim for all sorts of nervous diseases, terminating in insanity, imbecility and death. These ideas are essentially erroneous; for no instance is on record in which insanity or imbecility could be traced positively to this habit. The numerous cases in which self-abuse is practiced by insane, imbecile and epileptic patients seem to be instances in which both the disease and the habit of self-pollution are the results of a common weakness of the nervous system, and not that either one is the effect of the other.

The injury which is to be expected from indulgence in the habit of masturbation depends largely upon the extent to which the habit is practiced, as well as the age at which it was begun. As has been stated, every healthy male suffers a discharge of seminal fluid at stated intervals, no matter how continent he may be; and the frequency of these emissions may vary extremely without exceeding the bounds of health or causing injurious effects. The health of the individual is not impaired when the frequency of these emissions is much increased by marriage; nor is his general condition necessarily deteriorated if the emissions are made to occur without marriage. Injury is to be expected when the habit is acquired at an early age before the sexual powers are developed, and hence before they are capable of sustaining the effort required of them in responding to the stimulation of sexual excitement. Unfortunately in many cases, the boy becomes so addicted to the habit that he is incapable of thinking about or devoting his energies to anything else. The result must necessarily be a stunting of his intellectual powers. One other fact should be emphasized, namely, that the injury is simply the result of exhaustion of the

vital powers; and that this exhaustion results not from the loss of the seminal fluid, but from the *excitement* incident to the escape of the fluid. The most absurd and extravagant ideas prevail as to the vital importance of the male fluid; these ideas, derived chiefly from the advertisements of "specialists," ascribe to this fluid the qualities of a vital essence. It is a prevalent belief that the loss of a single drop of this fluid exhausts a man as much as the loss of a considerable quantity of blood. Such ideas are, of course, absurd; the exhaustion which follows the loss of the seminal fluid is consequent merely upon the intense excitement which accompanies the act. This is the most intense and exhausting emotion of which the human animal is capable; and indulgence in it is naturally followed by a corresponding degree of exhaustion. As a matter of fact, a seminal emission induced artificially does not and cannot exhaust the individual so much as natural intercourse; but the trouble is that while the number of emissions in the natural way is from the very nature of things limited, there is no limit to the license which a person may practice who gratifies his sexual appetite by artificial means. Hence masturbation is or may be more injurious than sexual congress, simply because it is so easily and generally practiced to an excess that is impossible in natural intercourse.

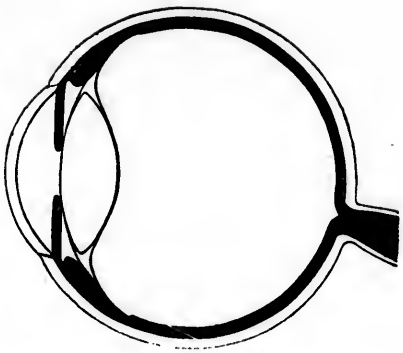
As for the treatment of masturbation no rules can be given. The habit must of course be stopped as soon as possible; yet the best means of attaining this object vary extremely in different cases. In some instances there may be room for the use of medicines; the child may be pale and feeble, and perhaps when the general health is improved, the practice of self-pollution may be overcome. But in most cases the treatment will consist in engaging the child's attention in some employment or recreation which absorbs his thoughts and energies; in encouraging him in the effort to overcome the habit, and in extending the warmest sympathy and support.

In some cases it may be absolutely necessary to employ mechanical means for preventing the practice in individuals who are too young to summon the moral strength necessary to overcome the habit. Various measures have been tried, such as tying the hands and feet. This is a harsh measure which is, moreover, often unsuccessful. If any such mechanical means must be used, the the most effectual is probably the application of a small Spanish fly-blister plaster to the parts in such a way as to keep them constantly so tender that the child is restrained by pain from meddling with them.

These plasters need not remain long enough to cause the actual formation of blisters; it will suffice to keep portions of the skin red and irritated, so that violent motion causes pain. The use of these plasters for a few weeks will usually be sufficient to break up the habit for a time; care must however be taken that the child does not resume the habit after the blisters are discontinued.

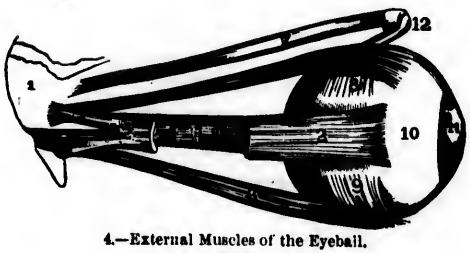
Those who may have at an early period of their lives been addicted to this habit, but have discontinued it, should be assured that no serious results are to be anticipated in the future. Physicians are occasionally consulted by young men who have become thoroughly alarmed by reading the pamphlets circulated for advertising purposes, in which it is asserted that numerous ills of adult life are the direct consequences of the least indulgence in this habit in youth. If any evil results, it will become evident long before the individual becomes matured; he need have no apprehension on account of a previous indulgence for a short time in this habit.

2.—Iris, Ciliary Muscle, and Choroid.

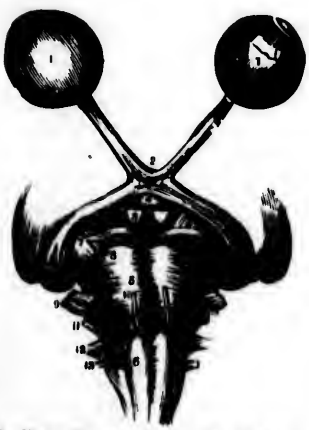


1.—Vertical section of the Eyeball.

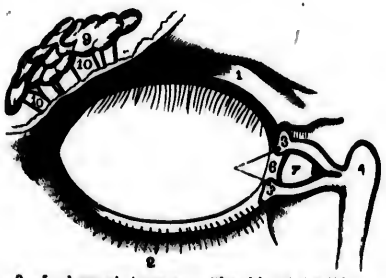
6.—Artificial Eye.



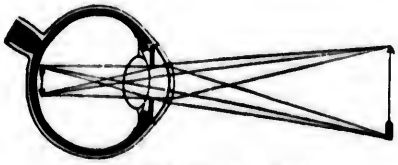
4.—External Muscles of the Eyeball.



7.—View of the second pair of Optic Nerves.



3.—Lachrymal Apparatus (the skin of the lids has been removed).



5.—Formation of Image on Retina.

EYE.

Explanation of "Eye" Plate

FIGURE No. 2.

The iris, ciliar muscle and choroid membrane.

1. The pupil, or apple of the eye.
2. Ciliar muscle.
4. Arteries of the choroid membrane.
5. The sclerotic tunic, divided circularly and partly removed.

FIGURE No. 1.

A vertical section of the eye-ball.

FIGURE No. 6.

An artificial eye.

FIGURE No. 4.

The external muscles of the eye-ball.

1. Part of the sphenoid bone, to which the muscles are fastened.
2, 2. Rectus externus muscle.
3. Optic nerve.
4. Rectus internus muscle.
5. Rectus superior muscle.
6. Rectus inferior muscle.
7. Obliquus superior muscle.
8. Insertion of the obliquus superior in the eyeball.
9. Obliquus inferior muscle.
10. Sclerotic tunic.
11. Cornea.
12. Trochlear or cartilaginous lever for the obliquus superior.

FIGURE No. 7.

View of the second pair of optic nerves.

1. Eyeballs; the left is perfect, the right one has the sclerotic and choroid tunics removed to show the retina.
2. Chiasma, or commissure of optic nerves.
3. The corpora albicantia.
4. The infundibulum.
5. Pons varolii.
6. The medulla oblongata.
7. The third pair, or motor nerves of the eye.
8. The fourth pair, or pathetic nerves.
9. The fifth pair, or trigemini.
10. The sixth pair, or external motor nerves.
11. The seventh pair, or auditory and facial nerves.
12. The eighth pair, or pneumogastric spinal accessory and glosso-pharyngeal nerves.
13. The twelfth pair, or hypoglossal nerves.

FIGURE No. 3.

Lachrymal apparatus, with the epidermis of the palpebræ, or eye-lids removed.

1. Cartilage of the eyelids.
2. Insertion of the eyelashes.
3, 3. Lachrymal points, or openings of the lachrymal canals on the margin of the lids.
4. Nasal duct; channel leading to the nose.
6. Lachrymal sac in the orbital extremity of the duct.
7. Inferior ridge of the eye.
9. Lachrymal gland.
10. Lachrymal canals, carrying the tear secretions into the eye.

FIGURE No. 5.

Formation of an image upon the retina.

Manikin of the Head.

The skin being removed, we see the cranium and its divisions; the frontal or forehead; the parietal or posterior walls, and the occiput. The irregular lines mark the sutures by means of which the bones are united, which before were separate. The nerves and the large blood vessels are indicated by the ramifying lines, white and blue. The muscles are colored dark red, as, for example, the muscle which imprints on the forehead the expression of anger, etc. Around the eye is the orbicular muscle, which closes the eye during sleep.

On one side, lower down, are two muscles which move the upper lip, and cause it to express contempt, laughter and other emotions. The superior maxillary bone is directly in front of the ear and below, a group of muscles which aid in mastication. In the chin are other muscles which serve to give expression and move the lower lip. The white spots united by thread-like lines are the plexus or groups of nerves which originate movement and produce sensation.

Underneath the head will be observed the hioides bone, which is in reality the root of the tongue. Underneath is the larynx, which leads into the trachea; below this passes the pneumo-gastric nerve, which, as its name implies, sends branches to the lungs and stomach. The wide blue line shows the jugular vein, and the crimson one in front the carotid artery, the two great blood vessels of the neck, which carry the blood for each side of the head. In a group at the hinder part are the muscles of the nock, by which the head is moved in all directions. Behind these again are seen the tortuous folds of the brain, the upper part, the cerebrum, which is the origin of muscular movement, and at the base at the back is the cerebellum, or small brain, the seat of thought. Below the brain is the base of the cranium, showing the separation of the cerebral mass from the eye, etc. The optic nerve, or nerve of vision, passes through an aperture in the base of the cranium to the eye-ball. Equally well shown is the way in which the eye is protected within its bony cavity. In a direct line from the base of the cerebrum is the medulla oblongata, continued to the spinal cord. On its surface is the nerve of the ear, and its branches furnish the nose, the teeth and the tongue. The two branches of the upper part of the jaw are in the plate in natural position. Folding back the leaf, we have a vertical section of the head. Above is the line of the epicranium; below, the cerebrum cut through from front to back. Then the hard body more compact than the brain, which separates and at the same time connects, the two halves of it and the striated body forming the base of the ventricles or cavities of the brain. Underneath is the cerebellum and in front of it the medulla oblongata, which unites lower down with the spinal cord. The processes and cavities of the vertebræ, or articulations of the spine are clearly shown, with the cushions which separate them from each other and guard against all injury to the delicate spinal cord, which is seen in its cavity.

In front are the cavities of the nose, mouth and throat; the cartilaginous bones on which are extended the olfactory nerves; the nasal ducts; the entrance to the Eustachian tube by which the air passes behind the tympanum; the pharynx or upper part of the throat; in front of this the small valve called the uvula or veil of the palate; the tongue with the salivary glands underneath; the œsophagus and its connections with the epiglottis, the larynx and the front trachea.

On the next leaf are the divisions of the cranium, which were formerly, and still are by many, believed to indicate the peculiar characteristics of each individual.

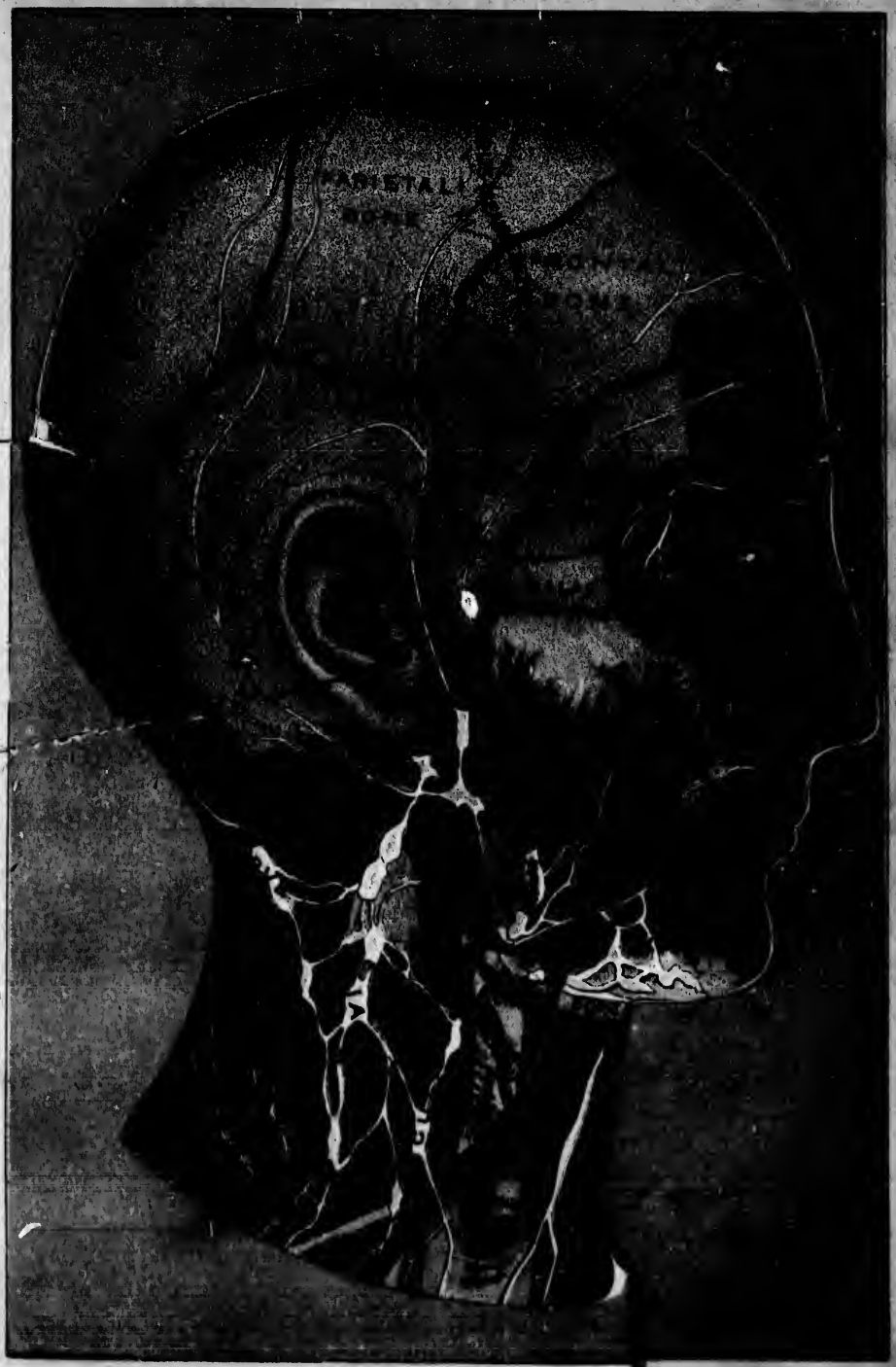
the frontal or
ılar lines mark
were separate.
ıg lines, white
muscle which
e is the orbicu-

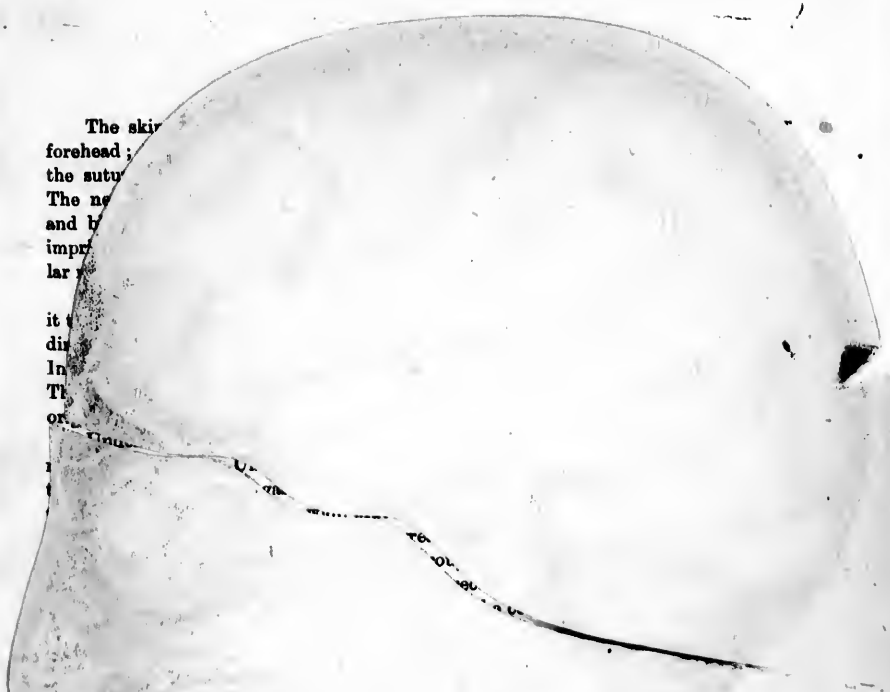
lip, and cause
axillary bone is
in mastication.
the lower lip.
f nerves which

s in reality the
racheæ; below
ds branches to
nd the crimson
k, which carry
the muscles of
again are seen
is the origin of
or small brain,
ing the separa-
erve of vision,
Equally well
y. In a direct
d to the spinal
the nose, the
jaw are in the
section of the
through from
hich separates
dy forming the
bellum and in
ıe spinal cord.
ine are clearly
ard against all

laginous bones
ntrance to the
arynx or upper
or veil of the
us and its con-

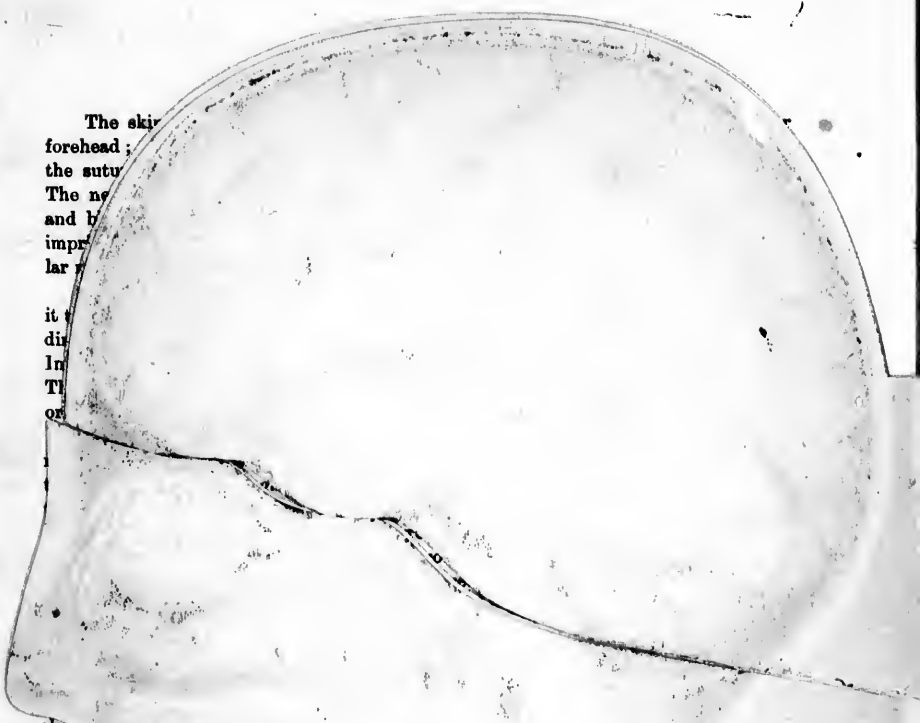
nerly, and still
dividual.



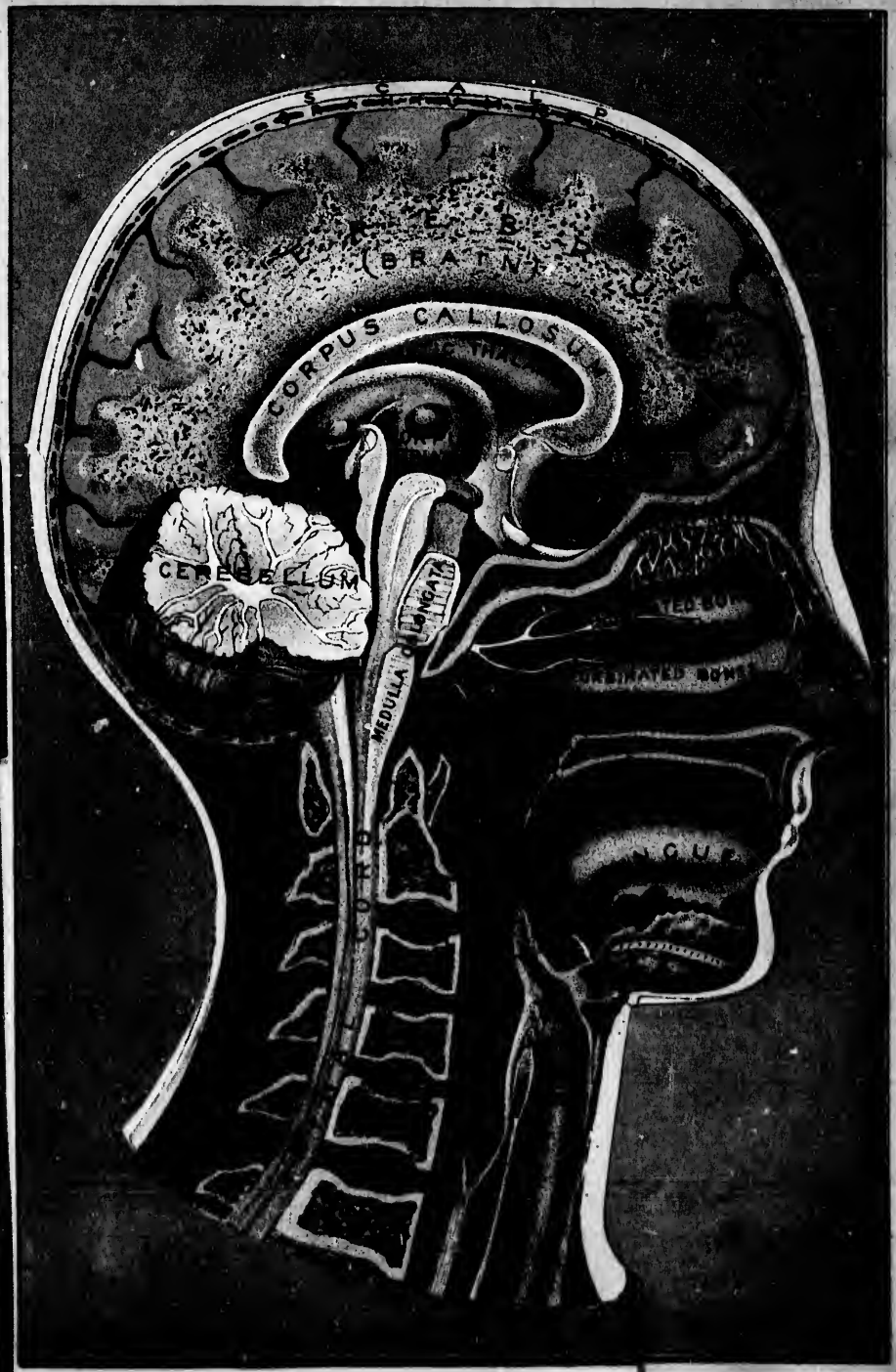


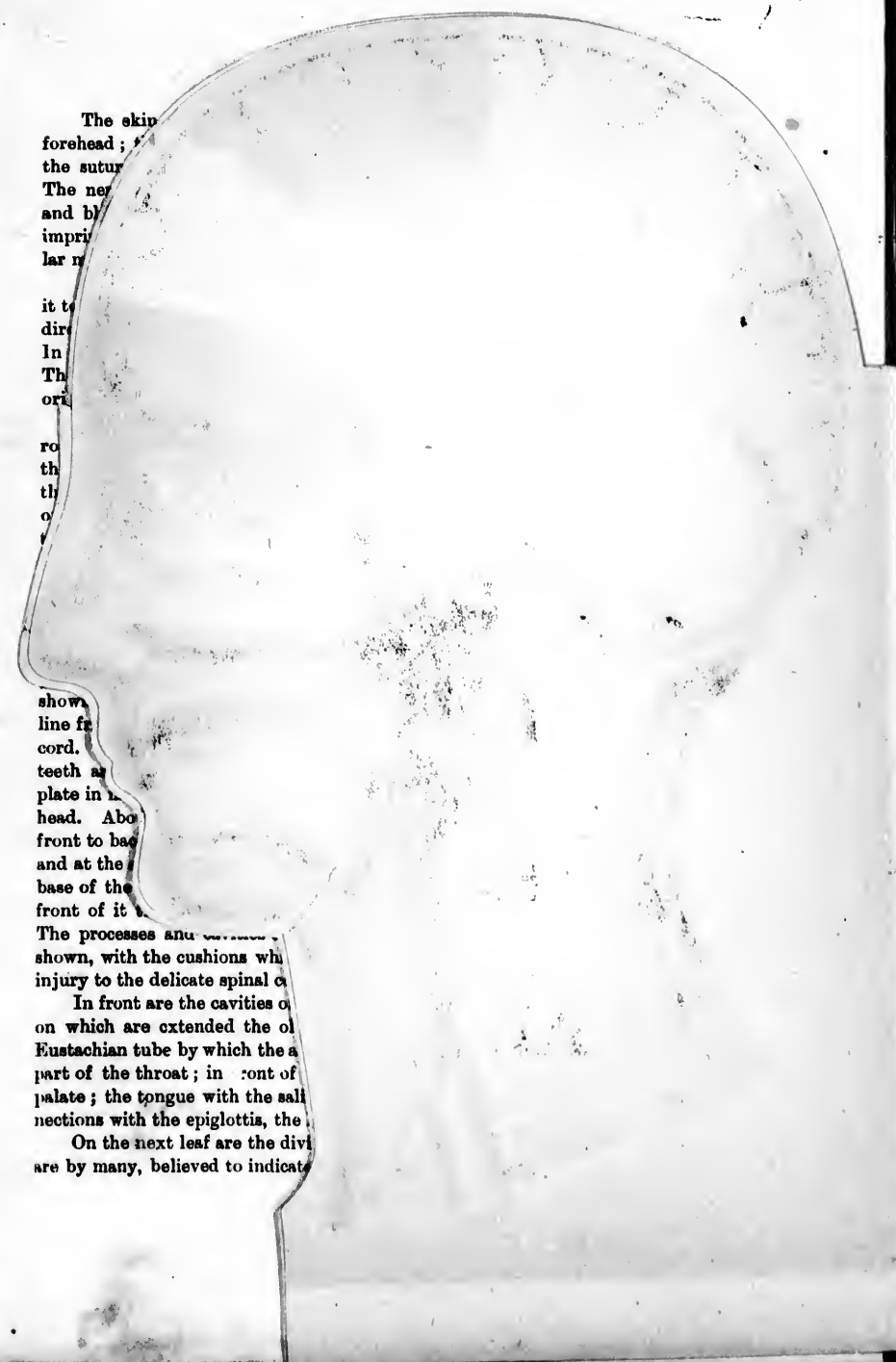
The ski
forehead ;
the sutu
The ne
and b
impr
lar
it
di
In
Th
or
sho
line
cord
teeth
plate in
head. A
front to b
and at th
base of t
front of it
The processes and cavities
shown, with the cushions w
injury to the delicate spinal
In front are the cavities
on which are extended the
Eustachian tube by which the
part of the throat ; in front
palate ; the tongue with the s
nections with the epiglottis, th
On the next leaf are the di
are by many, believed to indic

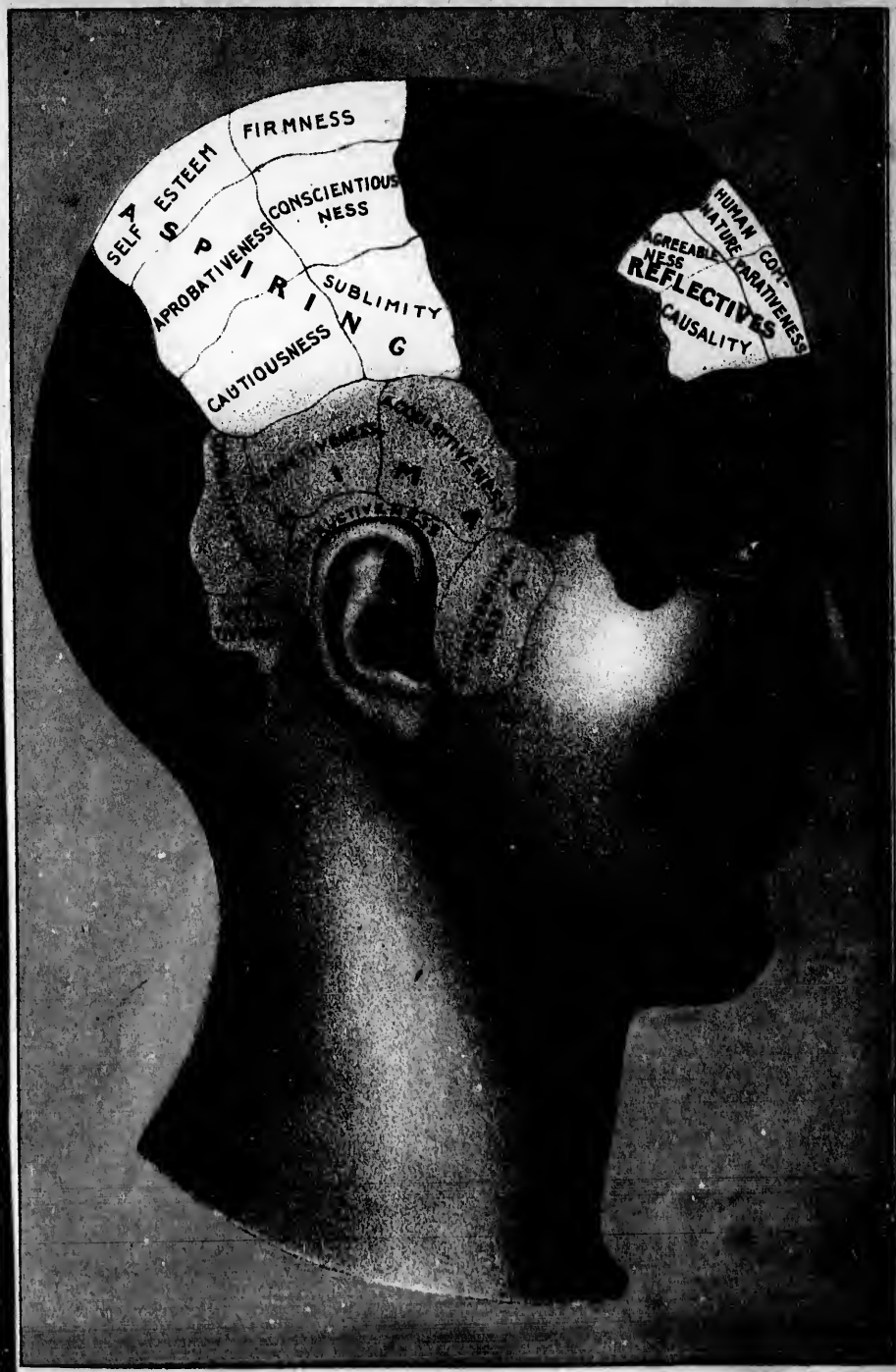

CEREBRUM
(BRAIN)



The ski
forehead ;
the sutu
The ne
and b
impr
lar
it
di
In
Th
or
sho
line
cord
teeth
plate in
head. Ab
front to b
and at th
base of t
front of it
The processes
shown, with the cushions w
injury to the delicate spinal
In front are the cavities
on which are extended the
Eustachian tube by which the
part of the throat ; in front
palate ; the tongue with the s
nections with the epiglottis, th
On the next leaf are the d
are by many, believed to indic


SCALP
BRAIN
CORPUS CALLOSUM
CEREBELLUM
MEDULLA OBLONGATA
SPINAL CORD




FIRMNESS
SELF ESTEEM
CONSCIENTIOUS NESS
APROBATIVENESS
SPIRING
SUBLIMITY
CAUTIOUSNESS
HUMAN NATURE
REFLECTIVES
CAUSALITY

DISEASES OF THE EYE AND EAR.

DISEASES OF THE EYE.

In order to understand the affections of the eye, even the most frequent and simple ones, it is necessary to have some knowledge of the general structure and functions of the organ. While it will be impossible to convey in words any accurate idea of the intricate and delicate structures contained in the eye, yet the general plan and principle of its formation are extremely simple and interesting.

Every one who has even a slight acquaintance with the box which a photographer uses, called the *camera*, can appreciate at once the structure of the eye. The human eye is, indeed, arranged upon precisely the same principles as the photographer's camera, as will be evident upon slight comparison.

The photographic camera consists of a box blackened on the inside, to which light is admitted only through an opening in the front; this opening is filled by a piece of curved glass, technically called a double convex lens. At the side of the box opposite to this lens is a frame made to carry a plate of glass. This plate of glass is coated with a layer of material—usually a compound of silver in gelatine—which is sensitive to light; that is, whenever the light falls upon the plate, this material undergoes a chemical change. In taking a picture the object is placed in front of the box in such a position that the rays of light emanating from this object are *focused* by means of the lens, that is, brought together so as to make a picture upon the plate. In consequence of the sensitive nature of the gelatine upon the glass plate to the action

of light, this picture is recorded upon the plate, making the *photograph*.

The same principles apply in the formation of the picture in the human eye. The eye is a spherical box or camera, blackened on the inside and closed on all sides except in front, where a circular opening exists. Right at this opening is a double convex lens like that of the photographer's camera; and at the back of the eye is a sensitive plate, a layer of nervous tissue called the *retina*, which is susceptible to the action of light just like the gelatine of the photographer's plate. The rays of light coming from an object in front of the eye are focused by means of the lens so as to make a picture of that object upon the sensitive plate — the retina — at the back of the eye. This picture excites the nervous center in the brain, so that the individual is conscious of the image on the retina.

The essential parts of the eye — those absolutely necessary to the perception of an object — are therefore the *lens* and the *retina*. If either of these be damaged so that it cannot perform its proper functions, there can be no perception of objects by the eye. Yet while these constitute the foundation of the eye, so to speak, there are various other parts of the organ which are essential to perfect vision as it exists in the healthy eye. We can understand these parts by referring again to the photographer's camera. He employs lenses of different power, according to the distance of the object which he wishes to picture upon the plate. If this object be situated close to his camera, the photographer must have a stronger lens — that is, one with a considerable curvature of the surface. This is necessary in order that the picture shall be accurately focused upon the plate at the back of the box. If the object be, on the other hand, situated at a considerable distance, such as an extensive landscape, the photographer uses a weaker lens — that is, one which is not so curved.

Just so there must be a difference in the curvature of the lens in the human eye at different times, for when we read small print for instance, or examine objects situated close to the eye, the rays of light must be strongly focused in order to make a perfect picture on the retina; and when we look at distant objects the rays of light must be less strongly focused — that is, the lens must be flatter. Now, it is impossible to arrange for the difference in the eye as is done in the photographic camera, for in the latter case a stronger

or a weaker lens is put into the opening of the box as occasion requires, several being kept on hand and changed according to the object desired. The eye is provided with only one lens; but by a most delicate arrangement this lens can be made to *change its shape.* It becomes more curved or flatter, according as the individual looks at near or distant objects. Thus the same result is produced as if the eye were provided with several lenses of different curvatures; that is, the object, whether near or far, is focused so as to produce a perfect picture on the retina.

This change in the curvature of the lens is accomplished by the contraction of a muscle — the *ciliary muscle.* Whenever we desire to look at near objects this muscle contracts, causing the lens of the eye to become more curved. We are not conscious of the effort at first, nor are we aware that we actually change the form of the eye. This is done unconsciously, like so many other movements of the body. But after a time we become conscious that we are exerting an effort; thus if we look at small objects for a considerable time, if we read fine print, for example, the eye becomes *tired.* This is for the same reason that the arm becomes tired after long-continued muscular effort, or that the legs become tired from walking. Every muscle must be rested after it has worked a considerable time, and it indicates the need for rest by the feeling which we call fatigue. So the eye becomes tired when reading small print, simply because the muscle which keeps the lens in a proper state of curvature has become exhausted.

Another feature, which is common to the eye and to the photographic camera alike, is an arrangement whereby the amount of light entering the eye can be regulated — that is, increased or de creased as occasion requires. The photographer regulates the light which enters his camera by means of a black ring which he puts over the lens, thus shutting out the light from the edge of the lens, and permitting it to enter only through the middle portion. When the light coming from the object is very intense, it is necessary to put this black ring over the lens so as to shut out some of the light. This is what the photographer calls *stopping the lens.* A precisely similar arrangement is found in the human eye. The colored ring in the front of the eye — the *iris* — is really a curtain, intended to regulate the amount of light which passes through the lens onto the retina. Whether blue, or brown, or black, it is so constructed that no light passes through it. Any light which enters the eye must

pass through the central opening in the iris — the *pupil*. Whenever the eye is exposed to a bright light, the iris closes somewhat, so as to make the pupil smaller, and thus permit less light to pass into the eye. Whenever the light is very dim, on the other hand, the iris opens, so as to permit more light to enter the eye.

This action of the iris in regulating the amount of light admitted to the eye, is, like the action of the ciliary muscle, an unconscious effort, which may even take place during sleep.

The closure of the pupil has also another object, for, in consequence of the shape of the lens, it is necessary in looking at near objects, to permit the light to pass only through the central part of the lens; if the rays enter through the edge as well as the middle of the lens, the image formed on the retina is blurred and the individual sees indistinctly. Hence whenever we look at near objects, when we read fine print for example, the pupil contracts quite markedly; if the eye be suddenly directed from near to distant objects, the pupil increases in size — a change which can be plainly seen if we watch a person who suddenly changes his eyes from a book that he is reading to look at a distant object. This occurs quite independently of the amount of light which enters the eye; it is intended to increase the distinctness of vision. A simple experiment will illustrate the value of this action of the iris in closing the pupil when we look at near objects. Let an individual close one eye, and holding a pin by its point between the thumb and finger, bring the head of the pin to within about ten inches from the other eye. He will now see the pin head quite distinctly. Let him then bring it gradually toward the eye, gazing steadily at the head of the pin all the time, when it has been brought to within a certain distance — usually within about three inches from the eye — the image becomes indistinct, that is the pin's head seems blurred. Let the person now take with the other hand a card with a pin-hole in it, and bring this card close up against the eye so that the pin-hole comes just in front of the pupil; upon looking through this pin-hole he will see that the head of the pin which was blurred a moment before is now perfectly sharp and distinct.

This simple experiment shows how important the action of the iris is in enabling us to see near objects distinctly. By looking through the pin-hole we accomplish the same result as if we closed the pupil to the size of the pin-hole, and are thus enabled to see distinctly where we could not see were the pupil large.

The form of the eye is maintained by means of stout membranes — the outer coat of the eye — and by the fluids which fill its interior. The front part of this outer coat is made smooth and transparent and is called the *cornea*. This part of the eye is shaped very much like a watch glass; it is its smoothness and polished surface which give to the eye the brilliant luster so characteristic of this organ. The interior of the eye is lined with a layer of black material — the *choroid* — the object of which is just the same as the object of the black layer in the photographer's camera or in any other optical instrument — that is to absorb straggling rays of light so as not to blur the image formed by the rays coming directly from the object. It is owing to this black lining that the pupil of the eye appears black, no matter what the color of the iris may be; for the pupil is merely an opening through which we look directly into the back of the eye; and since this back is made of black material which reflects but little light, it is evident that the pupil must appear to be black. There are certain circumstances under which the pupil may appear red; these circumstances occur when an individual happens to be standing facing a bright light while the observer stands between him and the light. Under such circumstances the pupil will suddenly flash out with a flaming red color, as if the eye were of fire. This appearance is more familiar in connection with the lower animals; it is frequently observed that the eyes of a dog or cat exhibit this brilliant red color. This redness is simply a reflection from the *retina*, which lies upon the black coat, the *choroid*, and has a brilliant red color.

The retina is, as has been said, a layer of nervous tissue which is sensitive to the action of light. Yet it is not equally sensitive over its entire surface; we are familiar with the fact that the sense of touch is more acute on the ends of the fingers and on the lips than in the middle of the back; in the same way the sense of sight — that is, sensitiveness to light — is most acute at a little spot directly opposite the pupil. This place is called the *yellow spot* of the retina, and is the point upon which the picture must be made in order that we shall see objects distinctly. The rest of the retina is susceptible to light, though less so than this central yellow spot. Hence when images of objects are formed upon other parts of the retina than the yellow spot, they are somewhat indistinct; we can readily appreciate this fact by looking intently at some

small object on the wall a few feet distant. This small object is seen quite distinctly, but other objects on either side of it are but imperfectly seen. In consequence of this arrangement, it follows that the eye must be directed toward any object which we desire to see distinctly. This necessitates some arrangement for moving the eye quickly and easily, in order to view successive objects with great rapidity. Hence the eye is made movable in its socket, and is provided with a series of muscles whose function it is to revolve the eye and thus enable the individual to view different objects in quick succession. In this way the pictures of different objects, located in various directions from the individual, can be readily formed upon the yellow spot, and thus distinctly seen.

It has been several times stated that pictures are actually formed upon the retina, just as they are formed in the photographer's camera. This statement can be easily verified by removing an eye from a freshly-killed animal—a sheep or bullock. If the outer white coat be cut carefully away at the back of the eye, so as to leave the inner coat intact, and the eye then be taken in a dark room and the front of it—the cornea—turned toward a window, a picture of the window-sash and frame will be seen distinctly upon the back part of the eye where the outer coat is cut away. This is what happens in life; every time that we see an object, an image of that object is actually formed upon the retina.

If, in the experiment just described, the picture in the eye be carefully observed, it will be seen that the image is *inverted*, that is, the upper part of the sash appears to be the lower part in the picture. This is also true of the image in the photographer's camera, the picture of a person as formed upon the sensitive plate, is really inverted, so that the individual seems to be sitting or standing on his head. Much speculation has been indulged in at various times in efforts to explain how it is that we seem to see the objects in their proper erect position, though the pictures of them on the retina are upside down. It is not necessary to enter into this discussion; but simply to remind ourselves that the infant learns to appreciate the relations between the sense of touch and of sight during the first months and years of his existence. Even if there be no other explanation, we may readily assume that after the child has learned by touching objects that they really stand erect he will get into the habit of regarding them as erect, no matter how the pictures are formed on the retina.

The interior of the eye is filled largely with liquids; one of these, the so-called vitreous humor, occupies most of the eye, and serves to keep the coats of the eye properly filled out. This is a jelly-like substance, which is readily seen by cutting open the freshly-extracted eye of an animal. This vitreous humor is perfectly transparent, and in the natural condition of the eye offers no impediment to the passage of light. But sometimes in diseased conditions of the eye, minute bodies float in this vitreous humor. These bodies seem to the individual to be outside of the eye, and constitute the "specks" before the eyes, which annoy some people extremely.

Another most important part of the optical apparatus is the eyelids. Each of these is moulded out of a substance resembling gristle into the form of a thin plate curved so as to fit over the globe of the eye. These plates of gristle are covered by very fine skin externally, and internally by a delicate mucous membrane called the *conjunctiva*. A band of muscular fibres passes around the opening of the eye ever the upper lid above and the lower lid beneath, making a somewhat oval or elliptical figure. When these muscular figures contract they draw the two lids together, thus closing the eye. From the borders of the lids there project the eyelashes, which give protection against the entrance of dust and other foreign bodies. Just behind these hairs is a row of minute glands, which produce a greasy material. This oily secretion is very important, since it greases the edges of the lids, and thus prevents the tears from escaping down the cheeks.

This mucous membrane, or conjunctiva, covers the entire eye as well as the under surface of the lids. It is a very important part of the eye, since the moisture which it secretes serves to prevent friction between the eyelids and the globe itself. A considerable part of this moisture is furnished by a gland — the *lachrymal* or *tear* gland — which is located at the upper and outer part of the eye. This gland is constantly producing a watery fluid, which under ordinary circumstances is just sufficient to keep the eye moist and to provide for the freedom of its movements. At the other end of the opening between the lids — that is, at the end next to the bridge of the nose — there are two small openings, one on each lid. These are the openings of very fine hair-like channels which lead into a larger tube or duct. This tube runs downward from the inner angle of the eye into the nostril. These channels afford the

natural way of escape for the moisture which is constantly being produced in the eye. It sometimes happens that this duct leading from the eye to the nostril becomes inflamed and stopped up; in this case the tears — by which we mean simply the moisture constantly produced in the eye — can no longer escape into the nose, and, therefore, flow over the edge of the lids onto the cheeks.

We have thus mentioned the most essential points in the structure of the eye; and with a clear understanding of these points we can appreciate the usual affections to which the eye is subject, as well as the care and attention which should be bestowed upon them.

Color-Blindness.

There is one other fact in regard to the eye which has recently attracted much attention among physicians, and has become a matter of great importance in connection with public conveyances. This is the lack of ability on the part of some individuals to distinguish properly between different colors — a condition technically known as "color-blindness." It seems at first incomprehensible that a man who can see at all should not be able to distinguish colors perfectly. But the fact is that the ability to distinguish *outline* is quite distinct from the ability to recognize *color*. It is a fact that one man may see a bay horse just as distinctly as a second individual can, yet the first may be unable to see any difference between a bay horse and a black horse of similar outline — a difference which is of course plainly perceptible to most of us. To some individuals ripe cherries are indistinguishable in color from the leaves which surround them. This subject has been discussed in detail in a book entitled "Color-Blindness," by Dr. Jeffries, of Boston, from which the following facts and incidents are taken:

This defect of vision is often called "Daltonism," because a noted chemist of the name Dalton was a sufferer from this defect, and described very graphically the way in which different colors appeared to him. To Dalton blood appeared of a color similar to that called bottle-green; grass had a color almost identical with red objects. Green cloth — such as is used to cover tables — appeared of a dull red color. "When this kind of cloth loses its color, as other

people say, and turns yellow, then it appears to me a pleasant green. Very light green paper, silk, etc., are white to me. Colors appear to me much the same by moonlight as they do by candle-light. By lightning and electric light they appear as by daylight. A light drab woolen cloth seems to resemble a light green by day."

Dalton's defect of vision led him into the commission of some ludicrous mistakes. "Firstly, he was a Quaker, and would not wear the sword, which is an indispensable appendage of ordinary court dress. Secondly, the robe of a doctor of civil laws was known to be objectionable on account of its color—scarlet—one forbidden to Quakers. Luckily, it was recollected that Dalton was afflicted with the peculiar color-blindness which bears his name, and that, as the cherries and the leaves of the cherry-tree were to him of the same color, the scarlet gown would present to him no extraordinary appearance. So perfect, indeed, was the color-blindness, that this most modest and simple of men, after having received the doctor's gown at Oxford, actually wore it for several days in happy unconsciousness of the effect he produced on the street." When asked what color this gown appeared to him, Dalton pointed to some of the evergreens outside of the window and said that, to his eye, the colors were alike. The lining of the gown, which was pink silk, he could not distinguish from sky blue.

A boy eleven years old, who was color-blind, saw a woman passing by with a basket on her arm. He told his mother that the woman had chickens in the basket, because he saw the *red* feathers hanging out. These proved to be *green* leaves, with which the woman had covered the butter which she carried in the basket.

A relative of this boy, who was in the navy, bought a blue uniform coat and vest, and trousers to match them; the latter garment proved, however, to be *red*.

"Six men—uncles, nephews and cousins—in one family, all belong to the Society of Friends; and their mistakes in selecting articles of dress have been rendered especially conspicuous by the preference which members of that religious body give to the least brilliant and most unconspicuous colors. One of their number provided himself with a bottle-green coat, intending to purchase a brown one; and selected for his wife, who desired a dark gown, a scarlet merino. Another, who is an upholsterer, purchased scarlet for drab, and had to rely upon his wife and daughters to select

for him the fabrics needed in the course of his profession. A third, who is a farmer, could not tell red apples from the surrounding green leaves, except by their shape. All of them confounded red with green, olive with brown, and pink with blue. One of the younger men, whose profession requires him to deal much in colored tissues, has found that the 'only way of telling the difference between scarlet and green, or blue and crimson, is to take them into a room lighted with gas or candles,' when the distinction which was invisible by daylight becomes apparent."

"A post-office clerk in Prussia was found to be constantly in trouble with the stamps. The accounts would come wrong. Sometimes there was not enough money in return for stamps sold, and on other occasions there was too much. This made dishonesty on his part less likely; but it was incomprehensible how he would make the accounts so entangled. At length it was discovered that he was color-blind, and could not distinguish red from green stamps." —*Boston Medical and Surgical Journal, December 27, 1877.*

No doubt letters in the United States find their way to the dead letter office as unpaid, from the color-blind senders putting on *red* two-cent instead of *green* three-cent stamps, since we all, from habit, regard the color rather than the number on a postage stamp, especially when in haste.

Color-blindness is a congenital defect — that is to say, it is born with the individual — in the majority of cases. In 1845, Dr. Earle reported color blindness in five generations of his own family. Instances are also known in which this defect has resulted from disease and from injury.

It is interesting to observe that all physicians who have investigated the subject, find that color blindness is more frequent in males than in females.

Within the last ten or fifteen years the attention of railway and steamship authorities has been directed to this subject; for it is evident that since trains and ships are largely dependent for their safety upon the accurate recognition of the colored lights employed as signals, a failure on the part of engineers, switchmen, pilots, etc., to distinguish between red and green might be followed by the most serious accidents. In fact, several catastrophes have been traced to color-blindness on the part of such employes. Many railway and steamship lines subject their men to examination as to

their ability to detect colors; and in Sweden such examination is required by law,

In order to detect the color-blindness of an individual, it does not suffice to simply ask him to *name* the colors of different objects presented to him, for he may have a perfectly accurate perception of the color, and yet from lack of familiarity with the names, he may designate this color by an improper name. Hence, the only reliable method is to give him an opportunity for *matching* colors. This is done by presenting to him a pile of worsted skeins of a great variety of shades; one of these, say a dark green, is put aside, and the person is requested to select from the pile the other skeins which seem to him to have the same color. If he have the usual form of color-blindness, he will select red and scarlet among other dark colors as similar to the green.

Dr. Jeffries presents the following recapitulation of the subject:

One male in twenty-five is color-blind in a greater or less degree.

Of this defect they may even themselves be wholly unconscious.

The defect is congenital. It exists in varying degrees. It is largely hereditary. It may be also temporarily or permanently caused by disease or injury. It may exist in one eye only.

It is incurable when congenital. Exercising the eyes with colors and the ears with their names, helps the color-blind to supplement their eyes, but does not change or increase their color perception.

Experiment and experience show that we are forced to use red and green marine signal lights to designate a vessel's direction of motion and movements, and at least red lights on railways to designate danger.

Form, instead of color, cannot be used for these purposes.

There are many peculiar conditions under which railway employes and mariners perform their duty, which render colored signals, and especially colored lights, difficult to be correctly seen.

These signals can never be correctly seen by the color-blind. There are such among railroad employes, officers, pilots and sailors.

There is, therefore, great danger from color-blindness.

Railway and marine accidents have occurred from it.

There is no protection but the elimination from the employes of railways and vessels of all persons whose position requires perfect color perception, and who fail to possess this.

Care of the Eyes in Childhood.

In every civilized country there is at the present time a large number of individuals who are totally or partially blind; in a very considerable portion of these cases the loss of sight occurred during the early months or even weeks of life. It, therefore, becomes a matter of much importance that the eyes should be carefully protected from the very hour of birth, since many of these cases of blindness result simply from carelessness and ignorance on the part of the attendant.

One of the first points to be observed is the cleansing of the eyes immediately after birth. The eyes should, indeed, be washed before the rest of the body is cleansed. Warm water, *perfectly clean*, should be used; a piece of clean, soft cloth, such as an old cambric handkerchief, may be dipped in this water and used to remove from the eyes the secretions which naturally adhere to them. After this, the eyes should be gently dried; no soap, nor anything indeed but water, should be allowed to come into contact with them. When the child's body and head are washed, care should be taken to prevent any of the water from entering the eyes.

It is necessary that the infant's eyes be protected from intense and dazzling light. Since the child is unable to protect itself during the first few weeks of life, by moving its head or shading its eyes, there is an especial demand for watchful care on the part of the attendants. Furthermore the infant's eyes are not so well protected as the adult's, since the eyelids are thin and almost transparent and the eyelashes and eyebrows are but little developed Hence care should be taken that the infant is not exposed so that the direct rays of the sun can shine into its eyes. Yet it is not necessary to fall into the opposite error of covering the face so as to keep out all

light and air, or of keeping the room dark, since these practices render the child's eyes unnaturally susceptible.

During infancy the eyes are also affected by the influence of impure air. The child which is kept in hot, ill-ventilated rooms, whether these be in the houses of rich or poor, is apt to suffer from affections of the eyes.

Yet the greatest danger to the eyes in infancy is the disease called *purulent ophthalmia*. This is an inflammation of the mucous membrane covering the front of the eye, accompanied by a discharge of matter. The inflammation is the result of impurities which have entered the child's eyes during the passage of the head through the vagina of the mother. It is, therefore, especially apt to occur in infants born of women who are suffering at the time of confinement from some discharge from the genitals. A woman subject to obstinate leucorrhœa — "the whites" — is apt to communicate disease to her child.

The inflammation begins usually between the second and the seventh days after birth. It begins by redness and swelling of the lids; a discharge at first somewhat thin and yellow, but afterward thick and ropy, escapes from between the swollen lids. The first effect of the discharge is merely to glue the eyelids together; when this occurs, matter collects behind the lids, so that when pressed upon a gush of yellowish pus escapes.

When this condition occurs no time should be lost in summoning the best medical assistance. Thousands of eyes have been destroyed by the attempt to treat this disease with so-called "home remedies." It should be understood that the eyes may be lost beyond repair within twenty-four hours after the disease begins, and that every moment is precious in arresting the affection before irreparable injury is done. There is no disease of the eyes which causes so much blindness as this, and the reason for this seems to be the ignorance of the attendants in not recognizing the gravity of the affection. In most cases, for two or three days after the eyes become inflamed, the little patient is in the hands of the nurse or the grandmother, who have unfailing remedies for all the ills that baby flesh is heir to. At the end of these days it is found that the eyes are becoming worse, and *then* the physician is called in. This is, however, in many cases, too late to save the eyes. Until a physician can be summoned the following treatment should be adopted.

The child should be kept in a warm and somewhat darkened room. The important point is to *keep the eyes clean.* To accomplish this the first requisite—the only one which the attendant should use—is warm water. The lids should be carefully separated, care being taken to avoid any pressure upon the eyeball. This will be best accomplished by having one person place the hand upon the infant's head, so that the tip of the forefinger rests upon the upper eyelid, which should then be gently drawn toward the eyebrow; the forefinger of the other hand is then placed in a similar position with regard to the lower lid, which is in like manner drawn downward. A second attendant then removes the matter with a fine clean sponge, and afterward allows a stream of water to fall gently upon the lids so as to wash out the eye most thoroughly. This water should be caught as it escapes from the eye by a sponge or in a cup held against the child's face.

It will be necessary to repeat this washing of the eye as often as the matter collects under the lids; this may be every hour, or even every half hour. In the meantime it is well to wash the lids gently, without opening them, with warm water, in the intervals between the more thorough cleansing of the eyes. If the escape of matter is not so profuse as to require frequent bathing, it will be well to place upon the eyes a piece of soft cloth folded several times so as to make a compress, and wet with cold water. This may be frequently changed—say every fifteen minutes—in order to prevent the cloth from becoming warm.

It is extremely important for all who come into contact, direct or indirect, with the child, to remember that the matter which escapes from its lids is *extremely contagious.* A single drop of this matter introduced into the eye of a second individual, whether child or adult, will cause a similar inflammation in the infected eye. Hence it is necessary to observe the greatest precautions to prevent the introduction of such matter into a healthy eye. The attendants should be careful not to touch their own faces, nor rub their own eyes, while they are handling the infant or any of the cloths used for its eyes; they should wash the hands immediately after touching the infant. The greatest care should be taken to prevent the careless use by other persons of the towels, linen, sponges, etc., which may have come into contact with the discharge; indeed it will be well to burn these articles so soon as they are no longer required.

When children have passed the age of infancy, and have begun to use their eyes intelligently in the examination of surrounding objects, the condition of the vision should be the object of attention and scrutiny on the part of the parents. It is a familiar fact that the acuteness of vision varies extremely among adults, and that certain defects of the eye — such as short-sightedness — can be so completely remedied as to restore to the individual almost perfect sight. Now, there exists among children just the same difference in the acuteness of vision as is observed among adults, and many defects of the eyes, which are so troublesome in after life, originate in the failure of parents to appreciate these differences. Short-sightedness is an affection which does not force itself upon the attention until the subject of it acquires considerable intelligence — enough to observe the difference between his own eyes and those of his companions. During childhood, therefore, it cannot be expected that the short-sighted individual will discover his defect. Parents should, therefore, always bear in mind the possibility of these defects in the eyes, which do not show themselves by any outward deformity, and can be discovered only by careful observation of the child. Many a child has been considered stupid and dull, when his failure to equal his companions and schoolmates in intellectual acuteness was merely due to some undiscovered defect of the eyes which placed him at a disadvantage. Not long since a boy of eight years was brought to a London physician noted for his knowledge and skill in the treatment of diseases of the brain. The mother complained that the child had never been so bright nor quick to learn as other children; he seemed unable to appreciate the true relation of things, and was supposed to be suffering from some disease or defect of the brain. The physician detected at once that the child was suffering from an extreme degree of short-sightedness, and was inclined to think that the apparent stupidity of the child resulted merely from this defect of vision, in consequence of which the boy was unable to see objects at a distance of more than five or six feet. Appropriate spectacles were provided, and the immediate and marked change in the child's intellectual habits proved the correctness of the doctor's opinion.

Children, as well as adults, may also be far-sighted, and therefore unable to peruse their books with any comfort, if at all. Many a far-sighted child, when complaining that his eyes hurt him upon studying, has been accused of laziness and indifference, when the

fact was that the condition of his eyes rendered it impossible for him to read for any considerable time, even half an hour, without suffering pain.

These defects of the eyes escape notice for years, unless the parents are aware of the possibility of such defects in children, and take pains to ascertain the condition of the child's eyes. Sometimes these defects are indicated by actual deformity in the shape of a *squint*. In the great majority of cases a child acquires a squint as the result of defect in the eyes — either short-sightedness or long-sightedness. Hence, if the least inclination to squint is manifested, the parent's suspicions should be at once aroused as to the probability of a defect in the eyes. The popular idea that squint results merely from a vicious habit, such as the imitation of another child, is incorrect; and hence the efforts to remedy the deformity by harsh reproof or punishment are as unavailing as they are cruel.

It is extremely important that the cause of squinting should be understood and appreciated; for the condition can be remedied and loss of sight prevented if the proper measures be employed at an early stage, before the squint has lasted more than a few months. If the condition be allowed to exist for years on the other hand, it becomes extremely difficult to restore the eye to its natural position, and to prevent some impairment of sight; for in the course of time the vision in the squinting eye becomes less acute, or may even be lost entirely. This results from the fact that the individual acquires the habit of looking with the sound eye only, to the neglect of the squinting eye, which loses the power of sight just from lack of use.

While these defects of vision are sometimes born with the child, they are far more frequently *acquired* during the early years of life. A slight defect in the shape of the eye — constituting short-sightedness or far-sightedness — may practically disappear, so as to cause the individual no trouble if the eyes be properly managed; while on the other hand, it may be aggravated into a serious impairment of vision if the child be improperly trained in the use of the eyes. One of the worst features in the usual training of children is the practice of teaching them to read and write at an early age, such as four and five years; for it should be remembered that the eyes must be strengthened, like other parts of the body, by the growth of the individual. It is just as unreasonable and injurious to impose serious effort upon the child's eyes by teaching

him to read early as to overtax his limbs by requiring him to carry heavy burdens while his bones and muscles are still soft and tender.

The power of sight in later years is much influenced by the time of life at which children are required to undertake close and continuous effort with the eyes. For most children in this country this time begins when the child is sent to school. In addition to the fact that the eyes are now used continuously and closely, there are the disadvantages which result from the use of improper type in the text books, and of improper illumination. Children should not be permitted to use books printed in small and closely-set type, as is so often the case in the school-books which they are compelled to employ. Then, again, the illumination is rarely all that could be desired. In many cases the quantity of light admitted to the school-room is quite insufficient, requiring the closest attention and straining of the eyes.

One of the most important items, however, is the avoidance of all those tasks which require close application of the eyes. The use of text-books for instruction during the first years of school life, is not only useless for the education of the child, but is often the cause for serious impairment of vision in after life. The various systems of "object-teaching" and "kindergarten" obviate to a certain extent the disadvantages of the system of text-books still in common use in most of the public schools. Half a century ago Beer said: "He who has taken the fruitless pains, as often as I have done, to try and impress upon parents and friends in the most friendly manner and upon the most convincing grounds the mischievous effects upon the eyes of growing children, of the forcing-house system of the present day, will still be disheartened to find his well-intended counsel, based upon long experience and often repeated, either entirely neglected or listened to only by a few. Because people hold the imperfectly understood principle that children should be constantly occupied, there is at all hours of the day a master at hand. There is reading, writing, language-learning, drawing, arithmetic, embroidery, singing, piano-playing without end, until the persecuted victims are rendered pale, weak and sickly, and to such an extent short-sighted or weak-sighted, that finally medical counsel must be obtained. Of what avail is it to many charming girls, many estimable women, that as children they were regarded as prodigies, when the soundness of their eyes and

the acuteness of their vision have been sacrificed? I have seen pictures worked upon a tobacco pouch in the so-called pearl stitch, which were scarcely inferior to miniature painting, and which I examined with much pleasure until I remembered the eyes of the embroideress. In the present daily teaching of children the work most injurious to their sight is the constant piano practice from engraved notes; since the uniformity and the small size of these notes are calculated to fatigue and weaken the strongest eyes, as any one may ascertain by experiment."

Professor Arlt, the famous eye surgeon of Vienna, commenting upon these lines says: "If the illustrious Beer were now with us, he would not fail to call our attention to the injurious print of many books such as the stereotyped editions of Latin, Greek and German classics, the pocket dictionaries, and the small maps which require a magnifying lens to render the names of places readable. Parents and teachers should be very careful that such books and maps are not used by the children under their charge. The number of those who, in consequence of these books, have suffered in the extent, duration and clearness of their vision, is not inconsiderable, and I remember that I myself, when I had completed my school education, was no longer able to see a mountain an hour's journey distant, and which in my thirteenth year I had seen from the same place with perfect distinctness."

Mr. Brudenell Carter, of London, in discussing the same subject, remarks:

"With regard to the actual conduct of the teachings, it must be remembered that there is no reasonable doubt of the injurious influence of premature exertion of the brain in retarding the development of the body, the eyes of course included; and I myself entertain none that such premature exertion is at least equally injurious to the mental faculties themselves. Many years ago I wrote an essay upon the artificial production of stupidity in schools, which had for its purpose to show the manner in which the proceedings of teachers may defeat their supposed objects; and this essay has now been so often reprinted in this and other countries that I would fain hope that it may have induced some few teachers to reconsider their ways. For the present purpose it is sufficient to observe that any excess of school work implies almost of necessity an undue application of vision to near objects; and

that hence, when the eyes are either weakly or diseased, such excess should be strictly prohibited.

"It is very worthy of note that, in the experience of eye surgeons, it is exceptional to meet with a child suffering from defective vision who has not, before the defect was discovered, been repeatedly and systematically punished by teachers or school-masters for supposed obstinacy or stupidity. The very reverse of this practice is that which ought to obtain; and apparent obstinacy or stupidity should lead from the first to the question, 'Can he see perfectly'? Children have an indefeasible claim upon their elders for friendly and considerate treatment. If they are harshly or unjustly dealt with, punished for errors which they cannot avoid, or forced to undertake tasks, either mental or bodily, which are beyond their powers, they will suffer either in mind or body, or in both. Unfortunately the work of teaching seems to exert a destructive influence upon the imagination, using that word in its true scientific sense, and the average school-master has often done an amount of wrong which can hardly be repaired, before the surgeon has any opportunity of interposing to put the saddle upon the right horse, and to assign the palm of stupidity to the pedagogue instead of the pupil."

The same excellent authority says with reference to the selection of an occupation:

"In the choice of a profession for children the capabilities of their eyes should never be left out of account. The state of a young man whose eyes refuse to perform his accustomed work may be even more painful than if he were blind; and we should find fewer persons in this condition if more care were taken to consider the powers of the eyes before deciding upon an occupation. Eyes which within a few years would fail an engraver, a goldsmith or a watchmaker, would last their possessor his lifetime if he were an agriculturist, a gardener, or employed in many other callings. He who has sound and normal eyes, may choose his occupation without reference to them; but he who is short-sighted or weak-sighted, or whose eyes are inclined to be inflamed, must endeavor fully to realize the claims which an otherwise desirable calling will make upon his sight, and to understand the different ways in which this or that kind of work may be injurious to him.

"It may perhaps be laid down as a general principle, that a child who is simply short-sighted and who can employ his eyes

continuously and with clear vision upon small objects, such as very fine print, so long as it is near enough, may undertake work which requires accurate and continued seeing. Experience teaches that merely short-sighted eyes, when the short-sight has not reached a very high degree, will bear without injury very fine and continuous work In the higher degrees of short-sight, however, it is undesirable to engage in any occupation in which the vision must be directed by turns to near and to distant objects, since the latter will require the use of lenses, which increase the strain thrown upon the eyes by the former.

" Children who are the subjects of weak sight or far-sightedness, and who either cannot see near and small objects clearly, or cannot see them for long together, or only by the aid of convex glasses, should be dissuaded from engaging in occupations which will demand from them the application of the eyes to uniform work upon fine or small objects. The far-sighted individual can indeed be greatly assisted by glasses, but these are not available in all pursuits.

" Children who have often suffered from any of the various forms of inflammation of the eyes which are incidental to early life, especially if they show any tendency toward a relapse, or if they are still prone to irritation of the margins of the lids, should never be allowed to undertake any kind of work in which they will be exposed to dust, particularly woolen dust, to smoke, or to excessive perspiration from fire or heat.

" Even when the eyes are of natural formation and acuteness, it would be improper to forget how much the power of sustained effort with the eyes is dependent upon the general vigor of the muscular system. Girls of feeble frames and late development should avoid on this account the more sedentary forms of industry; and should rather find employment in work that is comparatively coarse, than in sewing, embroidery, or the like. The caution herein contained applies also in a still greater degree when the eyes have been weak or inflamed during childhood.

" In addition to the foregoing general principles, the whole education of children with delicate eyes should be regulated with some reference to their delicacy. For those who attend a day school, the distance and manner of the journey and the protection to be afforded upon the way require careful consideration, since various forms of inflammation of the eyes are caused or at least promoted, by

exposure to wet or vicissitudes of weather. In all day schools there should be arrangements to allow the removal of wet or damp clothing, and especially of wet or damp boots or shoes, before the children are suffered to settle down to their tasks. The atmosphere of school-rooms and the due supply of fresh air to them are matters which probably will not be regarded until school boards and school managers have no political or polemical questions left to dispute about."

Weak Sight.

Under this term are popularly included a number of conditions which originate in various ways. It is important that we should recognize the fact that "weak eyes" may be weak from any one of many causes; and that many of these causes can be cured, or at least relieved so as to render the patient comfortable, and his eyes "strong."

The vision of the natural eye includes an immense range, beginning at a point about five inches from the eye and extending to infinite distance, like that of the fixed stars. So long as the eye remains in its natural condition it can be employed for vision continuously upon objects situated anywhere within this range. If the individual become short-sighted or long-sighted to a considerable degree there occurs, after a certain time, an indistinctness of vision over some part of the natural range; the sight becomes indistinct either for distant or for near objects. In most cases there occurs for some time before this indistinctness of vision some pain, either in the eyes themselves or in the forehead and temples. This pain increases if the effort to use the eyes be continued. There may result a severe headache, followed perhaps by sickness at the stomach, giddiness and palpitation of the heart. The symptoms are sometimes so severe as to inspire a belief that the patient is suffering from some disorder of the brain or of the stomach. Yet if the actual source of the difficulty be suspected and corrected, these symptoms, and with them the supposed disease of the brain, subside. A good example is related by Mr. Carter:

"A young gentleman of good position, who was reading for honors at his university, suddenly broke down with symptoms which were attributed to some form of brain disease, and was

advised to give up his studies and to go home. After a period of rest, being no better, he sought advice in London, where the opinion previously given was confirmed, and as a means of affording the most complete possible rest to his brain, he was advised to make a voyage to Australia and back. He did so and returned in the same condition. He was then considered to be incurable, was told that he must abandon a career which had been opened to him and a matrimonial engagement which he had formed. In a word his whole life was blighted. Ultimately he was brought to me, not from any idea that his eyes were at fault, but merely that I might examine their internal circulation in order to see whether this examination would throw any light on the state of the circulation in his brain. I found his eyes healthy but somewhat short-sighted, and on making inquiry into his symptoms, ascertained that they resolved themselves into simple inability to read. As soon as he took up a book he became giddy, and the giddiness brought on intense headache, palpitation of the heart, and sometimes sickness at the stomach.

"The case was of the simplest kind, the patient had never used spectacles, and up to a certain point he had been able to read well and easily. When he began to work for honors, and to read eight or ten hours a day, the muscles gave way; and then, as the two eyes were no longer directed to the same point, the patient 'saw double.' This in its turn produced giddiness, and the giddiness produced headache and sickness by disturbing the circulation. The strained muscles which had once given way, became prompt to give way again when they were unduly called upon, and the grave view which was taken of the symptoms by medical men filled the patient with alarm; as soon as he tried to read the old troubles were brought back by fear and expectant attention. I assured him that he had no brain disease, tried to make him understand his condition, prescribed spectacles to correct his short-sight, and told him to wear them constantly and to read in them three times a day for half an hour at a time. He was to report progress in three weeks; and at the end of that time he returned cured. He could read as much as he liked. He was going to be married the following week, and on returning from his wedding trip was to take up the career which he had fancied closed to him forever. All these pleasant anticipations were in due time fulfilled and the cure was permanent and complete."

The eyes may suffer in adult life from numerous causes, such as improper illumination, excessive use, exposure to cold, and diseased conditions of the body.

There is considerable misapprehension as to the proper light required for the eyes. Sunlight is just as necessary and proper for the eye as food is for the stomach ; but the eye can be injured by excess as well as by deficiency of light, just as the stomach can be by excess or deficiency of food. The eyes may be injured by long exclusion from daylight, as occurs when they are bound up for a long time, or when colored glasses are worn. In such cases the eye acquires an unusual degree of acuteness so that the individual can distinguish objects in what others would regard as total darkness. If such eyes be restored to daylight, much caution must be used to prevent injury.

A more frequent cause of injury to the eye is exposure to a dazzling light, especially after leaving comparative darkness. Many individuals have experienced serious impairment or even loss of sight by looking directly at the sun, or by watching an eclipse through a piece of glass which was not sufficiently obscured. After looking at the sun there often remains an appearance like that of a dark cloud, which becomes of a fiery color when the eyes are closed. Sometimes a permanent dark spot, corresponding to the position of the sun's image, remains in the eye. At other times this dark spot gradually spreads over a considerable part of the retina, so that the individual is threatened with total blindness. Prof. Arlt says that he saw three cases of this kind after the eclipse of the sun in 1851.

Impairment of vision may occur likewise from the sudden reflection of bright sunlight into the eye by means of a mirror, as is often done by children at play. The reflection of the sun from the surface of snow or of the water has also occasioned serious injury to the eyes.

Several considerations become evident from these facts. It is to be remembered that the position of the eyebrows and the arrangement of the lids is such as to protect the eyes from light which comes from above, but to leave them unprotected from that which comes up from below. Hence low windows are disadvantageous, unless provided with blinds which draw up rather than down in order to shut off the light from the lower part of the window.

Yet more difficulty is experienced in regulating artificial than natural light. This occurs not simply from the feebleness of many artificial lights, and from the fact that they are often but imperfectly shaded, but also because the artificial lights produce a larger percentage of heat than is derived from the ordinary daylight. Gas especially produces an excessive amount of heat in proportion to the light furnished. The heat has an injurious effect upon the eyes, since it dries the fluids which moisten their surfaces and predisposes to various inflammatory diseases of the eye. Various devices are employed to shut off so far as possible the heat rays which accompany the light from artificial sources of illumination. A common expedient consists in placing a bowl of glass containing water underneath the gas flame; the water, while permitting most of the light rays to pass through it, absorbs a large amount of the heat. This absorption of the heat is still further increased if a little alum be dissolved in the water.

Another device consists in surrounding the artificial light with blue glass. Since the heat rays are found chiefly with the red light, the blue glass, by intercepting all but the blue light, cuts off most of the heat.

Another item of importance in the use of artificial light pertains to the position of the lamp. The ordinary lamp should be so arranged that the flame is a few inches higher than the eyes, since in this way the eyes are protected to a certain extent by the eyebrows; it should also be placed a little to one side, preferably the left, in order that the light rays shall not fall directly into the eyes. It is always advisable to have but *one* source of illumination, whether this be natural or artificial. Thus the individual should so arrange his work and himself that the light falls into his eyes from only one lamp or gas jet; by permitting it to enter from several sources the eye is more fatigued, not only because it receives an undue amount of light, but also because it is strained by the effort to see distinctly in the presence of so much light. So, too, when it becomes necessary toward evening to employ artificial light, the daylight should be excluded on the same principle.

The effort to read when the individual is unsteadily moving, as happens in a carriage or in a railway car, is of course extremely trying to the eyes, and should be avoided.

Foreign Bodies in the Eyes.

The dust everywhere present occasions a constant irritation of the eyes, especially in our large cities. Persons who are much exposed to dust should frequently wash the eyes with cold water. It is constantly happening that small bodies, such as particles of wood, cinders, etc. are thrown violently against the mucous membrane of the eye by the wind. The first effect is to cause a copious secretion from the tear gland, accompanied by movements of the lids, whereby the particle may often be dislodged. In this case the patient experiences a sense of relief, though a certain amount of burning may be felt in the eye for some hours afterward.

In other cases the particle lodges in the front of the eye, the *cornea;* or it is carried upward beneath the upper lid. Under these circumstances the patient almost invariably rubs the lids — a most objectionable practice, since it not only fails to afford relief to the pain, but also serves to force the particle more firmly into the tissue on which it rests, and thus renders its subsequent removal more difficult. The lids should be kept apart, and the eye moved around beneath them. In this way the particle is sometimes dislodged and comes into view If it can be seen, it can best be removed by moistening the corner of a soft handkerchief and applying it to the object. If the particle be loose, it will usually adhere to the handkerchief at once; but no force should be employed to loosen it. In many cases the fragment can be distinctly seen imbedded in the cornea; yet its removal can be effected only by a surgeon, provided with instruments for that purpose.

In many instances the foreign particle lodges under the upper lid, near its margin. In this case it causes a constant rasping of the eye, and yet cannot be brought into view. It can sometimes be dislodged in the following way: The patient takes hold of the eyelashes of the upper lid and draws it away from the eye. He then pushes up the lower lid with the other hand, so that its lashes may sweep over the inner surface of the upper lid. Sometimes the particle will be found adhering to the lashes of the lower lid when they are brought down again. If this attempt fail, the loop of a fine hair pin may be passed gently upward behind the upper lid, which is meanwhile held away from the ball of the eye. Sometimes the particle can be dislodged in this way. This must be done with care,

since otherwise the delicate surface of the eye may be damaged A certain way for dislodging particles from this location consists in *turning the lid.* This requires considerable skill and experience, and can rarely be properly done by a non-professional hand. In order to accomplish it, the patient is directed to " look down." The lashes of the upper lid are grasped between the thumb and finger of one hand, and the lid is drawn gently downward and away from the eye. Meanwhile a hair pin, knitting needle, or other object of similar shape, is placed upon the upper lid, just behind the gristly part, so as to make a hinge, around which the lid can be turned. By means of the eyelashes, which are still grasped between the thumb and finger of the other hand, the margin of the lid is drawn upward and then backward, so as to fold the lid back on itself. The hand may then be taken away, and the lid remains in this position. Any foreign body which may be present is at once detected, and may be removed by the corner of a soft handkerchief. The lid can be replaced by simply drawing the lashes outward and downward again, when it falls naturally into place. In every case in which a foreign body has been present in the eye, and has caused much irritation, there will remain for some time after its removal a feeling as if it were still present. This feeling is often so strong that the patient cannot be persuaded that the body has been removed, even though he may have seen portions of it.

The irritation consequent upon the presence of a foreign body may be allayed to a considerable extent by putting two or three drops of fresh sweet oil between the lids. If the body be not removed from the eye there will probably follow an inflammation of the mucous membrane of the eye — the *conjunctiva.* This is indicated by great sensitiveness to light, by redness of the eye and a feeling as if there were sand or gravel in the eye. The treatment of this affection will be given under an appropriate heading on a subsequent page.

So long as the foreign body remains on the surface of the eye, that is, does not penetrate further than the mucous membrane which covers the globe, no serious impairment of sight is to be expected. But these are by no means the serious cases. For it often happens, especially among those who work in metals or stone, that particles of these hard substances will be driven with great force against the eye. In many cases these particles penetrate the front of the eye, especially if they strike the transparent front —

the *cornea*. The injury inflicted depends upon the depth to which the particle penetrates. In some cases the force with which it strikes is so much diminished by its passage through the hard tissue of the cornea, that the particle penetrates no further, and drops into the watery liquid — the *aqueous humor* — which lies between the cornea and the colored part of the eye, the iris. In this case it may occasion no further damage; perhaps a small, white speck will mark the point at which it penetrated the cornea. It may lie in this watery fluid for a long time without causing any interference with the functions of the eye; or it may in a short time excite an inflammation of the iris, which is a serious affection. In any case the services of a surgeon should be at once procured, since the foreign body is a constant source of peril.

In other cases the particle strikes the transparent body which fills up the pupil — the *crystalline lens*. So long as the lens is in its natural condition it is perfectly transparent and colorless, so that the pupil appears quite black. If, however, a particle of iron or stone penetrate into the substance of the lens, there will generally be seen after a few days a whitish speck somewhere in the ring of the pupil. This speck is due to a change in the lens, whereby it loses its transparency and becomes opaque. This change may extend so as to involve the entire lens, in which case the pupil appears *white* instead of black. The lens, being opaque, obstructs the entrance of light to the back part of the eye, so that the individual's sight is more or less impaired; indeed he may become quite blind in this eye. Fortunately this condition is not necessarily permanent. The lens can be removed by an operation, so that the light will again penetrate to the back of the eye and sight will be restored.

But the most serious of all these cases are those in which the foreign particle passes into the interior of the eye. This is especially dangerous if the fragment has entered the eye not through the cornea, but just outside of the rim of the cornea, in the white part of the eye. It often becomes necessary to remove such an eye from the body. The reason for this lies in the fact — which has been ascertained by long experience — that if the eye be permitted to remain, the foreign body being still in it, there may result an inflammation not only in the injured eye but also in the other one, and that such an inflammation is apt to result in loss of sight. Hence, at the very first signs of irritation in the injured eye, the

surgeon advises and even insists upon its removal. It will not do to wait until the eye has become inflamed, for then it is usually too late to save the other eye, even if the injured one be removed. It is important that non-professional people should understand the gravity of the situation. It seems to most people quite unnecessary and harsh to remove an eye which does not seem much affected, and many a man has acted upon this idea, has refused to permit the removal of the injured eye, and has lost the sight of both eyes in consequence.

Another class of injuries is those in which chemicals, such as acids and alkalies, or quicklime, come in contact with the eye. In every such case the assistance of an eye surgeon should be obtained immediately. Until he arrives the friends may wash the eye thoroughly with cold water, remove any particles that can be seen, drop a little sweet oil into the eye, and then apply a cloth, such as a soft handkerchief, which has been saturated with cold water.

No injury nor accident to the eye should be allowed to go without the advice of a surgeon; for, owing to the delicate structure of the organ and the importance of vision, there is often no proportion between the apparent injury and the actual damage inflicted. An injury which may seem to the uninitiated quite trivial may actually involve most serious consequences for the patient's prospects in life. People generally are accustomed to measure the gravity of an injury by the amount of blood which flows and of visible damage to the tissues; but this rule does not apply at all to injuries affecting the eye.

Sight may be seriously impaired also by injuries inflicted in a playful way. A case is recorded in which the sight was lost through a trick which is exceedingly common. A man was sitting in a chair, when another came in behind him, and clasping both hands over his eyes, told him to guess who it was. The person struggled to free himself, the other tightened his grasp, and in the struggle the eyes were permanently blinded by the fingers of the other individual.

The eyes, like other organs in the body, are affected by diseases which impair the general condition. An individual who is suffering from some exhausting disease is apt to have some impairment of sight, or at any rate, be unable to use his eyes to the extent which is customary with him. There are also some diseases which produce not only the general failure in the power of the

eyes, but also changes which are peculiar to the disease in question. Thus one form of inflammation of the kidney, known as "Bright's disease," is accompanied by serious changes in the nervous tissue of the eye, the retina, which result in a decided impairment of vision. Indeed, it has often happened that patients who were actually suffering from Bright's disease, though having no suspicion of it, have consulted an eye surgeon to ascertain the cause of the impairment of sight, and have been surprised to learn from him that the disease in the eye was merely a part and symptom of the disease of the kidney. An affection of the spinal cord already described, called *locomotor ataxia*, is also frequently accompanied by disease of the eye, with or without serious impairment of sight.

There has been considerable dispute as to whether tobacco smoking is injurious to the eyes. There can be no doubt that the smoke is irritating to the mucous membrane of the eyes; but it has been asserted, and is now pretty generally believed among eye surgeons, that excessive smoking causes a disease of the retina call *atrophy*, whereby the sight is seriously impaired. Yet it must be admitted that, notwithstanding the increase in the prevalence of this habit of smoking during the last half century, there scarcely seems reason for believing that the affection which is supposed to be caused by smoking has increased to a corresponding degree.

The same assertion has been made as to the relation between the use of alcoholic beverages and the loss of sight. It has been maintained that the excessive use of liquors results in atrophy of the retina and impairment of vision. Yet the grounds for this assertion are by no means so strong as for the belief that tobacco can cause the disease.

Short-sightedness.

This condition, which is technically termed *myopia*, consists in a limitation of the range of distinct vision to comparatively near objects. The natural eye is so adapted that it can accommodate itself so as to see objects situated at any distance which is more than five or six inches from the eye. As has been already stated, this power to see objects at different distances—far or near—depends upon the power possessed by the eye of changing the

curvature of the *crystalline lens*. In order that the object shall be distinctly seen, a picture of it must be formed at the back of the eye upon the *retina*. This picture is formed by the focusing of the rays of light by means of the crystalline lens. When the object is situated at a distance from the eye, the lens is comparatively flat; when, on the other hand, it becomes necessary to view an object situated only a few inches from the eye, the lens is, through the action of the *ciliary muscle*, made more curved. In every case the curvature of the lens is such that the rays of light are properly focused so as to produce a picture upon the retina. If from any cause the picture is not properly focused upon the retina, the individual perceives only a blurred image.

Now, it is evident that the failure to focus the picture properly upon the retina may result from either one of two causes: First, the curvature of the lens may be improper — that is, the lens may be too flat or too curved; second, the retina may be situated too far back or too far forward — that is, the eye may be too long or too short; for it is evident that a lens which can focus the rays so as to produce a definite picture on the retina in one eye, will have an improper curvature for producing the picture in the second eye, in which the retina is situated further back than in the first. This can be readily illustrated by taking an ordinary sun-glass, which is a lens shaped almost exactly like the crystalline lens in the eye. This lens may be held so as to produce a perfect picture of the sun — that is, a bright spot—on a sheet of paper held below it. If this paper be now moved a little further from or a little nearer to the lens, there will be seen upon it a large bright circle but not the brilliant image of the sun.

Now, the short-sighted eye is, in the majority of cases, *too long;* that is to say, the distance from the lens to the retina is so great, that the rays of light cross each other before reaching the retina. If the retina could be moved a little further forward toward the lens, the short-sighted eye would become a perfectly natural one. In many, perhaps most cases, the short-sighted eye was in childhood a perfectly natural one; but in consequence of improper use, straining of the muscles, etc., the eye has become compressed and the back part — that is, the retina — has been pushed further backward away from the lens, so that the eye becomes too long, in other words short-sighted.

It would be out of place here to discuss the various causes con-

cerned in the production of short-sightedness, but it is necessary to make some remarks upon the practical application connected therewith.

A short-sighted individual has a certain range of vision in which he sees objects quite as distinctly as those whose eyes are naturally formed. This range varies from about ten inches to six, eight, ten or more feet. His vision differs from that of those with natural eyes in two respects: First, he is able to see objects when brought closer to the eye, as a result of which he can distinguish smaller objects than other people can; second, he is unable to see objects at a distance. The result of this is that the individual gets in the habit of bringing objects close to the eye, since by so doing he does not feel the same strain upon his eyes as when he looks at them at a greater distance.

Whenever an individual who can see near objects quite distinctly cannot distinguish objects at a distance, we may suspect that he is short-sighted. The question can be easily settled by holding before his eyes a *concave lens*. If his sight for distant objects is improved by the assistance of this lens, the person is undoubtedly short-sighted.

There are several popular beliefs respecting short sight, some of which are quite erroneous.

First among these is the general impression that short-sighted eyes are particularly "strong" eyes. This belief results from the fact that short-sighted persons can distinguish smaller objects than other people can, and that they can see in a less brilliant light than others. A moment's thought shows, however, that both of these characteristics result from the ability of short-sighted people to see objects when held close to the eyes. For we know that the nearer an object is to the eye the larger it appears. Now a person with natural eyes can not see small print, for instance, at a distance less than eight or ten inches; the short-sighted person, on the other hand, can see the same print at a distance of four or five inches; but at this distance it appears, of course, larger than it did at ten inches. In the same way a person with natural eyes may fail to distinguish very fine particles, such as minute pieces of sand or dust, merely because he has to hold objects so far away from his eyes in order to see distinctly. The short-sighted individual cannot see these objects at the same distance — eight or ten inches — any better than the person with natural eyes, but he has this advantage

over the latter, that he can bring the object much closer to his eye and still see distinctly. Thus he is enabled to see smaller objects than the person with natural eyes.

The ability to see distinctly in a faint light is explained in exactly the same way. The nearer an object approaches the eye the more light enters the eye from it. Hence, the short-sighted individual who can see distinctly at a distance of four or five inches is able to recognize objects which another person who is compelled to hold them eight or ten inches distant, can not see. The difference lies not in the relative strength of the eyes, but simply in the fact that the object appears brighter because brought closer to the eye.

Another popular impression regarding short-sighted eyes is the belief that short-sight improves as the person grows older. This belief rests upon the fact that many short-sighted persons do not require such strong glasses in middle life as they were compelled to use in youth. This is often the case, but it depends not upon any inherent improvement in the condition of the eyes, but simply on the changes which naturally occur in the eye as the individual grows older. Such persons often say that they "are not so short-sighted as they were." They forget, however, that the measure of short-sight is in seeing *distant* objects and *not* near ones. They will find that while they may be able to see small objects better without glasses than they formerly could, yet they require glasses for distant objects just as before.

The one advantage which short-sighted people enjoy consists in their freedom from the necessity of the ordinary spectacles which most people require in advanced life. This freedom is due simply to the defect in the eye, which counterbalances the second defect consequent upon old age. As will be explained subsequently, the structure of the crystalline lens changes somewhat as a person becomes older, so that he cannot increase its curvature as he formerly did when looking at near objects. This change happens in the eye of a short-sighted person just as well as in that of another; but whereas the latter is compelled to use glasses in order to counteract the defect in his lens, the short-sighted individual does not require the glass, since the defect in his lens is already counterbalanced by the defect in his eye which makes him short-sighted. In consequence of these two defects, and their effect in counterbalancing each other, it sometimes happens that a person

who in youth and early life was compelled to wear glasses to correct his short-sightedness, is able to get along without them in advanced life. Such people are said to have "wonderful sight," or, as it is sometimes expressed, "second-sight."

This is the sole advantage possessed by short-sighted people; the disadvantages, on the other hand, resulting from the peculiar formation of the eye constituting short-sight, are numerous and serious. In the first place, the eye cannot be used to the same extent as the natural eye without pain, nor even without danger. Even when protected by glasses, the short-sighted eye is constantly in danger of certain accidents, if the degree of short-sight be considerable. After continued strain, such as reading for a number of hours, the eye usually becomes somewhat painful; and it has repeatedly happened that hemorrhage has occurred within the eye, causing serious impairment of vision for a time, or even permanently. The sight may also be partially destroyed by what is called "detachment of the retina," as a result of short-sightedness.

Another affection incident to short-sightedness is the change in the position of the eye, called "squint," or technically *strabismus*. This is especially apt to occur if the degree of short-sightedness be considerable. This can often be prevented by the use of appropriate glasses so soon as the first evidences of squinting are manifested.

One of the unfortunate features about myopia is the fact that t is *progressive*. As has been already stated, it is probable that most of those eyes which subsequently become short-sighted, were originally of natural shape, and that the defect has resulted from pressure upon the eye. In many cases this increase in the length of the eye progresses constantly as the individual becomes older, so that his vision becomes more and more defective, and may even finally result in total blindness. It is, therefore, extremely important that the eyes of a short-sighted person should be submitted at regular intervals to examination by a competent surgeon; for if it becomes evident that the disease is advancing, the greatest possible care in the use of the eyes must be observed in order to arrest the progress of the affection.

A short-sighted eye should always be looked upon as a *weak* eye. It will not stand the same amount of wear and tear as a natural eye; it is liable to several accidents and dangers to which other eyes are not subject.

As to the causes of myopia we are not, as yet, fully informed. Certain it is that the affection is hereditary; that is, it appears in successive generations of the same family; it seems to be probable that children may be more or less short-sighted at birth. Examinations of the eyes indicate that such is actually the case. At any rate the tendency to this elongation of the eye—that is, a weakness of the coats of the eye, so that they give way under pressure—is certainly inherited. Short-sightedness is pre-eminently an affection of civilization; it is practically unknown among savage races, as well as among the lower animals. This fact is quite comprehensible when we remember that the affection results from the excessive use of the eyes in gazing at small objects, and that it is the employments of civilization which require the use of the eyes in this way.

Numerous attempts have been made to ascertain which of the elements peculiar to civilized life are especially important in inducing the development of short-sightedness. The first attempts were made in Germany, where short-sight is especially frequent. Dr. Cohn, of Breslau, examined the condition of the eyes in ten thousand children in the schools of that city. Among these he found one thousand who were short-sighted. Among the important facts brought to light by his examination, and confirmed by similar examinations which have since been made by others, are the observation that the amount of short-sight steadily increases from the lowest to the highest classes in the school; that is, both the relative number of the cases and the degree of short-sight are greater after the pupils have spent several years in the school. He found further that the amount of short-sightedness was greater in badly lighted and badly ventilated schools; and that it seemed also to be increased among those pupils who were compelled to use poorly constructed desks, which required them to stoop in the performance of their tasks.

These observations of Dr. Cohn have been confirmed by repeated examinations of many thousand pupils in public schools, in various parts of the world. There is no question that improper illumination and furniture of school-rooms have great influence in promoting the occurrence and progress of short-sightedness. This is especially manifest in Germany, where the school buildings are not always built with especial reference to the requirements of the pupil, and where children are sent to school at an early age and are

kept closely confined many hours a day. In Germany, too, the hereditary influence of short-sightedness is especially manifested, since educational requirements have there been severe during many generations; the tendency to short-sightedness is not only promoted by the arrangement of the school-rooms, but is derived from ancestors who have suffered in like manner. An eminent English surgeon, in discussing this question, says:

"For the prevention of myopia in schools there can be no doubt that good and well-placed windows are essential, and that fittings of judicious design would be useful; but neither of these will be effectual or will prevent children from drooping over their work unless the matter receives the constant and vigilant attention of teachers, and unless the sanitary state of the buildings, and the time relatively given to work and to play, are such as to meet the requirements of physical health. It is a curious illustration of the essential mechanical character of certain minds, that the progress of the myopia should, in Germany, have been referred to the enforced convergence alone, and that better light and better fittings should have been put forward as sufficient to bring about a better state of things. Dr. Agnew, of New York, with more practical knowledge and with deeper wisdom, pointed out that a feeble and easily extensible character of the coats of the eye would be a condition largely dependent upon general debility; and that the treatment of this debility by food, tonics and exercise, as well as by an ample supply of pure and often renewed air in the school-rooms, a judicious shortening of tasks requiring the close application of the eyes, and the use of books printed in bold characters, would be of great assistance in bringing about a much needed reform. The robust faith of the average school-master in the efficacy of what he calls teaching is probably not destined to survive the time when a somewhat better acquaintance with the nature of mental operations will become diffused abroad; and in the meanwhile, and with reference to the frequent sacrifice of the physical side of the development of the young it is not uninteresting to recall the results of an experiment made some ten or twelve years ago in the village school at Ruddington, in Nottinghamshire, under the direction of the late Mr. C. Paget, sometime M. P. for Nottingham. In this school Mr. Paget introduced a half-time system as an experiment, to which only a portion of the children were subjected, and which amounted to a substitution of garden work

for about one-half of the ordinary school hours. The children who were so treated, were found after a short period altogether to outstrip in their school work those who devoted, or who were supposed to devote, twice as much time to it. The prevention of the increase of short-sight in schools, is less in my judgment, an affair of desks and fittings than of careful and judicious sanitation; for I have no doubt that the optical conditions which would produce myopia in weakly children would fail to do so in the robust. None the less, however, should these optical conditions, together with the lighting and the distance of the work, receive a due share of attention; although such mechanical matters must not be expected to supersede the necessity for the constant supervision of a directing intelligence."

When it is discovered that a child is short-sighted, the line of treatment to be pursued is very simple. The evils to be apprehended result from the strain which the eyes are compelled to exert in order to see distinctly; and this strain is merely the consequence of the lack of proportion between the curvature of the lens and the depth of the eye. If we could change this proportion by making the eye shallower; that is, by bringing the retina forward and somewhat nearer to the lens, we would obviate the difficulty. This, of course, cannot be done; the form of the eye cannot be changed, but the other factor is a possibility—that is, we can change the direction of the rays of light before they enter the eye so that they shall be focused upon the retina. This is accomplished by the use of spectacles, a concave glass being placed in front of the eye.

The treatment of short-sightedness consists, therefore, in the use of spectacles. The object of these glasses is not to make the patient see better than before. Indeed, the short-sighted individual will often complain at first that he can see better without the glasses than with them. The benefit derived from the glasses is simply that they compel the patient to hold objects further from his eyes; by this means the eyes are relieved from the strain which is the cause of danger for the future.

At first the patient will experience some inconvenience and perhaps even discomfort in wearing spectacles. This is merely the result of the pernicious habit which the eyes have so long maintained. It disappears in time, so that the patient feels much comfort in the use of his glasses, and much discomfort without them.

The effort required to accustom the eyes to the glasses is greater in advanced years than in early childhood, since the habit of straining the eyes is of longer duration. It is especially desirable that glasses shall be worn so soon as the short-sight is discovered, which is almost always in childhood. For not only are the evils which follow upon short-sight thereby averted, but the progress of the affection may be entirely arrested; hence after the individual attains maturity he may, in many cases, unless he devote himself to some profession requiring close application of the eyes, give up the glasses entirely.

Another advantage in the use of glasses which is most important, though scarcely appreciated, is their value in bringing the individual into relation with the world. Those who have natural eyes which take in the usual range of vision, cannot appreciate the fact that the world of a short-sighted person extends only ten or fifteen feet around him; yet such is the fact. The immense advantage derived from the use of the eyes in training the individual in a knowledge of external objects is lost, to a great extent, by the short-sighted person. Instances illustrating this fact are known to every surgeon who has much experience in the treatment of diseases of the eye. Thus Mr. Carter says: "I once prescribed glasses to correct the short-sight of a lady who had for many years been engaged in teaching, and who had never previously worn them; her first exclamation of pleasurable surprise, as she put on her spectacles and looked around her, was a curious commentary on the state in which her life had until then been passed; she said, 'Why, I shall be able to see the faces of the children.' If we think what this exclamation meant, and if we apply the lesson which it teaches to other pursuits, we shall not fail to perceive that the practical effect of myopia is to shut out the subject of it from a very large amount of the unconscious education which the process of seeing the world involves, and thus to occasion losses which can hardly be made up in any other way. Taken in detail, these losses—the mere not seeing of this or that seeming trifle—may appear insignificant; it is their aggregate which becomes important. A young lady was lately brought to me by her parents on account of the way in which the effects of her myopia had forced themselves upon their notice during a continental tour. Two school boys were of the party, and they subjected their sister to an unceasing chorus of 'Don't you see this?' and 'Don't you see that?' and 'How stupid

you are!' until it became manifest to the elders that a state of things which at home had always been accepted as a matter of course was really a very serious evil. A distinguished man of science, who is short-sighted in a high degree, and who did not receive glasses until he was 19 or 20 years old, has often told me how much he had to do in order to place himself upon the same level, with regard to experience of quite common things, with many of his normal-sighted contemporaries; and it will be manifest on reflection that the matters which are lost by the short-sighted, as by the partially deaf, make up a very large proportion of the pleasures of existence. I am accustomed on this ground to urge upon parents the necessity of correcting short-sight in their children; and I am sure that a horizon limited to ten or even twenty inches, with no distinct perception of objects at a greater distance, has a marked tendency to produce habits of introspection and reverie, and of inattention to outward things, which may lay the foundation of grave defects of character. Landscape painters are the only persons to whom a small degree of myopia can be useful. I once accompanied a landscape painter on a sketching expedition, and after a time asked him whether he intended to omit a certain house from his drawing. He looked up with surprise and said, 'What house? there is no house there.' I at once understood a curious haziness of aspect with which it was his custom to clothe distant scenery in his pictures, and which was greatly admired by many persons who mistook it for a skillful rendering of an uncommon atmospheric effect; in fact, it was only what the short-sighted man saw always before him; and I am sure he must himself have been greatly puzzled by much of the praise which he received.

"The short-sighted child has no curiosity to explore a world which he sees but dimly, and his habit is to curl himself up in a corner and to pore over books. He is absolutely disqualified by his defect from taking part in many games, such as cricket, football, lawn tennis and the like, since all of them require distinct vision of some distant object. The spectacles, therefore, assuming them to be necessary in order to give the vision which is needed, will enlarge the sphere of his activity rather than curtail it, and any consciousness of their presence soon wears off under the influence of daily use. The apparent danger to the eyes from them, in consequence of falls or blows, is much in excess of the reality, especially if the frames are so constructed so as to afford the greatest stability

of position. Many short-sighted men habitually hunt in spectacles, and take their share of falls with as little injury as their neighbors; while among the spectacled officers of the German army, in the war with France, the number of instances in which any wound was inflicted or aggravated either by the glasses or the frames was exceedingly small."

Even when provided with proper spectacles, short-sighted children manifest a disposition, from the force of habit, to bring their books close up to the eyes, or to put their eyes close to their work. It is, therefore, important to see that the child maintains an erect attitude, and does not droop the head, since this stooping keeps the eyes filled with blood and interferes with the breathing. The care of short-sighted children includes, therefore, such attention and supervision as will enable them to get the greatest possible benefit from the spectacles provided for them. It should be observed that the books furnished the child are printed in large, clear type.

Another bad habit which is unconsciously practiced by short-sighted persons, is the custom of reading by a dim light, such as twilight or the light of a fire. They are especially prone to this habit because they are able to read by a fainter light than suffices for people with natural eyes. It is, therefore, desirable that such children should be prevented from practicing this habit, as they will otherwise almost certainly do.

One other point should be mentioned here, namely, the curious popular impression that it is much better to go without glasses as long as possible. Many people even take a considerable pride and satisfaction in avoiding the use of glasses. Such a belief may lead to the most disastrous results. In every case the use of glasses is an absolute essential when the degree of short-sightedness is so great as to cause the patient annoyance.

Far-Sight.

Short-sight, or myopia, results, as has been stated, from an unnatural length or depth of the eye, whereby the retina is situated too far behind the lens. There exists also a condition quite opposite to this; that is, the eye is not deep enough, is too s[illegible], causing the retina to occupy a position unnaturally near to t[illegible]

The result of this improper formation of the eye is, in one respect, similar to the effect of excessive depth of the eye; that is, the range of the patient's vision is not so great as that of a person with a natural eye. In this case, however, the difficulty is not that the individual is unable to see *distant* objects, but that he cannot distinguish *near* objects. His vision is good for everything which is not situated within a few feet of the eye. This condition is, therefore, called *far-sightedness*, or long-sightedness.

These two opposite conditions of the eye, excessive depth in the one case—near-sightedness—and unnatural shallowness in the other case—far-sightedness—are often indicated to a certain extent by the form of the eye. Thus an individual whose eyes are near-sighted in a high degree, often has a peculiar staring expression, which is found upon inspection to be due to a protrusion of the eye-balls This protrusion seems to be due to the extreme length of the eye from before backward. The far-sighted individual, on the other hand, has often unusually *flat* eyes, an appearance due to the shortness of the eye from before backward. Just as near-sightedness is technically called *myopia*, so far-sightedness is medically designated *hypermetropia*.

Far-sightedness—an unnatural shallowness of the eye—is more apt to escape notice than near-sightedness. The near-sighted child is apt to betray his defect of vision even to one who is not seeking to examine the state of his sight; for he will often express his inability to see objects which are plainly discernible to his companions. The far-sighted person, on the other hand, does not have so many opportunities for revealing to himself as well as to others the existence of any defect of vision; for he is enabled to see in the distance as well as anybody else, and can distinguish ordinarily small objects by holding them a little further from the eye than others do.

Since the defect of the far-sighted eye consists in its inability to see near objects, it is evident that the defect will be detected during the individual's efforts to read, write, or engage in other pursuits requiring close application of the eyes. Such efforts are apt to be accompanied, even in early years, by fatigue and pain in the eyes, which is often followed by a dimness of vision, since the eye actually becomes unable to maintain the strain necessary for seeing near objects. After resting a time the individual can again read with perfect ease, but is again compelled, after a short time, to discontinue the employment by the pain, weariness and sense of effort in the eyes.

A curious feature about far-sightedness is, that the subject of it sometimes acquires a habit which we would suppose would be monopolized by *near*-sighted individuals; he habitually holds a book at an unusually short distance from the eye; in consequence of this the friends often remark that the person is near-sighted, though examination discloses the error of this belief. The explanation seems to be that by bringing the object near the eye, clearness of vision is increased, because the images formed upon the retina are larger than when they are held further away.

If the person is required to employ the eyes upon fine work constantly, these organs become red, irritable, bloodshot, and often discharge a small amount of mucus. This discharge will be noticed by the patient in the morning upon rising. The patient will notice that the condition of his eyes is much improved by simple absence from his occupation for a day; thus they are usually much better on Monday after resting from work on Sunday.

It is, therefore, important that every person who has symptoms of this kind should ascertain by consulting a competent surgeon, whether or not the symptoms originate in this condition of hypermetropia. Such individuals are very apt to content themselves with a remark to which they have been accustomed from childhood, namely, that they "have weak eyes." This weakness of the eyes can be easily remedied by the use of proper glasses. If not remedied, the irritation and frequent inflammations will gradually result in serious disease of the eye which may prove exceedingly obstinate to treatment.

The cure for far-sightedness, like that for near-sightedness, is in the use of spectacles. In early life these spectacles may be quite weak; but in advanced life, when the crystalline lens of the eye becomes hardened, it will become necessary for the patient to increase the strength of the glasses. In this respect, therefore, hypermetropia differs from myopia, since in the latter condition the glasses required by the patient may be weaker than those which he needed in childhood.

Squinting.

It is important that parents and teachers recognize the usual cause of squinting. The most curious and absurd ideas prevail with reference to this deformity. One of the commonest is, that

squinting is merely a vicious habit which the child could avoid just as well as not if he would. Acting upon this principle, parents are apt to stimulate the unfortunate child to better conduct by punishing him, believing that in this way he can be induced to keep his eyes straight. Another popular belief is that the habit of squinting is "catching;" and a child who is unfortunately afflicted with this deformity is regarded as an object to be avoided just as much as if he had the itch.

Both of these impressions are erroneous. The fact is, that squinting is utterly beyond the control of the individual, and cannot be corrected by punishment; nor can it be communicated from one individual to another. In fact, it would be quite impossible for a person to acquire at will a habit of genuine squinting.

Squinting is, in the vast majority of cases, the result of defective formation of the eyes. It may result either from an undue depth or an undue flatness of the eyes — that is, from myopia or from hypermetropia. If the child be short-sighted, he is apt to have that form of squint in which one eye turns outward; if on the other hand, he be far-sighted in a high degree he is prone to the common form of squint in which one eye turns inward. In fact about nine cases out of ten of this common form of squinting occur in individuals who are "flat-eyed," that is, *hypermetropic*. This deformity is usually manifested at about the time when the child begins to use his eyes critically in the examination of external objects — say from three to five years of age. When the habit of squinting is first developed it usually seems to affect both eyes, that is, the eyes turn inward alternately. Sometimes the child looks with the right eye while the left is turned in toward the nose; at other times, perhaps while he is still looking at the same object, he reverses the proceeding, directing the left eye toward the object under inspection and rolling the right eye inward. For a considerable time it seems to be a mere matter of accident as to which eye is made to squint, but as time elapses it will be noticed that the child neglects one eye or the other constantly, employing either the left or the right eye for examining objects and permitting the other to turn inward.

This is the time for action in correcting this deformity, for when the individual has acquired the habit of using one persistently to the neglect of the other, the sight of the latter undergoes gradual impairment. Hence it frequently happens that if the squint

be neglected until the person has reached adult age, the squinting eye is almost completely blind, or at least practically worthless. This impairment of sight results simply from disuse, just as an arm or leg becomes gradually weaker if it be not used. By employing proper measures to compel the individual to use both eyes, or rather to permit him to see with both eyes without straining these organs, the squint may be entirely avoided and the sight may remain perfect in both eyes. It is, therefore, a matter of supreme importance that a squint should be rectified at its very beginning. People generally are inclined to think that the only disadvantage of a squint is the impairment of beauty; this is, of course, a matter of considerable moment, especially in girls. But if this were all, the squint might be neglected, since the eye can be straightened almost any time by a slight operation which involves no danger to the patient nor to the eye. But no operation can restore the sight which is lost by permitting the squint to persist for years.

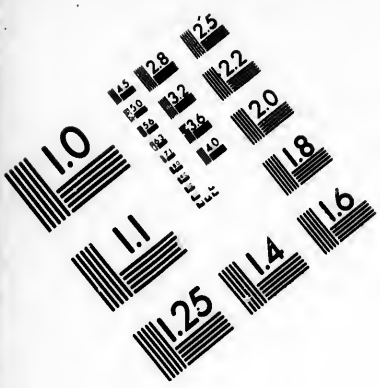
By correcting the squint at its very beginning, therefore, we not only prevent a serious personal deformity, but we also save the sight of an eye. With one eye a person can, it is true, see well enough for all ordinary purposes, but it is a by no means comforting thought to be conscious that he has no reserve eye in case he should, from any cause, lose the sound one.

The remedy for squinting lies, during its early stages, in the use of glasses. It is often possible to correct a squint entirely, before it has existed more than two or three years, by the judicious employment of spectacles. The glasses act, of course, by correcting the near-sightedness or far-sightedness upon which the squint depends.

After the individual has been in the habit of squinting for several years, it is rarely possible to correct the deformity entirely by the use of glasses. Yet there should be no hesitation whatsoever in submitting the eye to an operation whereby it can be straightened; since, even though the sight of the eye be somewhat impaired, the vision can often be restored, at least so as to make the eye practically valuable.

The Selection of Spectacles.

In selecting spectacles for cases of short-sightedness or far-sightedness, it is always advisable to secure the advice of an eye surgeon, if this be practicable, for there are certain principles



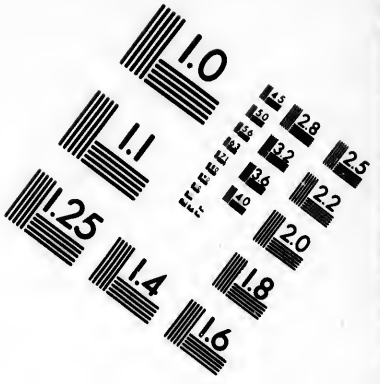
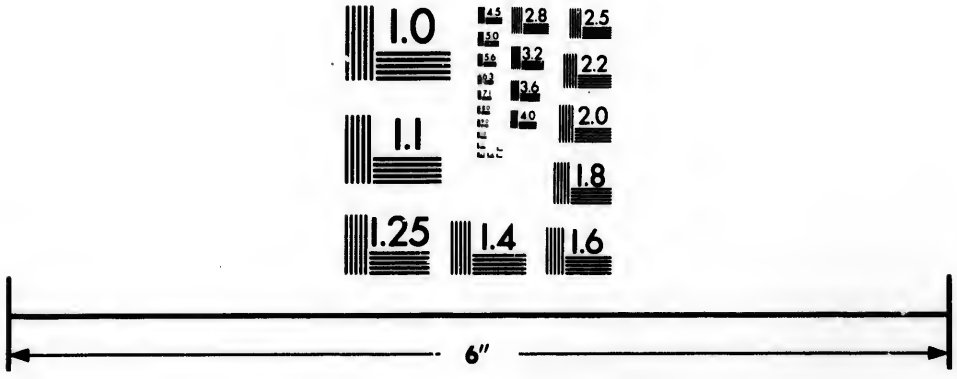
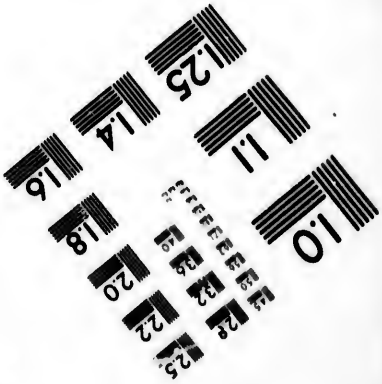


IMAGE EVALUATION TEST TARGET (MT-3)





Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

2.8
2.5
3.2
2.2
3.6
2.0
1.8
1.0

involved which can be understood and acted upon only after a thorough acquaintance with the anatomy and the functions of the eye. In fact the adaptation of spectacles is one of the most delicate and trying duties of the surgeon.

Without entering into details which would be unintelligible to one who is not thoroughly versed in the structure and functions of the eye, certain hints may be given which have evident and practical value.

The most important point to be remembered is that the spectacles should be so fitted *that the eyes shall look through the center of the respective glasses.* It is, therefore, necessary to have the frames made differently, according as the spectacles are designed for viewing *distant* or *near* objects. For it is evident upon slight consideration, and can readily be seen by observing the eyes of another individual, that when a person looks at a distant object, the axes of the two eyes are parallel; while, when he looks at an object held close to the face, the axes of the eyes are no longer parallel, but are directed so as to meet at the object which is under examination. It is evident from this that the glasses which are intended for assisting the eyes in viewing distant objects should be somewhat further apart than the glasses which are intended for viewing near objects. One of the commonest mistakes which is made by patients in buying their own spectacles is the neglect to observe that the glasses are situated as already indicated. In some cases, it is true, one can correct this error by bending the frame of the spectacles so as to bring the glasses a little nearer together or further apart, as occasion requires; yet it is a much better plan to procure in the first place only such spectacles as are adapted to the breadth between the eyes. Let it be remembered that when we speak of the *center* of the lens we mean the thickest part (if the glass be convex) and the thinnest part if the glass be concave, and not the center of the frame which holds the lens. Every eye surgeon constantly meets cases in which patients complain of discomfort in wearing spectacles, sometimes so great as to compel them to abandon the glasses; and yet examination shows that the fault is not in the strength of the lenses, but merely in the misfit of the frame. The best way for ascertaining whether the frame is properly adapted to the individual is, of course, by wearing the glasses for a few hours. As this cannot always be done before purchasing, the buyer should, before selecting the pair of specta-

cles, place them in position upon his nose and look at himself in the mirror. If the spectacles are intended for distant vision, the pupils of the eyes should be seen opposite the center of the lenses; if the glasses are meant for reading, the pupils should be situated a little outside of the center of the lenses.

A frequent cause of discomfort in the use of spectacles is the innocent practice of wearing another person's glasses. One member of a family will frequently acquire a habit of using spectacles intended for the eyes of another, and will wonder that they cause so much discomfort. It should be remembered that spectacles should be fitted with the same accuracy as shoes or gloves; indeed with more accuracy, since the eye is far more delicate and susceptible to the influence of strains than either the foot or the hand.

It should be remembered that the same individual may require two pairs of spectacles for different purposes. Thus a short-sighted person will usually require weaker glasses for viewing distant objects than for reading. As the eye changes with the rest of the body in advancing years, it will become necessary to change the spectacles at intervals. A neglect to do this will, in many cases, cause much discomfort and even pain.

As to the materials of the lenses themselves, the choice rests between pebble and glass. In former times the pebble (rock crystal) was much to be preferred. But in later years glass is made of a quality so much superior to that of a half century ago, that there is but little choice between the two except in one particular: this is the greater hardness of the pebble, as a result of which it is not so liable to be scratched, and may last longer. Spectacles of pebble may be wiped with a pocket handkerchief without injury, while lenses of glass should be cleaned only with a piece of wash-leather kept for the purpose. It is extremely important that spectacles be kept with care, not only to avoid scratching by contact with hard substances, but also to preserve the original shape of the frame. The pasteboard cases which are commonly employed for the purpose are rarely sufficiently stiff to resist the pressure to which they are exposed in the ordinary course of life.

If it be impossible to secure the services of a professional eye-surgeon in selecting the proper lenses, the individual should bear in mind one or two points. The best way for deciding upon the strength required in the lenses is to test them by means of the types which are kept for the purpose by every dealer in optical goods.

It may be said in general that a short-sighted individual should select one of the weaker glasses which enable him to accomplish the desired object, whether that be for viewing distant or near objects; a far-sighted individual, on the contrary, may select a somewhat stronger glass for the same purpose.

As a person advances in years, the eye undergoes certain changes which interfere somewhat with the performance of its functions and deprive it of some of the powers which it possessed in youth. These changes are just as natural to the eyes as the changes which occur in the skin, the hair and the bones. The eye becomes somewhat flatter, and the crystalline lens acquires a degree of hardness which renders it incapable of undergoing the same changes of form which it exhibited in early life. It will be remembered that these changes of form occur when the eye is changed from distant to near vision and conversely. When the person looks at distant objects the lens is comparatively flat; when the eye is directed to near objects the lens is, by the action of the ciliary muscle, rendered more curved. This change in form — which is technically called the *accommodation* of the eye — is necessary in order that a picture of the various objects shall be accurately produced upon the retina.

When the lens has become hardened and therefore less compressible than it was in early life, this power of *accommodation* whereby the eye can be adapted for viewing near objects is partially lost. The individual, therefore, can no longer see objects held near to the face with the same distinctness as he did twenty or thirty years previously; though his sight for distant objects remains just as good as ever. At first he overcomes the difficulty by holding objects somewhat further from the face; but in the course of time he is unable, even with this device, to read print of ordinary size. Hence it becomes necessary for him to employ some artificial means whereby the same effect can be produced as was formerly brought about by the change in the shape of his lens. This is accomplished by the use of a convex glass.

The age at which it becomes necessary for an individual to employ glasses varies with many circumstances, though it may be regarded on the average as between 40 and 50 years of age. Some individuals, of course, are spared this necessity for a much longer time, sometimes because their eyes are subject to defects which are remedied by the change in the lens due to old age. In

every case it will be well for the individual to begin with weak glasses, and change them for stronger ones as the progressing change in the eye requires.

Inflammation of the Eye—(Conjunctivitis).

The term "inflammation of the eyes" is popularly applied to an inflammation affecting the mucous membrane which covers the globe of the eye and lines the eyelids.

Symptoms.— The disease usually begins with a feeling of grating in the eye, the patient generally supposing that some particles of sand or other foreign matter have entered the eye. In a few hours the eye becomes red, the redness usually beginning at the part of the eye next to the lids. At the same time the secretion from the surface of the eye is increased; at first there is an augmented discharge of mucus, which assumes a stringy character; this collects especially at the inner angle of the eye and forms little scabs along the edges of the lids. Upon awakening on the following day the patient finds the lids glued together, and experiences some difficulty in separating them. On the second day the discharge from the eye will be observed to contain more or less matter. By this time the entire front of the eye is of a bright red color, except where the redness is concealed by patches of a thick stringy secretion. The lids are usually somewhat swollen, and in many cases the eye seems to be puffed out—an appearance due to the presence of watery fluid under the conjunctiva, whereby this is lifted off from the globe of the eye. The sight is not impaired except occasionally by the presence of a little matter which can be readily wiped away.

In many cases both eyes are attacked simultaneously; in others one eye becomes inflamed a day or two in advance of the other; but in nearly all instances the disease will attack both eyes before the patient recovers.

The cause of this inflammation seems to be, in many cases, exposure to cold; in other instances it results from the contact of irritating substances. In still other cases the inflammation appears to be epidemic, affecting a large number of persons in the same community, and attacking every member of a family in succession.

Conjunctivitis is rarely a serious affection, especially if properly treated; when neglected it sometimes spreads to the deeper structures of the eye, causing ulceration of the cornea and possibly interference with sight.

Treatment.—As a rule the patient requires no constitutional treatment, since the local inflammation is not commonly associated with symptoms of general disturbance. If the patient be hot and thirsty he should have a saline laxative, such as a teaspoonful of Rochelle salts or of the citrate of potash.

The eyes may be bathed every hour or two with one of the following lotions, care being taken to allow a little of the solution to flow into the eyes at every application:

Alum, - - - - - -	Ten grains.
Water, - - - - - -	Two ounces.

If the case be severe the following lotion may be employed:

Alum, - - - - - -	Eight grains.
Sulphate of zinc, - - - -	Two grains.
Water, - - - - - -	Two ounces.

In the intervals between the application of the lotion the eye may be washed with water to secure the escape of the discharge; the patient will derive much comfort from the application of a cloth, such as a soft handkerchief, soaked in cold water and allowed to rest upon the eye. In making such applications to the eyes, only thin cloth should be used, and not more than three thicknesses should be applied to the eye, since otherwise the heat produced may aggravate the pain.

If there be much swelling and puffiness of the conjunctiva the the following solution may be prepared:

Nitrate of silver, - - - -	Two grains.
Water, - - - - - -	Two ounces.

Two or three drops of this should be be dropped into the eye morning and night. If this solution be used the alum mixture above given is not required, but the eye should be cleansed and kept cool as directed above.

In order to prevent the lids from sticking together the edges may be smeared with vaseline when the patient retires at night.

Chronic inflammation of the eyes may result from an acute attack, but is more frequently caused by intense application of the eyes from over use in study, or in some employment requiring close

observation. In many cases it is aggravated by some defect, such as far-sightedness, which the patient does not suspect. In most instances it occurs in debilitated individuals, especially in scrofulous children.

Symptoms.—The eye is red and looks irritable; there is a certain increased amount of susceptibility to light, so that the individual avoids a bright light as much as possible. The edges of the lid are red; there is an increased secretion which gathers at the corners of the eye. The person cannot read or apply the eye continuously for the usual time without feeling that the eyes grow very tired and hot.

Treatment.—In most cases it becomes necessary to improve the state of the patient's general health. Without such treatment the local applications to the eyes remain ineffectual. It will therefore be necessary to examine carefully the state of the patient's functions, and to prescribe such medicines as are necessary to relieve any irregularities of the system. If the patient be a scrofulous child, it will be advisable to administer cod liver oil, a teaspoonful of which may be given twice a day. Such children will also be benefited by the following prescription:

Syrup of the iodide of iron,	One ounce.
Glycerine,	Two ounces.

Mix and take a teaspoonful after meals.

Care should also be taken that the eyes are not strained by excessive application to fine work. It may even be necessary for the individual to change his employment temporarily, so that the eyes may secure the proper rest. Continuous reading, especially of fine print, and all other close applications of the eyes, should be avoided.

Unless the eyes are very irritable, the local treatment may consist in the use of the following eye-water:

Sulphate of zinc,	Two grains.
Water,	Two ounces.

Three or four drops of this may be dropped into the eye once or twice a day. If this does not cause improvement in a few days, the following may be substituted:

Sulphate of zinc,	Two grains.
Alum,	Five grains.
Distilled water,	Two ounces.

Mix and drop into the eye as before directed.

The eyes may be washed frequently with cold water, and the edges of the lids should be smeared with vaseline at night upon retiring.

If there be much dread of light, these applications will probably increase the irritation and should, therefore, be discontinued at once. In such cases benefit is often derived from the application of a small fly-blister, say half an inch square, to the temple. Instead of the lotions above mentioned there may be used the following:

Yellow ointment of mercury,	- Half an ounce.
Vaseline, - - - - -	- Half an ounce.

A small portion of this, as large as two pin heads, may be placed between the lids morning and night.

The treatment must be continued for several weeks or even for months, before a cure can be expected. In many cases it will be found that the surfaces of the lids are studded with minute reddish bodies, *granulations*. In these cases the affection will be far more obstinate, and relief cannot be expected without the use of some other measures than those indicated. These measures can, however, be carried out only by the surgeon, and need not be indicated here.

Purulent Inflammation of the Eyes.

Purulent inflammation of the eyes is marked, as the name indicates, by a profuse discharge of pus or matter from the surface of the eye. It usually occurs in two classes of patients: first, newborn children; and second, in persons who are suffering with gonorrhœa.

This is one of the most formidable affections of the eye which the surgeon is ever called upon to treat. When properly cared for, it is the most readily controlled, but when neglected or improperly treated, it is one of the most severe and disastrous of all the diseases to which the eye is subject. Many a life has been blighted in the first few weeks of existence by the destruction of the eyes a disaster which might have been avoided if the affection had been promptly and properly treated.

It will be seen, therefore, that one who undertakes the treatment of purulent inflammation of the eyes assumes an immense

responsibility; and it is equally evident that no one who is not thoroughly familiar with the nature and treatment of the disease should think of assuming such responsibility.

Symptoms.—In the child the inflammation begins between the second and sixth day after birth. It is first noticed by the nurse, who detects a slight running from the eyes, some swelling and redness of the lids, and a gumming together of the lids during sleep. After a time, often in a few hours, the discharge becomes greatly increased in quantity; it ceases to be watery and becomes yellow and thick. The eyelids become much swollen and very red, the swelling being sometimes so great that the lids can scarcely be separated. Many times the mucous membrane of the eye—the conjunctiva—becomes puffed up and separated from the globe by an accumulation of watery fluid underneath. This swollen conjunctiva may almost entirely cover the cornea, so that there is but little to be seen in the eye except the red and inflamed conjunctiva covered with matter.

The matter collects between the lids in large quantities, and streams down the face when the lids are separated. The quantity of matter which is formed and escapes from the eyes in severe cases is most remarkable.

The gravity of the disease depends partly upon the severity of the attack, but largely upon the promptness and skill with which remedies are applied. If properly treated, recovery is almost certain. Yet there are cases in which the attack is so severe that one or both eyes are destroyed within a few hours, almost before treatment is begun.

In most of these cases, it will be ascertained on inquiry, that the mother was suffering at the time of confinement from a purulent discharge from the vagina, which may have been a genuine gonorrhœa or merely an aggravated case of "the whites."

Treatment.—The first requirement in treatment is to keep the eyes perfectly *free from the discharge.* This is to be accomplished by frequent washing with warm water. In order to do this, the child should be laid on the lap of the nurse, its head being turned to one side or the other, according as the one eye or the other is to be washed out. The lids are gently separated with the thumb and finger, while a small stream of water is allowed to run into the eye next to the nose, and to run out on the opposite side

into a sponge or basin held beside the head to receive it. This must be repeated just as often as is necessary to prevent the accumulation of matter between the lids.

This may be required every half hour, and should be attended to by night as well as by day. The importance of this measure cannot be over-estimated; without it, no remedies can save the eye in a severe case.

After the eye has been washed out, one of the following lotions may be applied:

Alum,	Twelve grains.
Distilled water,	Two ounces.

This should be injected gently into the eye with a small glass syringe, the injection being repeated as often as is necessary to check the secretion of matter. In severe cases this lotion may be required every hour. As the discharge decreases in quantity, the intervals between the use of the injection may be increased.

Two or three times a day the child should be seen by a surgeon, who will probably find it advisable to drop into the eye about three drops from the following solution:

Nitrate of silver,	Five grains.
Distilled water,	One ounce.

This can be most conveniently applied by means of a dropping tube, or it can be brushed upon the lids with a soft camel's hair brush. The nitrate of silver solution is a powerful remedy, which must not be carelessly employed by inexperienced hands.

Sometimes the edges of the lids and the skin of the cheek under the eyes become sore from the irritating character of the discharge; this can be in a great measure relieved and prevented by keeping the parts smeared with vaseline.

One of the unfortunate accidents which sometimes occur in severe cases of purulent inflammation of the eyes in infants, is a turning over of the upper lid, whereby the red and swollen mucous membrane is exposed. This is a very unpleasant sight, and may cause further trouble by the formation of sore and ulcerated places on the lid. This is a troublesome incident in the affection, and usually requires surgical interference for its removal. The matter should not, however, be neglected, since it may result in serious deformity of the lid if not promptly attended to.

The great danger in purulent inflammation of the eyes is, that

the inflammation may extend to the deeper structures of the eye, especially the cornea. So long as the conjunctiva — the mucous membrane covering the eye — alone is affected, there is no particular danger of impairment of sight. But it is impossible to say how long the inflammation will be thus limited to the conjunctiva. Instances are known in which it has spread to the cornea within twelve hours. The occurrence of this serious accident is indicated by a grayness or haziness at the front of the eye. After a few days, or even within twenty-four hours, a little hole or ulcer can be detected at the spot, surrounded by a white margin. When the inflammation subsides, the site of this ulcer will be marked by a white opaque spot on the cornea. This is usually permanent, and if it happen to be situated about the middle of the cornea — that is, in front of the pupil — it may constitute a serious impairment of vision.

Gonorrhœal Inflammation of the Eyes.

This painful and dangerous disease results from the introduction of some of the matter of a gonorrhœal discharge into the eye. One who has seen many patients suffering from gonorrhœa, and has observed how ignorant they are of the danger to the eye involved by the disease, and how careless they are with reference to the protection of the eyes, cannot wonder that so many eyes are seriously injured and even destroyed by this disease.

The patient who is suffering from gonorrhœa cannot be too careful to avoid all possibility of contact of the urethral discharge with the eye. The hands should be carefully washed every time that they come into contact with the genital organs or with the dressing used on these parts. Particular care should be taken with regard to the use of towels. The towel which is used for drying the hands should be kept separate from those used for the face. All cloths and other dressing used about the genital organs should be burned when soiled.

Symptoms.—The evidences of inflammation in the eye begin about one or two days after matter has been introduced. The patient feels a sense of burning and itching in the lids, which causes him to rub the eye. This feeling increases in severity, and is soon accompanied by a watery discharge from between the lids. The

edges of the lids become red and swollen, and the entire surface of the globe acquires a deep red color. Within twenty-four hours the lids may have become so swollen as to close the eye completely. When they are separated there will be found an accumulation of discharge, which now consists of yellow matter. Within a day or two the eyes run profusely, the matter flowing over the lids onto the cheeks. The edge of the lid and the adjacent skin of the cheek become red and sore.

The eye is the seat of most intense pain, which suffices to prevent the patient from sleeping.

The danger to be apprehended is the extension of the inflammation to the deeper structure of the eye, causing ulceration of the cornea. In severe cases the entire cornea — the transparent front of the eye — becomes white and mortified, and may even drop off in the course of the affection. Yet sight may be seriously impaired or lost without such extensive disease of the cornea, since if the cornea be ulcerated even over a small surface, there will remain a white opaque spot after the inflammation has subsided; and if this spot happen to be located just in front of the pupil, vision will be thereby interfered with.

Treatment.—It is extremely important that the treatment of gonorrhœal inflammation of the eyes be begun promptly and energetically, for there is no other affection which attacks the eye of the adult in which the most serious injury can be inflicted in so short a time. In many cases the eye is irreparably lost within twenty-four or even twelve hours after the discharge begins.

One of the most important items to be observed is the *protection of the other eye from contagion*, for the matter produced in the inflamed eye is extremely contagious, quite as much so, indeed, as that which flows from the urethra; and the proximity of the eyes renders transfer of the matter from the diseased to the sound eye very easy. Several plans have been proposed for protecting the sound eye. One consists in sealing the lids together with several layers of collodion, re-enforced by narrow strips of adhesive plaster. An ingenious device for protecting the sound eye without interfering with the use of it, is thus described by Mr. Buller: "It consists of a square piece of mackintosh, into the center of which a watch-glass is fastened, and of three strips of adhesive plaster. The mackintosh is trimmed to fit the nose and forehead

of the patient, and should extend across one side of the forehead about half an inch above the eyebrow, and downward nearly to the tip of the nose, the nasal portion reaching a little beyond the middle line.

"A strip of adhesive plaster about an inch in width, and long enough to reach from just in front of one ear to a corresponding point on the opposite side, is applied along the upper border of the mackintosh. The second strip may vary in width according to the height of the nose, and must be snipped in three or four places in order that it may be adapted to the uneven surface upon which it rests, the lower part only slightly overlapping the edge of the shield. For additional security, a third, the somewhat shorter strip, is placed along the ridge of the nose. The eye in thus completely protected by a waterproof shield, the upper and inner sides of which are firmly adherent to the skin of the forehead and nose, whilst the lower and outer borders are free, so that the eye is exposed to the air almost as freely as when an ordinary shade is worn. Moreover, the surfaces of the watch-glass being parallel, vision is not interfered with and the patient is able to attend to the affected eye.

"As the strips of adhesive plaster become softened in the course of a few days, by the warmth and secretion of the skin, they require to be renewed. This may be done as often as is necessary without any difficulty or danger of infecting the healthy eye."

Treatment.—A patient suffering from gonorrhœal inflammation of the eye is usually in a depressed and debilitated condition, as the result of the sufferings which he has endured from the gonorrhœa. The inflammation of the eye aggravates considerably this condition. It becomes necessary, therefore, to administer remedies which shall sustain and strengthen the patient. For this purpose we may administer the compound syrup of hypophosphites, a teaspoonful of which may be given three times a day. The diet should also be generous in both quantity and quality; yet the gonorrhœa forbids the use of liquors unless these be dry wines. It will be well to administer quinine regularly in the following prescription:

Sulphate of quinine, - - -	One drachm.
Tincture of the chloride of iron, -	Six drachms.
Peppermint water, - - -	Three ounces.

Mix, and take a teaspoonful in water before meals.

The patient will probably suffer intense pain from the inflammation in the eye; this can be in part relieved by the application of water dressings to the eye, as will be presently described. Yet in most cases it becomes necessary to administer opium in some form. The most convenient and desirable way will be in the following prescription:

Sulphate of morphia,	Two grains.
Sulphate of atropia,	One-eighth of a grain.
Water,	Two ounces.

A teaspoonful of this solution may be taken three or four times a day, if necessary, to subdue the pain; two teaspoonfuls may be taken at once at bedtime.

If there be much fever and thirst, with a coated tongue, the following mixture may be given:

Bicarbonate of potash,	Twenty grains.
Aromatic spirits of ammonia,	Half a drachm.
Water,	One ounce.

This may be taken in a wineglassful of water.

Locally, the most important item of treatment for the patient and his friends to attend to is *perfect cleanliness of the eye*, that is, its freedom from the discharge which will otherwise accumulate. To accomplish this the eye must be carefully washed every half hour, or as often as matter accumulates between the lids. In washing the eye, the lids should be separated and a stream of water should be directed from a small syringe, so as to remove any matter which may have collected under the lids.

In the intervals between these cleansings of the eye, the patient should apply a soft cloth, such as an old handkerchief, which may be folded to make three thicknesses, and should be kept wet with ice water. This should be moistened afresh frequently, in order to keep the parts cold.

A most important application is a solution of the *nitrate of silver*. The strength of this solution, according to the severity of the case, from ten to forty grains to the ounce of water. This should be applied to the lids in the following way: The lids are separated, and their edges turned upward and downward respectively, so as to expose as much surface as possible of the inflamed conjunctiva. A soft camel's-hair brush is dipped in the solution of nitrate of silver, and swept gently over the exposed surface. Th-

brush is then rinsed in water and again passed lightly over the lids, so as to remove the excess of the silver solution. This application should be made just after the eye has been washed. In general, it will be sufficient to apply the silver solution once in the day. In severe cases it may be necessary to repeat the application twice in the same day. No one but a surgeon should undertake the application of nitrate of silver to the eye, since it is possible to inflict serious damage by the improper use of so powerful an agent.

If it be impossible to secure the services of a professional man, or if many hours must elapse before his arrival, it will be well for the patient to use the following solution, which can be made in a few minutes in almost every household: Take as much powdered alum as can be conveniently taken up on the point of a pen-knife, and dissolve it in a tablespoonful of water. Six or eight drops of this may be dropped into the eye between the lids every half hour or hour, after washing the eye with simple water. Or the following lotion may be obtained at the drug store:

Sulphate of zinc, - - - -	Four grains.
Tincture of opium, - - - -	Half an ounce.
Glycerine, - - - - -	Half an ounce.
Water, - - - - - -	One ounce.

A few drops of this may be dropped into the eye every hour at least.

Yet the patient must never lose sight of the fact that the hope of saving the eye depends upon the care in keeping it clean, rather than the use of medicines or eye-water.

It is hardly necessary to say that the discharge from the eye is as contagious for other individuals as for the other eye of the same person, and that the greatest care should be used to avoid the possibility of contagion. All cloths, brushes, etc., which have been employed in the treatment of the case, should be burned when no longer required. Towels and body linen which may have been soiled by the discharge, should also be kept from possibility of contact with other people.

Granular Lids.

This term is applied to a state of the eyelids, in which the inner surfaces of the lids are studded with minute bodies about the size of a pin's head, which may lie closely together over the entire

lid, or may be scattered in different parts of it. During the early stages of the affection these little bodies, called *granulations*, are red and bleed easily upon pressure; but after a time they become hard and white, and the mucous membrane between them becomes shrunken and yellow. At the beginning of the disease the eye is usually red, but in the later stages it becomes pale and somewhat yellow.

These granulations arise as the result of a purulent inflammation of the eyes, or as the continuation of an ordinary inflammation. In some cases they seem to result simply from the continued irritation of the eyes which occurs in a far-sighted individual who is compelled to employ the eyes constantly in fine work. Granular lids are not usually found among people in robust health and good sanitary condition; they are most frequently met with among people who live in closely-crowded quarters, neglectful of sanitary requirements. They are, therefore, more frequently seen among the poorer classes, especially those whose general health is evidently impaired. They may exist for a considerable time without giving any more annoyance than a slight sense of roughness in the lids, and perhaps a little tendency of the lids to stick together in the morning. In the majority of cases, however, there is increased discharge from the eyes, and a constant feeling as if there were sand in the eyes. The severity of these symptoms is increased by exposure to a cold wind, or to the glare of the sun as reflected from snow or from the surface of water.

Symptoms.—The patient's attention is at first attracted by a feeling of heat and fullness in the eye, and by a sensation as if there were particles of sand or other foreign bodies constantly irritating the surface of the eye. There is also increased sensibility to light, and usually a discharge of watery liquid which causes the lids to stick together in the morning. The edges of the lids are red and somewhat thickened, and in advanced cases the upper lid is apt to droop somewhat.

The little bodies which are situated in the inner surface of the upper lid lie in contact with the cornea; the constant movement of the lid over the globe causes constant irritation of the cornea by the friction of the granulations. After a time this irritation is shown by a cloudiness and whitish appearance of the cornea, which is limited to that part of the eye covered by the upper lid.

It is therefore only when this lid is raised, or when the patient directs the eye downward toward the floor that this whiteness becomes visible. After a time the surface of the cornea also becomes uneven and rough, and ulcerations may be produced. In many cases bright red streaks are seen across the upper part of the cornea, consisting of blood vessels.

Occasionally the eyes troubled with granular lids become suddenly inflamed in a high degree; the lids are then intensely red, swollen and puffed, and may be kept spasmodically closed in consequence of the excessive sensitiveness to light; an attempt to open them is extremely painful, and is accompanied by a gush of tears which sweeps out strings of mucus.

Careful management and appropriate treatment usually succeed in removing the granulations, and as a result in restoring the the clearness of the cornea, if the affection has been of only short duration, we may hope for complete or almost perfect recovery in every respect. The prospect is, however, worse in old cases; the mucous membrane of the eye becomes much changed in quality. It is no longer red and soft, but becomes white and hard like a scar. The result of this is frequently that the edge of the upper lid is drawn inward toward the globe of the eye, so that the eyelashes constantly rub against the surface of the cornea. The effect of this irritation is, of course, to aggravate the condition of the cornea and to diminish the prospects for ultimate recovery.

Treatment.—Few affections of the eye are so obstinate and troublesome in treatment as this granular condition of the lids. Numerous plans of treatment have been employed with more or less success, though none of them can be relied upon in all cases.

It must be remembered that in the majority of instances the patient's general condition is unsatisfactory; he requires tonics, judicious and generous diet and fresh air. These are just the remedies which the majority of such patients cannot procure, since these individuals are generally poor and are compelled to live in poor sanitary relations.

The local treatment consists in the application of some substance which will destroy the granulations and restore the mucous membrane to a healthy condition. For this purpose several different remedies are used; the most popular is perhaps the "blue

stone " or sulphate of copper. Every second day the lid is turned upward so as to expose the granular surface ; this is then carefully dried and the granulations are touched with the sulphate of copper. Nitrate of silver, the acetate of lead and other caustics of varying strength have been employed for the same purpose. It is not necessary to enter into details of treatment, since success cannot be expected in inexperienced hands.

In obstinate cases surgeons have sometimes resorted to a bold and somewhat perilous expedient. This consists in setting up a severe inflammation of the eye by introducing into it a drop of matter from a case of purulent inflammation of the eyes in another individual. For this purpose the matter is taken from an infant suffering with purulent inflammation. In a day or two the eye becomes the seat of a violent inflammatory process, which is, of course, carefully watched and controlled by the surgeon. In many instances it is found that when the inflammation subsides the granulations have disappeared.

This method will, of course, be undertaken only by a surgeon, and, indeed, it is now not so popular with medical men as was formerly the case. For within the last year experience has shown that granular lids can be in a great majority of cases easily and rapidly cured by the application of a substance known as *jequirity*. This remedy is too powerful for harm as well as for good to be entrusted to non-professional hands.

Inversion of the Eyelids.

This condition, technically known as *trichiasis*, frequently occurs as the result of granular lids. The edges of the lids become thickened, a condition which, in itself, tends to turn the lashes inward toward the globe of the eye ; this tendency is aggravated by the fact that the inner surface of the lid is drawn inward by the granulations.

The first effect of this inversion of the lids is to make the lashes rub against the globe of the eye. The result of this position of the hairs is first a severe irritation of the cornea, which results in a haziness and opacity of this structure. The growth of the hairs themselves is also impaired ; they become stunted and

changed in the direction of their growth. After a time the hairs become brittle, and perhaps only a few stumps are left here and there to mark the position of the eyelashes.

Treatment.—Since the condition depends upon granulations of the eyelid, it can be relieved only when these granulations have been removed. After this has been accomplished, measures may be taken to remedy the condition and position of the eyelid. To effect a cure a surgical operation is usually required, hence it will be unnecessary to discuss the treatment in detail. Temporary relief can, however, be obtained by pulling out the eyelashes. To do this the edge of the lid should be raised somewhat from the eye, since the lashes which cause the irritation are often situated out of sight when the lid retains its natural position. When the edge of the lid is thus raised there will often be seen a row of stumps projecting toward the surface of the eye. These should be pulled out, one by one. Further than this it is not advisable for the non-professional to go.

Scum on the Eye—(Pterygium).

People are sometimes annoyed by observing a fleshy-looking mass growing upon the corner of the eye; in the course of time this mass extends toward the center of the eye, assuming a triangular shape; the point of the triangle extends gradually toward the middle of the eye, and finally reaches the center of the pupil. This constitutes what is popularly known as "a scum" on the eye; it has, however, no effect upon the power of sight until it reaches the cornea and extends in front of the pupil, in which case it interferes somewhat, though not seriously, with vision.

In most cases the growth occurs at the inner half of the eye, and only one is found in a single eye; at times, however, one will grow from either corner of the eye and the two meet in the center.

This scum appears almost invariably in middle or advanced life, especially among those who have lived for a long time in warm climates. It is seldom seen in young persons. It grows very slowly, and rarely attracts notice until it has reached the margin of the cornea.

Treatment.—This variety of scum over the eye is quite harmless, and occasions no further annoyance than the deformity induced by it. Most people, therefore, prefer to submit to its presence rather than to undergo an operation for its removal. Such an operation is quite devoid of danger to the patient, as well to the eye; and if the individual be young, the improvement in the appearance of the eye warrants the operation. Whenever the growth reaches the middle of the cornea, so as to interfere with the sight of the eye, it is advisable to have it removed.

A smaller tumor affects the eyes of many persons and occasions much unnecessary annoyance. This tumor consists of a small yellowish knot, which is usually situated near the edge of the cornea. The patient's attention is usually drawn to it by a feeling of roughness upon closing the lid. This mass does no harm whatsoever, and may be permitted to remain without injury. If its presence annoys the vanity of the patient it may be seized with a fine pair of forceps and snipped off with the scissors.

Inflammation of the Cornea.

This disease is usually met with in children, especially among the poorly-nourished and under-fed. It may also occur in others as the result of a constitutional taint, such as scrofula or syphilis.

It is an obstinate and prolonged affection which usually lasts several months. In most cases it begins in one eye and progresses until it reaches a certain stage, when the second eye also becomes affected.

Symptoms.—Inflammation of the cornea generally begins with a slight redness of the white of the eye at the edge of the cornea. This redness ordinarily begins as several distinct patches, which subsequently spread so as to run together. The eye becomes very sensitive to light and irritable.

The cornea soon begins to look cloudy and white, and the vision is correspondingly impaired. After a time the cornea, instead of being clear and transparent as in the natural state, looks like a window pane that has been breathed upon, or like a piece of ground glass. There is usually an increased amount of secretion

from the eye, and frequently much pain in and around the organ.

After lasting several months, the cornea gradually loses its unnatural appearance, and in the course of a year or eighteen months frequently exhibits a perfect recovery. In many cases, however, the acuteness of vision is somewhat impaired, and there often remains a diffuse cloudiness of the cornea. In unfavorable cases the inflammation proceeds so far as to cause ulceration of the cornea, in which case there remain permanently white spots in different parts of it. These cause more or less interference with the sight of the eye, according as the dots are located in the middle or at the edge of the cornea.

Treatment. — In every case of inflammation of the cornea the patient requires constitutional treatment. It is necessary to ascertain carefully just what the defects in the patient's system may be, and to employ those measures which are best adapted to the relief of this condition. If the patient be a scrofulous child, he should have a teaspoonful of cod-liver oil three times a day, and fifteen drops of the syrup of the iodide of iron; the latter may be given in a teaspoonful of water after meals.

If the child have a syphilitic taint, it is necessary to employ remedies which will counteract this virus. For this purpose we may rub a little mercurial ointment into the skin behind the ear every night, keeping a strict watch upon the condition of the patient's mouth to avoid salivation. Internally we may administer one of the following prescriptions:

Syrup of the iodide of iron, - -	Six drachms.
Glycerine, - - - - -	One ounce.
Water, - - - - -	Two ounces.

Mix and take a teaspoonful after meals. If this do not agree with the child's stomach, we may order the following:

Iodide of potassium, - - -	Two drachms.
Citrate of iron and quinine, - -	Two drachms.
White sugar, - - - -	One drachm.
Water, - - - - -	Four ounces.

A teaspoonful of this may be taken at meal-times.

Whenever the child is suffering from marked debility, more benefit will be derived from residence in the country than from

medicines or applications to the eyes, for the improvement in the general health is always followed by actual improvement in the condition of the eye as well as by diminution in the distress experienced by the little patient.

As for the eye itself, but little can be done directly. If there be great intolerance of light and profuse discharge from the eyes, they may be washed several times a day with cold water and protected by a light bandage. The habit of wrapping the eye tightly in several folds of a handkerchief is a serious mistake, since the condition of the eye is much aggravated by the heat of the bandage. It will be better in all cases to avoid the use of bandages, and to protect the eyes by means of colored glasses. This is indeed absolutely necessary if there be great sensitiveness to light. In mild cases the blue glasses will afford sufficient protection and be least unsightly; but if the dread of light be excessive, the patient should wear glasses of a neutral tint. The best form is the large curved spectacle, whereby the eye is sufficiently protected from light and wind, but is not heated.

If much pain be experienced in the eye, relief may be obtained by making a fomentation as follows:

Extract of belladonna, - - - Sixty grains.

Dissolve this in a pint of boiling water; saturate a piece of lint or a soft handkerchief with the warm lotion, and apply it folded to the eye.

Instead of this fomentation the following eye-water may be used:

Sulphate of atropia, - - - - Two grains.
Distilled water, - - - - One ounce.

Two or three drops of this may be dropped into the eye twice a day.

Ulcers of the Cornea.

Ulcers in the transparent front of the eye, the cornea, result from severe inflammations of the eye. They are especially frequent in those forms of inflammation which result from the contact of matter from a gonorrhœal discharge. There are, however, some ulcers which originate without any previous severe inflammation of the eye. These occur chiefly in children, and almost always in

children of impaired health. They are especially common in the so-called scrofulous persons.

Ulceration of the cornea is always accompanied by extreme sensitiveness to light. So great is this susceptibility that the child frequently shuns the sunlight, cannot be persuaded to go out and play, and may even keep the head buried in a pillow or the eye covered with the hand.

The ulcer begins as a slight cloudiness or haziness of the cornea, which is soon found to surround a little hollow. This hollow is the ulcer. It sometimes remains quite limited in extent, and at other times spreads so as to acquire a diameter of a quarter of an inch or more. The haziness around the margin of the ulcer increases so as to constitute at times a considerable impairment of vision; for the cornea is of course more or less opaque, and does not permit the light to pass through it.

There is always some increase in the secretion of the eye, and the entire mucous membrane of the eye seems red and irritable.

The course and result of this affection varies much with the cause and the condition of the patient. In the most favorable cases the ulcers heal in the course of a few weeks under appropriate treatment, leaving only a minute white speck at the site of the ulceration. In less favorable cases the ulcers resist treatment for weeks, or even months, though finally healing. In the worst cases the ulcer eats through the cornea, so that the watery fluid in the front part of the eye escapes through the opening. As a result of this the colored ring of the eye—the *iris*—lies in contact with the cornea, and is apt to grow fast to the edge of the ulcer. If this occurs there may result most serious difficulty, and even permanent impairment of vision.

Treatment.—In every case in which an ulcer of the cornea occurs without injury to the eye, or without a previous severe inflammation, the fault is to be sought in the impaired health of the patient. Hence the treatment will be directed, first of all, to the improvement of the general health. Many of the children are decidedly scrofulous; they need the best possible care n the way of food, recreation, air and exercise; their strength should also be built up by the use of cod-liver oil and of the syrup of the iodide of iron. Directions for the administration of these drugs have been given in previous pages.

The local treatment consists in means for relieving the sensitiveness to light and for favoring the healing of the ulcer. For the first purpose it will be well to put into the eye every day two or three drops of the following solution:

Atropia, - - - - - -	Two grains.
Distilled water, - - - - -	One ounce.

In order to promote the healing of the ulcer, it is advisable in many cases to dust into the eye some powdered calomel. This is done by taking a dry camel's hair brush, dipping it into the powder, and then adroitly shaking it between the lids, which are meanwhile held apart by the fingers of the other hand.

Instead of the powdered calomel we may use an ointment containing the yellow oxide of mercury:

Yellow ointment of mercury, - -	One ounce.
Vaseline, - - - - - -	One ounce.

Mix and apply a piece as large as a pea between the lids at the angle of the eye. The movements of the lid will cause this to spread over the eye and reach the ulcer.

It is highly important that no substance containing *lead* should come in contact with the eye when there is an ulcer on the cornea; for the lead is deposited in and around the ulcer, making an unsightly mass which it is extremely difficult to remove. Hence no eye-water should be used in a case of this sort without knowing that it is free from lead. It is, therefore, necessary to avoid the so-called eye-waters which are kept on sale in the drug stores.

If the white speck which is left after the healing of an ulcer be located just in front of the pupil, it constitutes a permanent impairment of sight, which cannot be remedied by any known means. If it be located on the other hand somewhere near the edge of the cornea, it need not interfere seriously with the sight of the eye. But in every case the white speck constitutes a deformity, which attracts notice from its prominent position. This spot can be concealed, to a great extent, by tattooing with India ink. By this means the appearance of the eye is very much improved, though the impediment of vision, whatever it may amount to, remains undiminished.

Inflammation of the Iris—(Iritis).

This is one of the most important affections of the eye, since it may result in serious impairment of sight if it be not promptly and properly treated. Inflammation of the iris arises first, from some taint of the system, such as syphilis or rheumatism; second, from exposure to cold; third, from an injury to the eye.

Symptoms.—One of the first symptoms noticed by the patient is a dull aching pain in the eye; this is often regarded by the patient as neuralgia, since it is apt to extend upward on the side of the head and downward along the side of the nose.

Another symptom is a certain sensitiveness of the eye to light, though this is not usually so marked as in the affections of the cornea.

The appearance of the eye undergoes a change; this consists in a certain *muddiness* of the iris and of the watery fluid contained in the front of the eye; by comparing the iris with the one of the sound eye, a decided difference in color is usually manifest.

There is usually also some dimness of vision, though this may not be noticed by the patient until his attention is directed to the condition of his sight.

The most important feature of the disease, however, and one which is always present, is a *contraction of the pupil.* It will be seen that the pupil of the affected eye is much smaller than that of the opposite one, and that it does not change its size rapidly with the amount of light which is admitted to it. Thus, if the hand be held over the eyes for a moment and then removed, it will be observed that the pupil of the sound eye is quite large at the instant that the hand is removed, but rapidly decreases in size; the pupil of the affected eye, on the other hand, is not perceptibly larger when the hand is removed than it is subsequently, and it is constantly smaller than the pupil of the other eye.

Treatment.—One of the important objects of treatment is to *keep the pupil dilated,* for the tendency of the disease is, as has been said, to contract the pupil, that is to draw the iris toward the lens. For it is to be remembered that the black opening which we call the pupil is really filled up by a transparent body—the *crystalline lens.* Now when the iris is inflamed, if it lie in contact with

this crystalline lens, as it does when the pupil is small, there is danger that the two will grow together, that is, that the iris will become attached to the lens. This is a most serious accident, which may occasion much injury to the eye subsequently.

The first object of treatment is, therefore, to keep the iris away from the lens, that is to keep the pupil dilated. Fortunately this can easily be done by the use of atropine. For this purpose we employ the following solution:

Atropine,	Two grains.
Distilled water,	One ounce.

Three drops of this may be dropped into the eye once or twice a day, as occasion requires. The atropine exerts also other beneficial effects; it diminishes the irritability of the eyes and affords the patient much relief. It is rarely necessary to employ any form of opium to relieve the pain.

This part of the treatment is applicable to all varieties of iritis, whatever the cause may be. But the rest of the treatment varies according to the origin of the difficulty. Thus inflammation of the iris results in many cases from syphilis. If the patient has ever suffered from this disease, he must be on the lookout for this inflammation of the eyes as one of the possible manifestations of the disease.

If the inflammation of the iris be due to syphilis, it is necessary to employ not only the local remedies for use in the eye, but also those medicines which are known to counteract the syphilitic poison. For an extended discussion of this subject we must refer the reader to the chapter on "Syphilis." The following ointment may be prepared:

Extract of belladonna,	Fifty grains.
Ointment of mercury,	One ounce.

These are to be rubbed together so as to make a perfect mixture; a piece as large as a hazel nut should then be rubbed into the skin of the temple and forehead around the eye, and allowed to remain during the night.

Syphilitic patients usually require tonics; for this purpose a teaspoonful of syrup of hypophosphites may be taken after meals.

It sometimes becomes necessary in inflammation of the eyes of syphilitic origin, to administer opiates in order to secure to the

patient the rest which he so much needs. He may take fifteen drops of the *deodorized tincture of opium* three times a day, and twenty drops upon retiring at night.

If the individual have never had syphilis, but is a frequent sufferer from rheumatism, the treatment adapted to this condition must be employed before we can hope to cure the inflammation of the iris.

Cataract.

This is one of the most frequent and important affections of the eyes in aged people, and may also occur in the young. It constitutes the source of a "scum over the eye," though the scum is really not over but in the eye itself.

A cataract consists in an opaque condition of the crystalline lens. It will be remembered that the lens of the eye is, in the natural condition, perfectly transparent; it lies just behind the colored ring called the *iris*, and fills up the black opening in the ring called the pupil. Yet so long as it remains healthy the lens is quite invisible, and when we look into the eye we see no object whatsoever filling up the pupil.

When from any cause the lens loses its transparency and clearness and becomes opaque, it can be seen in the opening of the pupil. This is what happens in the disease called cataract, which may be defined, therefore, as an *opacity of the crystalline lens.*

Causes.—The opacity of the lens may be the result of anything by which its nutrition is impaired. These causes may be classified as follows:

It may occur as the result of old age; in advanced life the tissues of the body generally are not so well nourished as in earlier years. Changes occur in numerous organs; the bones become more brittle; the muscles are not so strong; the skin is less abundantly provided with fat; the hair loses its color and often falls out. The opacity of the lens in old age is merely one of the changes which seem to be due to the impairment of the powers of life; this variety is called "senile cataract," because an accompaniment of old age.

Cataract may also result from some taint of the system whereby the nutrition of the body is interfered with. One of the most

frequent examples of this is the condition known as *diabetes*. A patient suffering from diabetes is very apt to become partially blind from an opacity of the lens—that is, cataract.

The lens may also become opaque in consequence of some disease of the other tissues in the eye, for when certain of these structures — especially the retina and the choroid — become diseased, there results a disturbance of the nutrition of nearly all parts of the eye. One of these results is an opacity of the lens. Cataract may also be produced by an injury to the eye, such as a blow, even though there be no wound.

Finally, cataract is sometimes congenital—that is, an infant is born with opaque lenses.

Congenital Cataract.

The eyes of a child born with a cataract are usually poorly developed and of small size. In some cases the child itself is stunted and lacking in development of the body or of the mind, or both. Congenital cataracts are seen with especial frequency in children who are born imbecile or idiotic. A more frequent form of cataract in children comes on after birth, in well-developed as well as in stunted children. It may not be discovered for some months or years; in some cases the child is afflicted with convulsions, which are not due, however, as is popularly supposed, to the cataract. It seems more probable that both the convulsions and the cataract result from some disease of the nervous system.

Mr. Hutchinson, of London, has shown that infantile cataract is frequently associated with an imperfect development of the enamel on the teeth. "The incisors, the canines and the first molars, are the teeth which suffer most; and as a rule, with but very few exceptions indeed, the bicuspids escape entirely. The contrast between the clean, white, smooth enamel of the latter, and the rugged, discolored spinous of the first molar, is often very striking."

Cataracts occur from old age at any time after 35 or 40 years, but usually between 50 and 60. The patient first notices a certain haziness before the eye, accompanied by a corresponding impairment of the sight. After a time a faint white body can be seen

DIFFERENT CASES OF VARIOUS CLASSES OF CATARACT.
DIVERSOS CASOS DE VARIAS CLASES DE CATARATA.

(En todos estos casos la pupila está muy dilatada.)

(In all these cases the pupil is very much dilated.)

FIGURA No. 1.

Catarata que empieza en la parte anterior del centro del humor cristalino.

Cataract which begins in the anterior part of the centre of the crystalline humor

FIGURA No. 2.

Catarata que empieza en la parte posterior del centro del humor cristalino.

Cataract which begins in the posterior part of the centre of the crystalline humor.

FIGURA No. 3.

Catarata central estriada que incluye la capa anterior y posterior del humor cristalino.

Striated central cataract, which includes the anterior and posterior coat of the crystalline humor.

FIGURA No. 4.

Catarata que se forma en la capa fibrosa del humor cristalino.

Cataract which is formed in the fibrous coat of the crystalline humor.

FIGURA No. 5.

FIGURA No. 6.

Catarata que empieza en la capa fibrosa del humor cristalino, con opacidad de la orilla del este último.

Cataract which begins in the fibrous coat of the crystalline humor, with opacity of the margin of this last.

lying in the pupil. This becomes gradually more distinct and larger, so that finally the pupil is entirely filled with a white mass. By this time the sight of the eye is practically lost, the patient being able only to distinguish light from darkness.

Cataract follows an injury which impairs the nutrition of the lens. Thus, if a particle of iron or stone, or other foreign body penetrate the eye and enter the lens, a cataract will result within a few weeks. So, too, a blow upon the eye may shake the lens loose from its fastenings and result in the production of a cataract. Sometimes a blow upon the back of the head, or a fall upon the head, may result in an opacity of the lens.

Treatment.—Whatever the cause of the cataract may be, there is but one plan of treatment — the *removal of the lens.* There are, it is true, several operations, one or another of which is preferred according the circumstances of the case; but nothing can be done by means of medicines for the removal or even the arrest of a beginning opacity of the lens.

After the lens has been removed, the patient recovers the sight of the affected eye; for cataract impairs sight only by preventing the entrance of light into the eye. After the opaque lens have been removed, the light enters the eye again as before and the patient sees again. This statement assumes that there is no other disease in the eye itself than the cataract; in many cases other structures of the eye are also diseased; in these instances the removal of the lens may not restore the sight to the eye, since the retina or the choroid may be so affected as to be unable to perform their usual office.

After the lens have been removed the patient sees but indistinctly, for it will be remembered that in order that a person shall see distinctly, it is necessary that a minute picture of the object at which he looks shall be formed upon the retina, and that in order to form this picture the rays of light must be focused by the lens. When this is removed it becomes necessary to substitute some other contrivance, whereby the rays can be focused so as to meet upon the retina. This is accomplished by placing a lens before the eye in the shape of spectacles. When the eye from which the lens has been removed is thus provided with proper spectacles, the individual can see in some respects as well as before. He cannot, of course, adapt the eye to near and to distant objects

as can be done with the natural eye; but his condition is far better than before the removal of the lens.

The operation for the removal of a cataract is one of the most delicate and critical of all surgery. A slight error on the part of the operator, or — as is more frequently the case — an unfortunate condition of the eye at the time of the operation, may cause an inflammation which will result in the total destruction of the eye. It is, therefore, necessary that the very best and most proficient surgeon be employed when so important an operation is to be performed.

Injuries of the Eye.

The presence of a foreign body within the eye, however small or insignificant this body may be, is an extremely serious matter. It is therefore important to ascertain, as soon as possible after an injury, whether any particle has lodged within the eye and is still present there.

The symptoms which indicate that some such particle has lodged within the eye, are:

Severe and continued pain in the eye, which resists the ordinary remedies and is not proportioned to the apparent injury done.

An increase in the amount of inflammation excited by the original injury.

A gradual impairment of the sight in the affected eye.

It has been said on a previous page, and can only be repeated with emphasis here, that when a foreign particle remains in an eye the patient is in danger of losing, not only the injured, but also the sound eye. Whenever the injured eye shows signs of inflammation, when it secretes mucus freely and causes the patient considerable pain, no time should be lost in presenting the matter to a competent surgeon. For if the trouble be allowed to continue indefinitely, until the pain and irritation become so severe that the patient can no longer bear it, it will probably be too late to save either the injured eye or even the sound one.

Injuries from Gunpowder, Small Shot, Percussion Caps, Toy Pistols, Etc.—The most frequent injuries of the eye, which are brought to the surgeon in ordinary practice, result from contact with the eye of some of the missiles just mentioned. In this country

the Fourth of July is a harvest time for eye surgeons as well as for others. The toy pistols which have become so popular among boys, occasion frequent injuries to the eyes. For not only may fragments of the different missiles be driven into the eye, but the simple explosion in the immediate vicinity of this organ may occasion damage by detaching some of its tissues.

The explosion of gunpowder near the eye may affect this organ in different ways.

The simple concussion may so shake the eye as to derange its parts and impair sight.

The surface of the eye may be burned or scorched by the flame so that serious disease and deformity result.

Grains of the powder may be driven with force sufficient to penetrate the coats of the eye and lodge in its interior.

Treatment.—All loose powder should be at once washed out of the eye in the following way: The lids are separated and raised from the globe so far as may be gently done; then a fine stream of water is squirted over the eye and under the lids from a small syringe. The front of the eye—the cornea—will probably be studded with grains of powder which stick so tightly in the tissue that they cannot be removed by the stream of water. These can be detached by the dextrous use of a fine needle or other instrument prepared for the purpose; but this should always be left for the experienced surgeon and never undertaken by any one who is not a physician, since much injury can be done by unskilled hands. After the eye has been thoroughly washed, a few drops of sweet oil or a little vaseline should be inserted between the lids, and a soft cloth saturated with cold water may be kept applied to the eye, fresh water being used as often as is necessary to keep the part cool.

Injuries of the Eyelids.

The most common injury consists in a rupture of some of the blood vessels in the tissue under the skin of the lids, resulting in an escape of blood and swelling of the parts. This condition is what is popularly known as "a black eye."

The blood which escapes into the skin is at first red, but in the course of a few days undergoes a change of color, becoming dark,

then green, and finally yellow. It usually entirely disappears in the course of eight or ten days without treatment.

Treatment.— If cold can be applied to the part immediately after the injury, the escape of blood may be limited considerably and the deformity repressed. This can be best accomplished by applying ice directly to the eye, or by putting pieces of ice in a rubber bag or soft cloth, which may be bound over the eye. If this cannot be done at once, a cloth should be saturated with hot water and pressed firmly upon the part.

If any advantage is to be derived from this measure it must be used as soon as possible after the receipt of the injury; for the blood escapes within comparatively few minutes after the infliction of the blow, and it is only during these few minutes that we can hope to prevent the escape of blood.

After the injury has been done, and the eye is swollen and puffed with blood, it becomes a matter of importance to remove, as quickly as possible, the unsightly appearance. Yet this is practically impossible. We must wait until the blood is absorbed, a process which will require several days. The most that can be done is the application of cloths saturated with hot water. These should be frequently changed, so that the part can be constantly kept warm and moist.

There are various popular devices for the treatment of a black eye. The most common one, a piece of raw beefsteak, has the advantage of being moist and cool, but possesses no special merit otherwise. Pugilists are said to be in the habit of puncturing the swollen skin so as to squeeze out some of the blood, and thus hasten the reduction of the swelling. This is, however, a somewhat dangerous practice, since it renders the skin liable to an attack of erysipelas as well as to the formation of matter, accidents which would not otherwise occur.

Among the popular remedies for the relief of a black eye is a poultice made of *black bryony root*. A poultice is made by scraping some of the root and mixing it with bread crumbs. This is boiled in a muslin bag and placed over the eye. It is said to have an excellent effect in promoting the absorption of blood from the skin.

Another popular remedy is the *tincture of arnica*. This is used for injuries of all sorts, such as sprains and bruises. There seems to be as yet no evidence that it has ever done any good,

though it is very certain that it frequently produces a rash on the skin which may amount even to a serious eczema. It cannot be recommended for the treatment of a black eye.

Inflammation Around the Eyelashes.

In discussing diseases of the skin, we had occasion to refer to the fact that the little sacs or follicles from which the hairs in various parts of the body grow, are liable to inflammation. Thus one of the forms of that familiar and obstinate affection known as "Barbers' Itch," consists simply in an inflammation of the hair follicles of the beard.

The hair follicles of the eyelashes are also subject to a slow and obstinate sort of inflammation, constituting an affection which is technically termed *tinea tarsi*. This affection is more common among children than among adults. It begins with a redness and irritability of the edges of the lids; there occurs an increased secretion from the follicles of the eyelashes, which accumulates during the night especially, and gums the lids together so that they are separated with difficulty in the morning. The effort to pull the lids apart usually results in pulling out several lashes.

After the disease has lasted a few weeks the discharge contains matter, and dries into scabs which stick to the edges of the lids and surround the lashes. Pimples form around the lashes, and when they break there remain slight ulcers which are soon covered with yellow crusts.

In a short time the lashes fall out, and the edges of the lids become thick, rounded, and turned away from the eye—*everted*.

The result of this change in the shape and position of the edges of the eyelids is, that the minute canals through which the tears escape into the nose, are turned away from the globe. Hence the natural moisture of the eyes no longer escapes through the usual channel into the nostrils, but flows over the edge of the lower lids onto the cheeks. This occasions the patient great annoyance, since the skin below the eyes is constantly moist, and the individual seems to be continually crying; moreover, the irritation of the skin caused by the constant moisture results oftentimes in the production of soreness and rawness.

This disease may occur in all classes of society, but is especially frequent among the poor and ill-fed. It is also common as a sequel of several of the infectious diseases, especially scarlet fever, measles, and whooping cough.

One of the worst features of this complaint is the tendency to recur. After it has been once cured the patient is apt to suffer from it again at intervals.

Treatment.—The first consideration of treatment is to put the patient in the best possible condition for health. He frequently needs tonics, exercise and recreation as much as if he were suffering from some severe constitutional disturbance. For this purpose we may order one of the following prescriptions:

Extract of cinchona, - - - -	Twenty grains.
Extract of nux vomica, - - -	Four grains.
Reduced iron, - - - - -	Ten grains.

Mix and make twenty pills; take one before meals. Or the following may be given:

Dilute nitro-muriatic acid, - -	Six drachms.
Compound tincture of cinchona, -	Two ounces.
Water to make four ounces.	

Take a teaspoonful before meals.

In the local treatment of the eyelashes, one of the most important elements is cleanliness. The edges of the lids should be bathed with warm water three or four times a day, or oftener if necessary, to keep them perfectly clean; at night after washing the lids, the edges should be smeared with the following ointment:

Ointment of the nitrate of mercury, -	Fifty grains.
Vaseline, - - - - - -	Half an ounce.

This may be allowed to remain during the night, and washed off in the morning; after washing, the following lotion may be applied:

Alum, - - - - - - -	Four grains.
Sulphate of zinc, - - - -	Two grains.
Water, - - - - - - -	Two ounces.

If there be much discharge, this lotion may be applied several times during the day also.

If the lashes be long, they should be trimmed closely with scissors, in order that they may be kept clean more readily, and that the ointment may penetrate well into the hair follicles.

In mild cases, this plan of treatment will be sufficient to effect a cure in about two weeks. But if there be ulcerations and pimples containing matter around the lashes, it will be well to apply every morning after washing the lids the following solution:

Nitrate of silver,	Ten grains.
Water,	One ounce.

A soft camel's hair brush should be dipped into this solution and then applied to the little ulcers at the roots of the hairs. If this does not suffice to prevent further ulceration, the sore places may be touched with a pointed stick of the nitrate of silver.

In using this nitrate of silver, care should be taken that the point touches only the raw spots and is not smeared over the healthy skin. This should not be done more than two or three times a week.

When the edge of the lid is raw and ulcerated between the hairs, as well as around them, we may apply a lotion containing boracic acid:

Borax,	One drachm.
Lead water,	Four drachms.
Glycerine,	Two ounces.
Water,	Two ounces.

Stye.

A stye is merely a small boil located on the edge of the lid. It seems to begin, in most cases, in a hair follicle. The affection is so familiar that no description is necessary.

Treatment. — At the first indication that a stye is forming, it is sometimes possible to prevent, or at least mitigate it by touching the point gently with a stick of the nitrate of silver. It is, at any rate, well to try this, since no injury is done, even though it may fail to accomplish the desired object.

As soon as it becomes evident that the stye is too far advanced to be arrested, the object should be to hasten the formation of matter. The best means for accomplishing this is the application of warmth and moisture. This may be done by applying a soft cloth saturated with hot water, or by making a small linseed

poultice. So soon as matter appears at the surface it will be well, in order to shorten the patient's discomfort, to open the boil and squeeze out the contents.

Some persons are troubled with a succession of styes, which follow one another at short intervals. Such individuals will be benefited by a tonic, and by regular evacuation of the bowels. The following prescription may be administered:

Sulphate of quinine, - - -	Half a drachm.
Dilute nitro-muriatic acid, - -	Four drachms.
Tincture of the chloride of iron, -	Six drachms.
Syrup of tolu, - - - -	One ounce.
Water, - - - - -	To make four ounces.

A teaspoonful of this may be taken in a tablespoonful of water before meals.

For children the following prescription will be beneficial:

Powdered cinchona, - - -	Half a drachm.
Bicarbonate of soda, - - -	Half a drachm.
White sugar, - - - -	Forty grains.

Mix and make twelve powders; one of these may be taken morning and night.

Smaller children will find the following mixture more palatable:

Tincture of gentian, - - -	Four drachms.
Dilute muriatic acid, - - -	Four drachms.
Syrup of orange peel, - - -	One ounce.
Peppermint water, - - - -	To make four ounces.

A teaspoonful may be given in water before meals.

If the child be pallid and bloodless, the following prescription may be ordered instead of the last:

Citrate of iron and quinine, - -	Forty grains.
Syrup of tolu, - - - -	One ounce.
Water, - - - - - -	Three ounces.

A teaspoonful of this may be taken at meal-time.

When the skin of the cheeks is raw and sore, and the edges of the lids are extensively ulcerated, benefit will be derived from the use of Fowler's solution, three or four drops of which may be taken in water twice a day.

After the formation of pus at the edges of the lids has ceased, they should be bathed with the lotion and smeared at night with the mercury ointment, as directed above.

Tumors of the Eyelids.

There are frequently formed, near the edge of the upper lid, minute lumps, varying in size from a pin's head to that of a pea. These little tumors occasion no pain, but are the source of considerable annoyance to the person's vanity. They often occur in groups — two or three of them being found near together on the same lid. They may sometimes attain such a size as to interfere with the movement of the lid, and to prevent the eye from opening to its full extent.

These feel to the finger like small shot under the skin. Sometimes they are soft, and at other times quite hard, so that the patient is inclined to be anxious in regard to them.

These tumors grow very slowly, and may last for several years.

These masses are merely collections of matter in the follicles which surround the eyelashes. They are, therefore, essentially of the same nature as *wens* on the head.

Treatment.—There is but one way to get rid of these little tumors, and that is to open them and remove their contents. This will scarcely be undertaken by any one but a surgeon, since it is unsafe for an unskilled hand to bring a knife into the vicinity of the eye. The operation is a trivial one, and the cut can be made from the under surface of the lid, so that no scar will be visible. It will be therefore advisable for any one to whom the personal appearance is a matter of importance to have these little bodies removed.

Inflammation of the Tear-Duct.

This is a frequent and an annoying affection. The tear-duct, it will be remembered, is a small channel which runs from the inner corner of the eye, next to the bridge of the nose, down the inside of the nose, and terminates in the nostril. Under ordinary circumstances, the moisture which is constantly secreted in the eye to keep

it moist and its movements free, escapes into this little channel and runs down into the nostril. It is a familiar observation that a crying fit often begins with a necessity for the repeated use of the handkerchief, since the increased flow of tears can for a time escape through the natural channel into the nose; it is only when the tears flow so profusely that they cannot find immediate exit through the natural channel that they overflow the lids.

Several causes may operate to close this channel into the nose. A disease of the bone of the nose, such as often results from constitutional syphilis, may obstruct the tear-duct. A more common cause, perhaps, is an inflammation resulting from exposure to cold.

Symptoms.—One of the first symptoms perceived by the patient is the flowing of the tears over the lid. Indeed, in many cases, this is the only symptom complained of, and this may have lasted for years before the patient seeks medical advice. But, sooner or later, there usually occurs a feeling of tenderness and pain in one side of the nose, near the angle of the eye; the escape of the tears over the lid is much increased. In a few days a decided swelling becomes apparent at the tender spot on the nose; the skin over the spot is red and sore. The swelling, redness and soreness may be so great that the patient and his friends believe that he has erysipelas. After a time there usually occurs a formation of matter at the swollen point; and unless properly and promptly treated, this matter breaks out through the skin, making a ragged and ugly opening, and one which it is extremely difficult to heal. This accident may be anticipated if the patient experiences a sudden sense of relief from the intense pain which he has experienced during the previous days.

In some cases the swelling extends from the side of the nose to the eyelids, which become so swollen and puffed that the eye cannot be opened.

If the disease be allowed to run its course without treatment, the matter which has formed finally discharges spontaneously, the inflammation subsides and the parts regain their natural appearance; but in most cases a small opening remains at the side of the wound. This communicates with the tear-duct and through it the tears constantly escape onto the cheek. The result of this constant irritation is a soreness and rawness of the skin—*eczema*.

Treatment.—During the early days of the attack, the treatment must consist in measures which shall promote the formation

of matter, since it is usually impossible to prevent matter from forming. The patient will experience most relief from the applications of hot fomentations, either as cloths wrung out of hot water or as linseed poultices. These should be changed frequently, say every two or three hours, in order to keep the inflamed skin moist and warm.

As soon as it becomes evident that matter has formed, an opening must be made to permit the pus to escape. This is far better than to wait until the matter breaks through the skin spontaneously, since the scar left by the knife will be smaller and less ragged than the one which will otherwise be produced. The surgeon who makes the opening will probably find it necessary to pass silver probes through the tear-duct in order to open the channel and keep it enlarged so that no further obstruction shall occur. In most cases considerable difficulty will be experienced in persuading this opening to heal, since the tears will escape constantly from the duct and keep the wound from healing.

Artificial Eyes.

Many causes make it necessary to remove the entire eyeball. It is unnecessary to specify these in detail, since the diseases are almost invariably of such serious nature as to require the services of a surgeon even before the operation becomes imperative. People should understand that it is often absolutely essential to the life as well as to the health of the patient that an eye be removed; and this, too, although the eye may look from the outside quite natural. It has been already stated that the presence of a foreign body, such as a particle of steel or stone in the eye, often endangers the sight of the other eye as well as of the one which has been injured. In such cases it is often advisable to remove the eye. There are also cases in which a cancer grows in the back part of the eye, without causing for a long time any unnatural appearances which can be seen from the outside. Under such circumstances, it is difficult for the friends as well as for the patient to understand the necessity for the removal of the eye; but in every case the advice and opinion of the eye surgeon should be adopted. A neglect to have such an eye removed will usually result not only in a painful disease of the eye,

but also in an extension of this disease to the brain, whereby death will be induced.

After an eye has been removed, it is advisable to substitute for it an artificial eye, both for the cosmetic effect and for the protection of the parts beneath. Artificial eyes consist of a thin layer of enamel, colored so as to imitate the natural eye. These are made so as to be very light, smooth and unirritating; they consist merely of a shell, which can be retained in position between the lids. In many cases the resemblance to the natural eye is so perfect that the artificial nature is not detected. The writer once heard a noted eye surgeon relate how he had dined at the same table for six months with a gentleman who wore an artificial eye, although the surgeon had never noticed the fact, nor even entertained any suspicion that such was the case. When informed that one of the gentleman's eyes was false, the surgeon was puzzled for a few moments to decide which was the artificial eye, so close was the resemblance. These are, however, exceptionally successful imitations. In many cases the artificial eye will not be recognized unless attention is directed to it; but in other instances, attention is attracted by the fact that the artificial eye does not move as the other one does. The amount of motion depends upon how much of the eye has been removed. In those cases in which only the front of the eye is taken away by the operation, the part which remains — the stump — is freely movable, because the muscles which move the eyeball are retained and grow fast in the stump. The artificial eye lies upon the stump, and is moved with it. If, however, so much of the eye must be removed that the part remaining is too small to carry the glass eye, the latter is held in position by the lids, and remains motionless. This is also the case, of course, when the entire eye is removed.

The advantages of an artificial eye are as follows: It conceals to a greater or less extent a deformity which is otherwise annoying to the patient and often distressing to the beholder; it is of great service in maintaining the natural position and form of the lids; it prevents the lashes from irritating the shrunken eye; it serves as a defense against foreign bodies which are apt otherwise to get into the eye and produce irritation; it is also of great benefit in keeping the openings of the tear-ducts in proper position, so that the tears can be conducted away into the nostril.

The disadvantage of artificial eyes consists in the irritation

which may be caused by the glass. This is sometimes sufficient to induce a chronic state of inflammation, which renders the eye somewhat tender and causes a slight discharge of mucus. This can usually be avoided if eyes of the best manufacture be obtained, since the irritation is dependent usually upon the roughness of the edges of the eye, which is induced by the corrosive action of the secretions. When properly made of the best materials, the eye resists this corrosive action and remains smooth and unirritating for a very long time.

Six or eight weeks should be permitted to elapse after the removal of the eye before an artificial eye is introduced. This interval is necessary in order to permit the wound to heal perfectly and all swelling and irritation to subside. If the eye be introduced too soon, there is apt to remain an irritation and discharge which proceeds from some part where the wound had not entirely healed, which is kept open by the eye.

The following directions are given at the Royal London Eye Hospital to those who have had the misfortune to lose an eye:

INSTRUCTIONS FOR PERSONS WEARING AN ARTIFICIAL EYE.

To Take the Eye Out.—The lower eyelid must be drawn downward with the middle finger of the left hand, and then with the right hand the end of a small bodkin must be put beneath the lower edge of the artificial eye, which must be raised gently forward over the lower eyelid, when it will readily drop out. At this time care must be taken that the eye does not fall on the ground or other hard place, as it is very brittle and may be easily broken by a fall.

To Put the Eye In.—Place the left hand flat upon the forehead with the fingers downward, and with the two middle fingers raise the upper eyelid toward the eyebrow; then with the right hand push the upper edge of the artificial eye beneath the upper eyelid, which may now be allowed to drop upon the eye. The eye must then be supported with the middle fingers of the left hand, while the lower eyelid is raised over the lower edge with the right hand.

The eye should be carefully washed every night upon removal, and may be allowed to lie during the night in water containing a

little baking soda; in this way the mucus and secretions which have adhered to the eye will be loosened, and may be readily detached in the morning.

DISEASES OF THE EAR.

The essential parts of the ear are three in number: the *external*, the *middle* and the *internal* ear. The external ear comprises the fleshy part of the organ situated outside of the skull and a channel hollowed out of the bone and running into the head, called the *auditory meatus*. The fleshy part of the ear seems to have no especial value in man except as a means of displaying ornaments. It represents in rudimentary form the somewhat elaborate and movable structures which are so useful to many of the lower animals. The human ear is also provided with muscles, which, however, are mere reminiscences of the muscles which were probably useful to man before he attained his present state of development; at any rate they are of no service in the human animal, though we meet, now and then, with a man who possesses a slight ability to move the ears.

The auditory meatus, the bony channel which leads from the exterior to the middle ear, is of considerable importance to the surgeon, since it becomes the seat of many difficulties which may impair the patient's comfort and health quite materially.

Foreign Bodies in the Ear.

Foreign substances of various kinds are frequently found in the external ear. These are especially often met with in children, who seem to have an irresistible desire to insert small articles into the orifice, presumably in order to find out what will become of them. The substances which in this way find entrance in the ear present a most remarkable variety; the favorite articles are beads, peas, beans and small nuts, but the monotony is varied by using pieces of wood, slate pencils, and indeed anything which comes first to hand when the desire for exploration seizes the child.

Explanation of "Ear" Plate.

FIGURE No. 604.

1, 2, 3. The cochlea laid open so as to show the lamina spiralis.
4, 5, 6. Rests of the walls of the cochlea.
7, 8. The vestibule.
9, 10. Superior canal.
11, 12. Inferior canal.
13. Exterior canal.
14, 14. Semicircular membranous canal.
15, 16, 17. Auditory nerve.

FIGURE No. 584.

1, 2. Origin and termination of the helix.
3. Antihelix.
4. Antitragus.
5. Tragus.
6. Lobule of the exterior part of the ear.
7. On the outer part of the pinna, with a dash extending to the fossa scaphoidea.
8. Concha.
9. Meatus auditorius externus.

FIGURE No. 605.

1. The ampulla of the superior semicircular canal.
2. Ampulla of the external semicircular canal
3. Ampulla of the posterior semicircular canal.
4. Superior semicircular membranous canal.
5. External membranous canal.
6. Posterior membranous canal.
7. Spaces between the membranous and bony semicircular canal, which are supposed to be filled with humor of Cotunnius.
8. Common conduit, formed by the union of the superior and posterior membranous canals.
9. Point where the external semicircular canal opens into the fovea semielliptica of the vestibule.
10. Fovea semi-elliptica, which contains:
11. The macula cribrosa of Breschid.
12. Fovea hemispherica, which contains also some:
13. Macula cribrosa.
14, 15, 16, 17, 18. Expansions of the auditory nerve to the semicircular canals, and also to the semi-elliptic and hemispherical foveæ.
19. Turns of the lamina spiralis.
20. Scala tympani.
21. Nervous extension of the posterior ampulla.
22. Scala vestibuli.
23. Modiolus.

FIGURE No. 602.

1. Thickness of the outer cover of the cochlea.
2, 2. Scala tympani, or superior layer of the lamina spiralis.
3, 3. Scala vestibuli, or inferior layer of the lamina spiralis.
4. Modiolus or columella of the cochlea.
5. Center of the infundibulum.
6. Foramen rotundum, communicating with the tympanum.
7. The thickness of the outer cover of the vestibule.
9. The fenestra ovalis.
10. Orifice of the aquæductus vestibuli.
11. Posterior semicircular canal.
12. Superior semicircular canal.
13. External semicircular canal.
14. Ampulla of the posterior canal.
15. Ampulla of the superior canal.
16. Common orifice of the posterior and superior semicircular canals.
17. Ampulla of the external canal.

FIGURE No. 609.

1. Natural size of the cochlea; in the other drawing all the parts are much enlarged.
2. Trunk of the auditory nerve.
3. Ramifications of its filaments in the vesicular zone.
5. Membranous labyrinth.
6. Osseous tissue of the modiolus.
7. Opening between the two scalæ.

FIGURE No. 612.

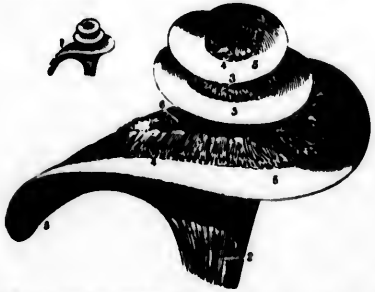
1, 1. Trunk of the auditory nerve.
2, 2. Filaments of the same in the osseous zone.
3, 3. Anastomosis in the vesicular zone.
4, 4. Membranous labyrinth.
5, 5. Fold in its external edge.
6, 6. Axis of the cochlea.
7. The modiolus.
8, 8. External osseous walls of the cochlea.
9, 9. Osseous laminæ of the lamina spiralis.
10. Scala vestibuli.
12. Columella of the cochlea.
13. Infundibulum.
14. A bristle passed through the course of the lamina spiralis.

604.—A view of the Labyrinth in an inverted position, laid open so as to show the distribution of the nerves.

584.—A view of the Left Ear in its natural state.

605.—A highly-magnified view of the external face of the Bony Labyrinth of the left side, opened so as to expose the Vestibule and its contents, etc.

602.—A view of the Labyrinth of the left side laid open in its whole extent, so as to show its structure—magnified.



609.—An imaginary figure or plan of the Cochlea.

612.—A vertical section of the Cochlea, highly magnified, to show the arrangement and connection of its parts

EAR.

In many cases the presence of this body in the ear is not discovered for some time; not, indeed, until the child's deafness calls attention to the existence of something wrong in the ear. In other cases the foreign body excites an irritation, which causes the child to complain of pain, and often induces an inflammation, accompanied by a "running" from the ear. At other times this foreign body excites no immediate difficulty, becomes incrusted with wax, and remains in the ear for years.

On the other hand, parents and friends are often mistaken in supposing that some foreign substance has lodged in the ear. If the child complain of a "buzzing" in the ear, the friends are often disposed to believe that some foreign substance has found its way into the channel, and refuse to be convinced to the contrary. If this buzzing be very loud, they usually think at once of some insect as the probable cause of it. Now the fact is that a buzzing or roaring sound in the ear is a frequent symptom of many affections, some of which involve the ear only, while others have nothing to do with this organ. There are various conditions of the system in which the patient fancies he hears a roaring sound continually—a fact which should be borne in mind by those who are incapable of imagining any other cause for a buzzing in the ear than the presence of a fly.

Much injury has been done by rough and ignorant efforts to extract supposed foreign bodies from the ear when none actually existed; for at the extremity of the bony channel there are situated some of the delicate organs which are necessary for perfect hearing, and the attempt to remove foreign bodies from the bony channel may easily injure some of these parts, and even destroy the hearing entirely.

Treatment.—If the foreign body can be distinctly seen from the outside, a gentle attempt to extract it may be made by using a pair of fine pincers (forceps). Great care should be used not to injure the skin of the part by clumsy use of the instrument.

If no foreign substance can be seen in the ear, no attempt to extract it with instruments should be made except by a surgeon. In most cases the body can be removed by syringing the ear with warm water. In order to accomplish this, a large syringe, holding say six or eight ounces, should be filled with lukewarm water; this is held in one hand, the nozzle of the instrument being placed against the upper part of the opening of the ear, so that the stream

of water shall flow along the roof of the channel and be permitted to return along the lower part. The operation will be facilitated by raising the fleshy part of the external ear. To accomplish this, three fingers of the left hand may be steadied against the patient's head, while the upper part of the rim of the ear is grasped between the thumb and finger of the same hand. The ear is then gently raised and pulled slightly backward, whereby the channel of the ear is rendered somewhat straighter, and the escape of a foreign body is facilitated. The water should be forced into the ear with only a gentle pressure on the piston; if too much force be used the delicate structures of the internal ear may be injured.

The syringing may be continued five or ten minutes; if at the end of that time no foreign substance has been removed, the effort may be discontinued and repeated again several hours later. More than this it is not advisable for a non-professional hand to attempt, since the removal of foreign bodies from the ear sometimes taxes the skill of the surgeon. After syringing, the ear should be dried with a towel and a little plug of cotton placed in the opening for a few hours.

The syringe selected should work easily and accurately, so that no air bubbles need be forced into the ear; if the piston be loose, so that air enters with the water, the operation is apt to be extremely unpleasant to the patient.

The patient's clothing should be protected by towels placed on the shoulder and tucked in behind the collar; a basin should be held close to the ear and touching the head so that the water may run back into the vessel and not escape down the patient's neck. The basin which is used for this purpose should be a separate one from that which contains the water to be injected, so that this water may remain clean and not become soiled with the matters which are washed out of the ear.

Wax in the Ear.

One of the commonest causes of deafness is an accumulation of wax in the bony chan..el of the ear. The wax which is naturally formed in the ear, is ordinarily removed sufficiently by the ordinary attention of the patient to his toilet. It is quite unnecessary for people to use "ear spoons," hairpins and the like in order to remove

the wax from the ear; for so long as the parts remain healthy, the wax will be properly removed in the ordinary course of nature without any care on the part of the patient. These ear spoons, in fact, frequently favor the accumulation of wax in the ear by irritating the surface so that the wax formed is no longer soft and natural, but becomes thick and hard — a condition which favors its retention and accumulation in the ear.

The conditions which cause the wax to change its quality so as to remain and accumulate in the ear, are not all known. Anything which causes a prolonged irritation of the skin of these parts, seems to cause the wax to harden and thus to prevent its escape.

Symptoms.— The presence of wax in the ear usually induces a gradual impairment of hearing. In most cases there occurs after some time a persistent buzzing or roaring noise in the ear, which may be so severe as to disturb the patient's sleep. Yet, if there be no other unnatural condition present than the mere accumulation of wax, there will probably be *no pain*. In this way we may distinguish this affection from several others which are accompanied by deafness and roaring in the ears, in which pain is a constant and prominent symptom.

The extent to which wax may accumulate in the ear in some cases, is quite remarkable; a hard black mass is found filling up the entire ear quite to the surface. Cases are known in which a patient has supposed himself permanently deaf, having suffered a gradual loss of hearing years previously, yet the difficulty has been found to be merely an accumulation of wax in the ear, the removal of which restored the person's hearing perfectly.

Treatment.— The treatment for an accumulation of wax in the ear is essentially the same as that already directed for the removal of a foreign body. The ear must be gently syringed with hot water, the details previously mentioned being most scrupulously observed. It will be advisable to add to the water a little borax or baking soda, in order to soften the wax and thus render its escape easier. We may employ the following mixture:

Borax, - - - - -	Half an ounce.
Water, - - - - -	One pint.

This should be heated so that it feels somewhat unpleasantly warm to the patient at first, and should be injected into the ear in such a

way as to permit the escape of the water and the wax. If the first syringing be unsuccessful, the process may be repeated once or twice at intervals of several hours.

If the accumulated wax be in the shape of a plug, as it often is, it will probably be loosened by the syringing and be forced to the orifice of the ear. As this opening is somewhat smaller than the interior of the channel, it may be necessary to extract the plug by means of a forceps. This should be done carefully, without forgetting the possibility of injuring the parts by the instrument. In other cases the wax accumulates at the inner end of the channel, on the surface of the delicate membrane which separates the external from the internal ear. In this case the removal of the wax will be a somewhat more difficult and tedious matter, which can scarcely be accomplished without the assistance of a surgeon.

After the wax has been removed the surface of the skin in the auditory meatus will be for some days quite sensitive and tender; it is advisable, therefore, to insert into the canal a small plug of cotton which has been well smeared with vaseline. This may be worn for several days, being changed for fresh cotton each day. A patient who puts cotton into the ear should not forget to remove it; sometimes these accumulations of wax are found to have been started by a plug of cotton which had been inserted and allowed to remain in the ear by a careless person.

Running from the Ear.

At the end of the bony channel which constitutes the outer part of the ear, there is placed a delicate curtain or membrane, which hangs across this bony channel and closes it completely. This is the *membrane of the drum of the ear*. On the inner side of this curtain is a cavity hollowed out in one of the bones of the skull, in which some of the most delicate structures concerned in the act of hearing are located. This bony cavity is called the "middle ear," or the *drum of the ear*. This cavity is lined with mucous membrane and communicates by a bony channel with the throat. This bony channel, called the *eustachian tube*, serves as a means for establishing a communication of air between the throat and the middle ear. It is extremely important that this channel remain

open and pervious to air, since if it become closed, the hearing is apt to be impaired. The opening of the eustachian tube into the throat remains closed most of the time, but is opened by the act of swallowing. If air be forced into the throat, therefore, at the same time that the patient swallows, it will find its way into the eustachian tube, then through this into the middle ear. Advantage is taken of this fact in treating diseases of the middle ear; by forcing the vapors of medicines into the nose while the patient is in the act of swallowing, we may cause these vapors to pass directly into the drum of the ear.

The channel which extends between the throat and the middle ear—the eustachian tube—is important not only because of its value in maintaining the hearing, but also in enabling us to understand some of the diseased conditions which are found in the middle ear, for an inflammation which affects the throat frequently extends through this tube into the middle ear. If the inflammation in the throat be a severe and violent one, such as occurs in scarlet fever and diphtheria, the inflammation in the ear will probably be also a severe one, resulting in the production of considerable matter. If the inflammation in the throat be merely a slow and mild affection—a "catarrh" of the throat—the process which is originated by it in the ear will probably also be a mild affection, which is known by physicians as "catarrh of the middle ear."

A "running from the ear" is almost always caused by an inflammation in the drum of the ear which has resulted in the production of matter. Now, the drum of the ear is a very small cavity, scarcely large enough to hold a bean; hence it takes but a very small amount of matter to fill this cavity completely. So soon as the drum of the ear is full of matter, considerable pressure is exerted upon the nervous structures situated in the membrane which lines the drum; for since the matter is confined within the cavity of the drum, it can find room only by pressure upon the walls of that cavity. The result of this pressure is intense pain. This pain becomes agonizing so that the patient cannot sleep nor divert his thoughts for a moment from the torture which he experiences in his ear. After several hours or days of agony, the person experiences sudden relief; the pain ceases almost or quite entirely, and at the same moment there is a gush of matter from the ear. This sudden relief is occasioned by the bursting of the delicate membrane—*the membrane of the drum*—which has

hitherto been sufficiently strong to keep the matter confined within the drum. The opening in the membrane may vary in size and shape, but suffices to permit a free discharge of the matter which would otherwise accumulate in the cavity of the ear. This matter is formed continuously in the drum of the ear and escapes constantly through the opening in the membrane of the drum into the external ear, and finally onto the neck. A running from the ear, therefore, is usually a sign that there has been an inflammation in the drum of the ear which has resulted in the escape of matter through the bursting of the head of the drum.

Inflammation of the Drum of the Ear.

This affection is especially frequent in children, particularly among scrofulous persons; it is also a frequent sequel of scarlet fever, measles and diphtheria.

Symptoms.—The symptoms indicating the beginning of the affection vary somewhat with the cause of the inflammation. In those cases in which the affection follows scarlet fever and measles, the symptoms which mark the beginning of it may be less severe and pronounced than is otherwise the case.

In many cases inflammation of the drum of the ear begins without apparent cause. In some it results apparently from exposure to cold. It is especially frequent after a cold wind has been allowed to blow directly upon the ear, or after the individual has been sitting in a draught.

The first manifestation is a slight sense of deafness and uneasiness in the ear. This is often followed by a decided chill, after which the patient becomes quite feverish. Headache, a thick coating on the tongue, etc., the usual accompaniments of fever, may be present. Meanwhile the pain in the ear becomes more and more severe, until it is finally excruciating. If the patient be a child, he cries constantly, complains of the ear, cannot eat or sleep. If it occur in an adult, the individual is compelled to give up his occupation entirely, and soon shows by his pallor and by the pinched expression of his face that his suffering is extreme. The affected ear is for the time being perfectly deaf.

This condition lasts until the head of the drum gives way from the pressure of the matter confined behind it. This is a moment

of supreme relief to the patient. The pain which has rendered his life a torment for several days suddenly subsides. In most cases the patient drops into a refreshing slumber within a short time after the pain has been thus relieved.

The matter which gushes from the ear at the time of the bursting of the membrane is extremely thick and yellowish. After a day or two it may become somewhat thinner and less profuse, but it is apt to persist for weeks. Indeed, if neglected and allowed to go without treatment, this running from the ear may annoy the patient for years. In fact, many individuals become so accustomed to it that they cease to think about it at all. It is not uncommon to find persons who have had a running from the ear since childhood, and who have never sought advice or treatment.

It is one of the curious popular fancies that a discharge from the ear, which has already lasted for some time, is supposed to be quite necessary to the person's health. Any suggestion by the physician to the effect that measures should be taken to stop a discharge from the ear in a child is often met by the alarmed remonstrance of the parents, who fear all sorts of imaginary evil from what they term " driving in " the discharge.

It must be stated most emphatically that such a notion is quite erroneous and without foundation of any sort. It is indeed highly desirable that a discharge from the ear should be stopped as early as possible; for, if no measures are taken to relieve the condition which causes this discharge, loss of hearing in the affected ear is certain to occur. If, therefore, there be any chance of saving the hearing, it will be necessary to adopt the most energetic measures at the earliest possible moment for stopping the discharge. It might be mentioned as an additional inducement to cure this difficulty, that a long-continued discharge is sure to cause rawness and soreness of the skin in the auditory meatus, as well as on the adjacent parts of the face and neck.

Treatment.—Whenever the symptoms above described occur in an adult, an inflammation of the drum of the ear is probably present. In children it is sometimes difficult for a non-professional person to detect the existence of this affection until the matter breaks out of the ear, for there are no signs on the outside of the head or ear by which the formation of matter in the drum of the ear can be detected. Moreover, the symptoms are sometimes so severe as to direct attention to the brain rather than to the ear, for

convulsions and delirium may occur. In general it may be said that if the pain be of a *throbbing* character, the affection is probably in the middle ear.

At times, this inflammation causes the death of the patient by spreading to the membranes which cover the brain, for there is only a very thin shell of bone between the cavity of the middle ear and the cavity in which the brain rests.

Treatment.—An inflammation in the drum of the ear should be treated promptly and energetically. In former days it was the custom to apply three or four leeches around the external ear, especially over the bony prominence just behind the ear. In these latter days leeches are not so fashionable; but surgeons frequently *scarify* this part of the skin — that is, make a number of fine cuts so as to permit a flow of blood. This should not, however, be undertaken by any one except the surgeon.

The remedies which may be adopted in the household are, first, hot fomentations to the ear and its immediate vicinity. Cloths should be saturated with water as hot as the patient can bear and applied to the ear; these should be covered with oiled silk or rubber sheeting, so as to keep the cloth warm, and the fomentation should be changed frequently — even every half hour if necessary — in order to keep the parts constantly moist and warm.

The comfort of the patient will be further promoted by frequent injections of hot water into the ear. These will be best made by the use of a fountain syringe. Numerous forms of fountain syringes — most of them made of rubber — are to be found in the market. If none of these can be procured, a fountain syringe can be extemporized by hanging a small vessel containing the hot water two or three feet above the patient's head; a rubber tube is then arranged as a syphon so as to conduct the water to the orifice of the ear. A stream of hot water may be allowed to flow gently into the ear for fifteen minutes at a time. This injection may be repeated every hour, or even less. After the injection the following mixture may be employed:

Laudanum, - - - - - -	One ounce.
Glycerine, - - - - - -	One ounce.
Water, - - - - - - -	Two ounces.

A teaspoonful or two of this may be poured into the ear, after which a small plug of cotton is applied so as to retain the liquid.

If the patient be feverish, a hot bath will be beneficial. In any case, care should be taken to secure free evacuation of the bowels, for which purpose a teaspoonful of the citrate of magnesia may be taken.

It frequently becomes necessary to administer opium in order to quiet the pain. If the patient be a child over five years of age, a teaspoonful of paregoric may be given. This should be repeated in one or two hours if the pain is still severe. In this case, as in every other, it must not be forgotten that children are especially susceptible to the action of opium in any form, and that great care must be observed in administering it to them. If these measures do not give relief, the following ointment may be applied to the skin over the bony prominence just behind the ear:

Veratria, - - - - - -	Fifteen grains.
Vaseline, - - - - - -	One ounce.

It is sometimes possible to check the inflammation by these means, so that the affection subsides without causing the membrane of the drum of the ear to give way; but in the majority of cases the inflammation results in the production of so much matter that this membrane becomes softened and gives way.

After this has happened, injections of warm water into the ear should be made five or six times a day, or even oftener if necessary to keep the parts clean. After the first two or three days, we may employ to advantage the following injection, which will tend to diminish the production of matter, as well as to increase the comfort of the patient:

Listerine, - - - - - - -	One ounce.
Glycerine, - - - - - - -	Two ounces.
Water, - - - - - - -	Three ounces.

After the ear has been washed out with hot water, a tablespoonful of this may be injected slowly into the cavity. This injection may be repeated three or four times a day.

Treatment of "Running from the Ear."—After the ear has discharged for many months or years, it is often a troublesome and difficult undertaking to arrest the formation of matter completely. In many cases there is a growth of "proud flesh" in the ear, which keeps up a constant discharge. If this be the case, the matter must be referred to a competent surgeon, since the

removal of this proud flesh is an undertaking requiring skill and care. In many other cases, however, it is possible to stop the discharge by simple injections into the ear. It will be, therefore, advisable to try the effect of these simple measures first.

The first item of treatment is perfect *cleanliness*. The ear must be syringed out as often as is necessary to keep the parts clean. This may be done with simple warm water.

Four or five times a day there may be used the following injection:

Listerine, - - - - -	One ounce.
Tannic acid, - - - - -	Three drachms.
Water, - - - - -	Five ounces.

An ounce of this may be used for an injection; the solution should be thrown into the ear very gently and as much liquid as possible allowed to remain in the cavity of the ear. After this has been done, a piece of cotton smeared with vaseline may be inserted into the cavity of the external meatus.

In many cases the skin around the opening of the ear becomes raw and sore; if the ear be kept perfectly clean, this soreness will probably disappear spontaneously. In any case the healing of the skin may be hastened by applying the following ointment:

Diachylon ointment, - - - -	One ounce.
Vaseline, - - - - - -	One ounce.

Mix.

This treatment should be faithfully pursued for a month or six weeks, even though the discharge may cease somewhat earlier than this. If these measures fail, it will probably be necessary to call in the services of a surgeon.

The effects of an inflammation of the ear resulting in the discharge of matter vary in different cases. Sometimes the discharge ceases, under appropriate treatment, in a few weeks, and the individual retains a very fair degree of hearing. Yet in these cases, as well as in others less favorable, the opening in the membrane of the drum of the ear persists; it is, indeed, rare that this opening heals spontaneously, or can even be made to heal under treatment. This fact is mentioned because the idea prevails that if the "drum of the ear"—that is the *membrane* of the drum of the ear—be broken, the hearing is irreparably lost. This is an erroneous idea, since many patients who have suffered in this way hear quite

acutely. The loss of hearing seems to depend rather upon the damage that has been done within the cavity of the middle ear than upon the size of the opening in the membrane.

Various operations have been devised for closing the opening in the membrane of the drum; these have been in some instances successful. In other cases attempts have been made to substitute artificial membranes to replace the natural one where this has been destroyed. In some instances a fair degree of success has been obtained, and the hearing of patients has been decidedly improved, but such cases form a small minority.

In the majority of instances in which the hearing has been lost in consequence of an inflammation resulting in a running from the ear, there is no hope of improvement. The running can be stopped, but the damage to the hearing apparatus is beyond repair.

Injuries to the Drum of the Ear.

The drum of the ear lies so deep in the skull, and is consequently so well protected by the bones of the head, that it is rarely affected directly by injuries received to the head. In many cases the external ear and the auditory meatus are damaged by a blow, without affecting the parts essential to the perception of sound, and therefore without affecting the hearing.

Yet there are various accidents and injuries whereby the middle ear — the "drum of the ear" — is damaged. In some cases a sharp instrument happens to enter the bony channel leading into the middle ear; it may penetrate the membrane of the drum and destroy some of the structures which lie behind this delicate curtain.

It sometimes happens that pins or needles are introduced into the ear by children and work their way into the drum of the ear. Instances are known also in which a "box on the ear" has ruptured the membrane of the drum — an effect due, of course, to the violent compression of the air in the external ear. It is reported that a similar sad accident has several times occurred in consequence of a rapturous kiss on the ear. The possibility of such disastrous results should be borne in mind by parents, school teachers and lovers.

Catarrh of the Middle Ear.

This is one of the commonest affections of the ear, especially in the United States, where catarrh of the throat and nose is so prevalent. It will be remembered that there is a direct communication between the throat and the middle ear through the *eustachian tube*. It therefore can be readily understood that if the throat and nose have been long subject to catarrh, this affection may spread along the eustachian tube, and finally reach the middle ear. Such is, in fact, the case; a person who suffers much from catarrh of the throat need not be surprised at noticing, sooner or later, some impairment of the hearing.

Symptoms.—The two most prominent symptoms of this affection are *deafness* and *ringing in the ears*. Sometimes a dull pain is felt occasionally, but this is by no means a constant symptom.

Ringing in the ears and deafness are also symptoms accompanying the accumulation of wax in the external ear; hence their presence may indicate merely this harmless affection, and not the more serious one consisting of a catarrh in the middle ear.

Treatment.—This is one of the affections in which the skill of the surgeon is absolutely indispensable in effecting improvement; no benefit can be expected from remedies which can be applied by an unskilled hand.

Nervous Deafness.

This term was formerly very loosely applied; under it were included the affection just described, catarrh of the middle ear, as well as several others affecting the inner portion of the apparatus of hearing. There are, however, certain conditions which may be properly described as "nervous deafness"—that is, deafness due to a disease of the nervous structures essential to hearing.

The perception of a sound involves a somewhat complicated process. As it ordinarily occurs, this process is as follows: The vibrations of the air cause a tremor of the curtain which is placed

across the inner end of the bony channel of the external ear; there lies in contact with the inner surface of this membrane a small bone shaped like a hammer; this is the first of a chain consisting of three small bones lying in such close contact that a slight movement of one is communicated to the other. The third bone of this chain lies in contact with another membrane, which closes a bony channel filled with fluid. In this fluid—arranged in a somewhat peculiar way—rest the ends of the nerves of hearing. A vibration therefore which sets the membrane of the drum of the ear in a tremor, is transmitted along these bones to the membrane closing the inner bony canal, and through this membrane it is communicated to the liquid in which the nerve-ends lie. The effect produced upon these nerve ends by the little wave into which this liquid is thrown, causes in the individual the perception known as hearing. In order that this effect shall cause an impression upon the consciousness, it must be transmitted along the nerves of hearing to the brain.

It is evident, therefore, that there are many opportunities for derangements of an apparatus so complicated as this. Some of these have been already mentioned. A catarrh of the middle ear, for instance, causes such a thickening of the membrane of the drum that it does not vibrate so readily, and hence does not transmit sound to the nervous apparatus. An accumulation of wax in the external ear causes deafness by preventing the air from reaching the membrane of the drum. There are also diseases which affect the nervous part of the apparatus and cause deafness, although the drum of the ear and all its belongings may be perfectly healthy and in natural condition. Such cases are, therefore, termed nervous deafness.

Such instances usually occur as the result of diseases affecting the brain and the membranes which cover it. Thus deafness is frequently the result of "inflammation of the brain" and of *cerebro-spinal meningitis*. It occurs, too, as a sequel to scarlet fever, and to other infectious diseases.

Symptoms.—Nervous deafness can be recognized as such only by the absence of all symptoms which would indicate a disease of the other parts of the ear. When it is found, upon close examination, that the membrane of the drum of the ear, as well as this cavity itself, and the various channels leading to it are all in a per-

fectly natural condition, it may be inferred that whatever deafness exists is due to disease of the nerves concerned in hearing. This suspicion is in most cases confirmed by the history of the patient, since he has usually suffered from brain fever or other severe disease which is known to occasion destruction of the sense of hearing.

Such an opinion can, of course, be established only by a surgeon; yet the non-professional observer can usually form a pretty accurate idea of the nature of the deafness in the following simple way. The individual is, we will suppose, quite deaf in one or both ears — usually in both, if the deafness be of nervous origin. Now, let a tuning fork be struck against the table, and its handle held to the teeth of the individual, or placed against the head just behind the ear. If the cause of the deafness be located elsewhere than in the nervous part of the apparatus, the individual will now hear far more distinctly than when the tuning fork is merely held *near* the ear without *touching* it. If, on the contrary, the difficulty be located in the nervous apparatus, the patient will not observe any marked difference when the tuning fork is held in contact with the head.

The reason for this is, of course, evident. The nerves are the organs absolutely essential to hearing; the bony part of the ear and the membrane of the drum are valuable merely to conduct the waves of air so that they shall affect these nerves. Now, vibrations are also well conducted by the bones of the head, and therefore by the teeth; hence, if the individual hears decidedly better when the tuning fork is placed against the bones of the head than he did before, it is evident that the fault is in that part of the hearing apparatus whereby the vibrations are transmitted to the nerves, and not in these structures themselves; if, on the other hand, the patient can not hear distinctly when the tuning fork is held to the teeth, it is evident that the fault must lie, not in the conducting apparatus, but in the nerves themselves.

Treatment. — When it is definitely decided that the deafness results from disease of the nerve structures of long standing, all treatment may be abandoned; no means are known whereby these diseased nerves can be restored to their natural condition. Almost all the drugs known to the profession, and all other means, including electricity, have been employed in vain to remedy this unfortunate condition.

Yet it should never be assumed that this is actually the cause of the deafness until no further possibility of doubt remains; if the disease be located in any other part of the ear, there is always hope that faithful and persistent employment of proper remedies may at least improve, if not entirely relieve the deafness.

Earache.

Pain in the ear may be caused by any one of several affections. It is important that the differences in the cause be recognized, since the treatment must vary accordingly.

The most frequent cause of earache in *children* is an *inflammation* of the *middle ear*. The symptoms of this affection have been already described and the treatment mentioned. It is important that such a case be not passed over as "earache," and be treated simply by pouring laudanum into the ear, and by similar measures which are intended simply to relieve pain; for the pain is a symptom of a serious affection which must be relieved, so far as possible, by energetic treatment. Let it be remembered, therefore, that every case of earache in children should be most carefully examined to ascertain the cause, and in most cases requires the services of a surgeon.

A second frequent cause of earache, especially in adults, proceeds from decayed teeth. If this be the case, there will usually be evidence of the probable nature of the pain in the condition of the teeth. If there be any doubt about it, a few light blows upon the teeth will usually serve to reveal the existence of tenderness, and probably of decay.

In such cases the pain in the ear will probably never be entirely relieved until the teeth are properly attended to. Yet it should be said by way of warning that a slight tenderness of the teeth is apt to accompany earache, when the latter is of simply neuralgic character, even though there be no decay of the teeth. In such cases pressure upon the teeth causes slight pain, but not the acute and intense pain which occurs if the teeth be decayed.

A third variety of earache is a *neuralgia* affecting the nerves of the side of the face. This is felt chiefly in the ear, but usually spreads over the side of the head and over the cheek and neck.

Treatment.—In undertaking to treat an earache, the first item is, of course, to ascertain the cause of the pain. If the pain be caused by an inflammation in the middle ear, it will usually be of a throbbing character and accompanied by deafness, and perhaps by delirium and convulsions. The treatment for this affection has been already outlined.

If the pain proceed from decayed teeth, pressure upon the teeth will usually indicate its origin; in this case the measures to be used consist in attention to the teeth.

If the pain be of purely neuralgic character, the patient's general condition will usually indicate a depraved state of health. In these cases it is desirable to use tonics, and to apply sedative ointments to the ear. For this purpose we may give the following:

Quinine, - - - - -	Thirty grains.
Extract of nux vomica, - -	Five grains.

Mix, and make twenty pills. Take one before meals.

An ointment may be made after the following prescription:

Veratria, - - - - -	Fifteen grains.
Vaseline, - - - - -	One ounce.

This may be applied to the skin around the ear. In some cases relief can be obtained by penciling the surface with the *tincture of aconite*.

If this condition be obstinate, and if the pain recur at short intervals, a cure can be effected only by the strictest attention to all the details which can improve the patient's general condition.

Polyp of the Ear.

A polyp is a little fleshy tumor which grows in the bony channel of the external ear, usually as the result of a long-continued discharge from the ear. It generally projects from the bottom of the channel, where it may be seen as a bright red mass, partially obstructing the passage to the membrane of the drum. This may become so large as to fill the entire channel of the meatus, and even to project from the orifice of the ear.

When there is an opening in the membrane of the drum, proud flesh sometimes forms behind this membrane and projects through

it into the auditory meatus, causing an appearance similar to that of a polyp.

Symptoms.— The polyp may exist in the ear a long time without causing any symptoms which attract the attention of the patient. If it becomes so large as to obstruct the entrance into the ear, it is apt to occasion a certain amount of deafness. If it grow from the middle ear through an opening in the membrane of the drum, there is frequently a purulent discharge from the ear.

Treatment.— A polyp must be removed entirely by a surgical operation; no medicines taken internally nor applied directly to the growth will affect it. It is, therefore, necessary to employ the services of a surgeon.

Granulations in the Ear.

Whenever a wounded surface heals, little red bodies are formed called *granulations*. After there has been for some time an irritating discharge from the ear, the channel of the ear is apt to become more or less filled with such granulations. These occasion a constant discharge of matter, and may become so large as to block up the passage of the ear and thus impair the hearing. In the latter case they are called *polyps*. So long as they merely rest upon the floor of the meatus they may escape notice unless a special examination of the ear is made. By pulling the external ear gently upward and backward and looking into the channel, we can observe small red bodies, more or less obscured by matter, usually at the back part of the opening.

Treatment.— The ear should be syringed out with warm water in the manner already described; after this a camel's hair brush should be dipped in a solution of lunar caustic (forty grains) in water (one ounce). With this the granulations should be brushed every day, the syringing being regularly performed.

Eczema of the Ear.

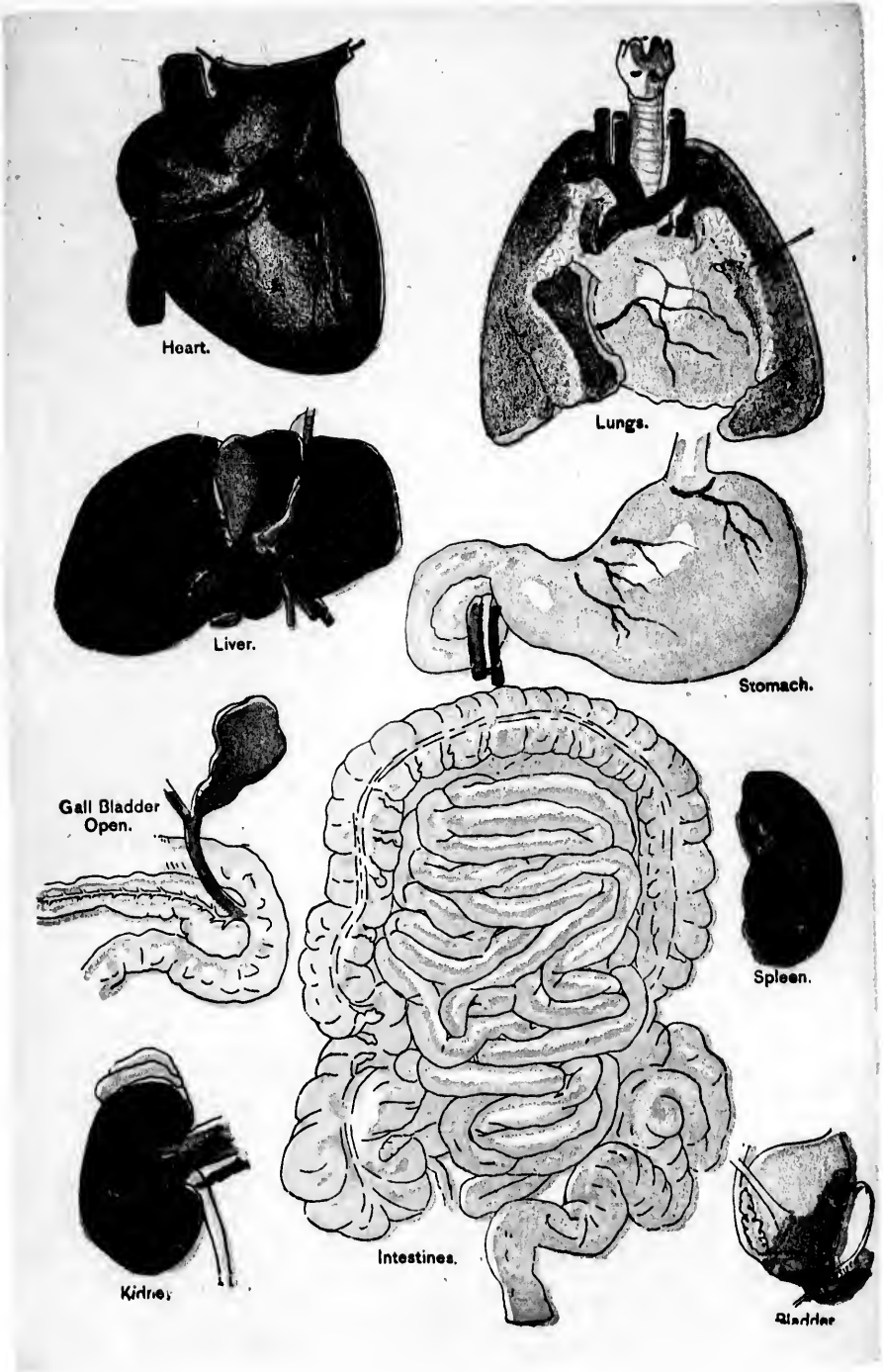
The external ear sometimes becomes the seat of an inflammation which is quite similar in all respects to inflammation of the skin in other parts of the body, and is hence called *eczema*. If

this be allowed to continue, the lobe of the ear frequently becomes thickened; indeed, the skin lining the meatus may become so thick as to interfere seriously with hearing.

Treatment.—The affection is frequently consequent upon a running from the ear; in this case the latter difficulty must be relieved before we can hope to permanently cure the inflammation of the skin on the outside of the ear. After this has been accomplished, we may apply the remedies which have been recommended in discussing "eczema."

quently becomes
become so thick

sequent upon a
ficulty must be
he inflammation
nas been accom-
n recommended


Heart.
Lungs.
Liver.
Stomach.
Gall Bladder
Open.
Spleen.
Intestines.
Kidney.
Bladder

Stomach.

Spleen.

Bladder

SURGICAL DISEASES.

Boil.—(Furunole.)

The appearance and symptoms of this common affection are so familiar as to require no description. A boil consists of an inflammation of the true skin, resulting in a swelling from the deposit of material in the skin. In most cases the central part of the boil loses its vitality and turns gray. This dead tissue constitutes the so-called "core" of the boil. When this core is detached and removed the inflammation ordinarily subsides spontaneously.

The causes which produce boils are not very definitely ascertained. In many cases the patient is in poor health and suffers from a succession of boils until his general health is improved. In other cases there seems to be no discoverable cause for the trouble, since boils occur in individuals who enjoy apparently perfect health.

The boil is usually developed with a considerable degree of constitutional disturbance. In most cases the patient feels ill, is somewhat feverish and may even have chilly sensations. In other instances the boil develops slowly and without much pain.

Treatment.—At the first indication of the development of the boil, its formation should be hastened by the application of hot flaxseed poultices, which are to be frequently renewed. These poultices will diminish the pain and thus increase the comfort of the patient. So soon as matter is formed, a free incision should be made so as to open the boil thoroughly and permit the escape of the core and whatever matter may have been produced. This will give the patient extreme relief, and should not be postponed by the timid fears which are so often manifested. After it has been opened, the boil should be poulticed for two or three days until the discharge becomes less profuse. After this it may be dressed with

vaseline or carbolic acid ointment spread upon soft cloth. It is far better to open the boil than to permit it to burst and discharge spontaneously; first, because the patient secures relief much sooner; and second, because the scar which remains will be far less unsightly.

Carbuncle.

A carbuncle is generally merely an aggravated boil or a collection of boils around the same spot. It is, therefore, much larger, and usually contains two or more "cores." It may attain the size of a hen's egg or even larger, and may cause a diffuse swelling of the skin around it for several inches. After increasing in size for some days it softens at several points, which become of a dull red or bluish color. If not interfered with, the skin breaks at these points, permitting a thin reddish or yellowish discharge to escape. If pressure be made, thick unhealthy-looking matter escapes. These openings enlarge and spread toward each other, and finally meet, making a large raw surface.

Carbuncles seem to proceed from essentially the same causes as boils. The patient is usually in a debilitated condition, and requires tonics and careful attention to the general health.

The carbuncle seems to exert a very depressing effect upon the patient's strength; if it be large, and especially if situated upon the head or neck, it is liable to be attended with severe fever and perhaps delirium. Such cases often result fatally.

Treatment.—The first object of treatment in every case is to support the patient's strength. For this purpose he should take tonics, alcoholic stimulants and a good diet. The following prescription may be given:

Quinine, - - - - -	One drachm.
Tincture of the chloride of iron, -	One ounce.
Tincture of nux vomica, - -	One ounce.
Water, - - - - - -	Two ounces.

Mix, and let a teaspoonful be taken in a wineglassful of water four times a day.

The patient should be liberally supplied with whisky or brandy, which can best be administered as egg-nog. This can be taken as the patient is inclined.

Care must be taken that the patient eats sufficient food. The appetite is usually much impaired, and unless especial attention be given to this point, he will suffer further increase of his weakness by neglect to take a sufficient quantity of nourishment. It is well to prepare bland and unirritating food, such as eggs, milk, soups, and the like.

In some cases the pain is so intense as to require the administration of opium; fifteen drops of laudanum may be taken in water three or four times a day, if necessary to relieve the pain.

Locally, the treatment consists in the application of hot poultices to promote the formation of matter and the separation of the cores. So soon as this production of matter has taken place, free incisions must be made, after which gentle pressure may be applied to the tumor to promote the escape of the matter. Poultices should then be again applied for several days until the dead skin and the matter which surrounds it have been thrown off. In some instances it becomes necessary to repeat the incisions.

After the discharge has ceased to a great extent, the wound may be dressed with vaseline.

Aside from the affection which is ordinarily meant by the term carbuncle, there is an infectious disease which has also been designated by that name. This disease affects cattle primarily, causing the destruction of immense numbers of cows, sheep and horses in many European districts. It may also be so communicated to man, to whom it is frequently a fatal affection. This disease is variously known as *anthrax*, *malignant pustule*, *wool-sorters' disease*, and *charbon*.

The disease is contracted by men whose occupation compels them to come into intimate contact with living or dead cattle; for the germs of the disease retain their vitality after the death of the animal, and may be transported around the world in the hides, or the hair, or the flesh of animals which have died of the disease. So frequent is the disease among the workmen engaged in handling wool that it is commonly designated in England as "wool-sorters' disease." It has also been communicated to workmen who were engaged in repairing furniture stuffed with horse-hair, even after that furniture had been in use for many years. It can, of course, and has been communicated to those who partake of the flesh of animals which have died of this affection.

This disease is very common in certain districts of Europe,

especially in France, Germany and Russia. It is known to exist in the United States, though to what extent is as yet unknown, since veterinary surgeons here have not scrutinized cattle with especial reference to this disease.

The affection begins usually with the formation of a small dark-red blister, which develops in a few hours to a lump of considerable size, containing a little matter or bloody fluid. In a short time the animal gives evidence of severe constitutional disturbance. It becomes weak and feverish. The appetite is lost, and within three or four days death occurs. In most cases the pustule, through which the matter was introduced into the animal, enlarges extremely, so as to produce an enormous swelling of the skin and tissues beneath it.

The carcasses of such animals contain the contagious principle; those who handle the bodies or the hides run the risk of contracting the affection, if they happen to have any cuts or abrasions on the skin. The soil over which such animals have grazed or on which their bodies have lain, becomes saturated with the virus, so that cattle which graze upon it subsequently are frequently affected in the same way.

Treatment.—If the nature of the disease be recognized early, the primary sore through which the virus enters the system should be at once cut out. If several days have elapsed, however, this treatment will probably prove unavailing; in such cases hot fomentations should be applied to the sore, and the individual should take quinine and whisky. Three grains of quinine may be taken in a tablespoonful of whisky mixed with as much milk, every three or four hours.

Fortunately the disease is less dangerous to man than to cattle; the majority of cases in the human subject recover.

Felon.

A felon is an inflammation of the delicate membrane which covers the bone—the *periosteum*. Such an inflammation may occur around any of the bones, but the term felon is reserved for an inflammation of this membrane covering the bones of the fingers.

In most cases the felon is developed on the last joint of a

finger or of the thumb, though it may also appear on the other joints.

The affection begins with a sense of burning pain usually under the pulp of the finger or near the nail. The skin over the part becomes red and swollen; meanwhile the pain has become intense and of a *throbbing* character; the patient is frequently unable to sleep because of the severity of the pain.

If the affection be allowed to proceed without interference, there finally occurs an opening of the skin and a discharge of matter, after which the pain subsides considerably. Yet the wound does not usually heal well; an obstinate sore remains from which a little matter is discharged, and the edges of which are apt to be covered with "proud flesh." It will usually be found that the stubbornness of this sore is caused by the presence of diseased bone at the bottom of it. This bone dies and is finally cast off as small pieces, which become loosened and make their escape through the wound, or are removed by the patient. In this way the joint, or even the entire finger may be rendered useless; in the most favorable cases there remains a deformity which may seriously impair the usefulness of the finger.

Treatment.—A felon is a most serious as well as painful affection. The danger lies in the fact that if this membrane which surrounds the bone be separated from the bone itself by the formation of matter beneath it, the bone dies and the usefulness of the finger is impaired. The only way for preventing this accident is by opening the membrane which surrounds the bone so as to permit the matter to escape, and thus to prevent it from burrowing along between the bone and its covering.

In order to palliate the pain we may poultice the finger with flaxseed meal; by this means, moreover, we hasten the formation of matter, which is one of the objects desired. So soon as it becomes evident that matter is present—or even sooner in some cases—a knife must be thrust through the flesh *down to the bone.* The cut should be freely made, so that the matter may escape readily. This is of course extremely painful, but only for a few moments, and the relief which the patient obtains immediately far more than compensates for the pain of the incision.

The importance of submitting the finger early to the surgeon cannot be overestimated; for the patient obtains thereby not only

relief from the most intense suffering, but also the best chances for preserving the usefulness of his finger.

After the felon has been opened, it may be poulticed again for a day or two, until the discharge ceases.

Sometimes the inflammation occurs under the root of the nail, and the incision must be made through the nail. The general principle remains, however, that the matter must be permitted to escape, in order to prevent a disease of the bone, which may result in a loss of a part of the finger.

Ulcers of the Leg.

One of the most common and troublesome affections, among poor people especially, is ulcer of the leg, particulary on the part of the leg just above the ankle.

These ulcers are of various kinds, and originate in various ways. They may proceed from a constitutional taint, such as syphilis; but they are more frequently caused by enlargement of the veins of the leg.

In most cases the ulceration begins as a blister or pimple, which after a time breaks and discharges a little watery fluid. This sore may scab over, but usually breaks out again, and keeps constantly increasing in size. In course of time the skin becomes ulcerated and matter is freely discharged from it. These ulcers may attain enormous size, so as to include, in fact, a considerable portion of the skin between the knee and the ankle.

In most cases of severe ulceration of the leg in which the individual has not had syphilis, the veins of the leg and thigh will be found to be enlarged, constituting the condition known as "varicose veins." These ulcers occur almost always in middle or advanced life, though they may be found in children who are poorly nourished.

Treatment. — The healing of the ulcers will be promoted by improvement of the general health. In most cases, however, the sufferers are unable to enjoy the recreation, air and exercise which form such important elements in improving the health. Yet what can be done in the way of food and personal care should not

be neglected, since such measures will have a marked effect in hastening the healing of the ulcers.

The treatment consists chiefly of local applications. Sometimes the ulcers can be healed by the constant application of astringent ointments, of which the following is a good example:

Diachylon ointment, - - - -	One ounce.
Vaseline, - - - - -	One ounce.

Mix. Apply the ointment spread upon soft cloths, which should be bound over the ulcer by means of a bandage.

The healing of the ulcer will be promoted by measures which tend to keep the blood out of the leg. For this purpose the leg may be enclosed in a bandage of soft flannel which is applied from the foot to the knee. Muslin bandages should be avoided, since it requires considerable practice and skill to apply these evenly and firmly. As they are ordinarily put upon the leg, they do injury rather than good; for they are generally arranged so as to leave deep impressions in the skin, and even to cut or abrade the surface.

The healing of the ulcers will be hastened by keeping the foot elevated as many hours in the day as possible. This can be best accomplished by having the patient lie down, or at least by supporting the foot upon a chair. Yet, as a matter of fact, it is practically impossible to persuade a person to remain in bed or on a chair all day and night, even though he have the opportunity; and for most individuals the opportunity is lacking.

It was, therefore, a godsend for persons afflicted with ulcers of the leg, when Dr. Martin introduced to the profession the rubber bandages, which he had himself employed in his private practice for twenty-five years. These bandages are simply made of pure rubber, of varying widths and lengths, according to the needs of the patient. The bandage is applied directly to the skin without interposing any dressings or ointments over the ulcer. It should be put on in the morning before the patient leaves the bed, or even puts his foot out of the bed. It is applied to the foot first, and then wound snugly around the ankle and leg some distance above the site of the ulcer. The patient can then rise and attend to his usual duties. The bandage is quite warm, and causes profuse perspiration of the limb; there is apt to be also an increased discharge from the surface of the ulcer. Yet these elements do not interfere

at all with the beneficial effect of the bandage; in fact, the benefit seems to depend largely upon the moisture and warmth secured by the bandage as well as by the support to the veins of the skin.

At night the bandage is removed and carefully cleansed with warm water, after which it may be hung up to dry until morning. The limb should be also bathed and cleansed, and the ointment above mentioned may be applied during the night.

The success obtained in the treatment of ulcers of the leg by the use of this bandage astonished every physician who employed it. The most obstinate ulcers, even those which had resisted ordinary measures for years, were healed in a few months or even a few weeks by the constant use of this bandage; and the patient had moreover the pleasure and profit of pursuing his usual avocation instead of being compelled to sit or recline during the day.

For all those, therefore, who suffer from obstinate ulcers of the leg, a Martin's bandage should be obtained. If, after the ulcer has been thoroughly healed, the bandage be no longer worn, the trouble may return; yet it can be again healed in the same way. To afford the greatest security against a fresh outbreak of the ulcer, the bandage should be worn for some weeks after the ulcer has entirely closed.

There are a few cases in which ulcers of the leg heal very slowly even under the use of a rubber bandage. In these cases there is usually either some constitutional taint in the patient, such as gout, rheumatism or syphilis, or the veins of the leg are extremely large. In such cases the appropriate treatment must, of course, be directed to the condition which seems to retard the healing of the ulcer.

There are cases of ulcers of the leg which can be healed only after the varicose veins are operated upon; so long as these veins remain in their enlarged condition, either the ulcer will not heal, or if it heals it soon breaks out again and becomes as bad as before. By operating upon the veins so as to prevent the blood from distending them constantly, the ulcers may be healed almost without treatment, since they are merely the results of enlarged condition of the veins.

Hare-lip.

This familiar and unfortunate deformity, so called from its fancied resemblance to the lip of a hare, is a congenital defect—that is, one which results from improper formation of the child in

the mother's womb. This departure from the usual formation consists simply in an arrest of the natural development. For in every case the upper jaw consists at first of two distinct halves which are separated from each other by a considerable space. If the development of the fœtus proceed naturally, these two parts grow toward each other so that some time before birth the two halves of the bone meet. There is, furthermore, in the early period of development a separate piece of bone at the front of the jaw which should become united to the rest before birth. Hare-lip results simply from an arrest of the growth of the fœtus, as a result of which the different pieces composing the upper jaw fail to grow together.

There are various degrees of hare-lip; in its most complete form there remains a space between the two sides of the roof of the mouth as well as a deformity of the lip. In these cases there remains, of course, communication between the mouth and the nose along the upper part of the mouth — a portion which is, in the perfect child, composed of bone, whereby the cavity of the mouth is kept separate from that of the nostrils.

In other cases the bony roof of the mouth is perfectly formed, but there remains a cleft in the soft palate as well as in the lip. In still other cases the mouth is perfectly formed but the lip is cleft.

The most aggravated cases of this deformity constitute a serious impediment to the usefulness of the individual; in infancy the child may suffer somewhat from lack of nourishment, since fluids taken into the mouth cannot be kept there, but escape through the roof of the mouth into the nose and run out through the nostrils. Furthermore, the soft palate is an important agent in the process of swallowing, and if it be cleft, even though the roof of the mouth be whole, fluids are apt to pass into the nose and emerge from the nostrils instead of going down the throat.

In more advanced years, too, this deformity constitutes a serious impediment to distinct articulation; an individual thus afflicted is therefore debarred from those pursuits which require public speaking. Indeed, it is difficult for some of these unfortunate individuals to make themselves understood at all; and they always suffer mortification in the presence of strangers.

It is highly important, therefore, that hare-lip should be remedied before the child has attained an age when the operation becomes more difficult and uncertain. If the child be in good health the operation should be performed during the first year of

life, unless there be some circumstance which, in the opinion of the surgeon, renders operation unadvisable.

If there be a cleft merely in the lip, the operation is a comparatively trivial one; parents should not postpone the matter under the impression that the child will "stand it" better when he becomes older. The sooner the deformity is remedied the better it will be for the child.

Cancer of the Lip.

This is a very frequent affection, especially among the lower classes. The growth begins as a crack or raw surface on the lip, which heals over apparently without any unusual symptoms; but in a short time it will be found that the healing process is not complete, that there is merely a dry scab on the lip which falls off or is scraped off by the movements of the mouth, and under which the original crack or raw surface is visible. After a time the sore becomes larger and the scab upon it becomes a thick crust. Sometimes the cancer begins in a little projection which looks like a wart, situated usually near the edge where the red surface of the lip joins the skin.

The growth may remain in this condition for months, and scarcely attract the attention of the patient, who rarely suspects the existence of any serious disease or seeks medical advice about it. At last, however, perhaps in consequence of some irritating ointment or application, the growth increases rapidly in size and becomes ulcerated. In a few months or even weeks the lip has become very thick, its surface is raw and covered with foul matter, and the edges of the ulcer are sharply cut and turned outward. In many cases the surface is covered with scabs of dried matter.

If the disease proceed without treatment, a considerable part of the lip is destroyed; the saliva dribbles from the corners of the mouth; the glands at the angle of the jaw and under the tongue become enlarged; the disease spreads so as to attack the inside of the mouth, as well as the skin around the lip; the teeth fall out and the individual dies of exhaustion.

As to the cause of cancer upon the lip we have no definite information. There are many reasons for supposing that a sore, which

is at first simple and not cancerous, can be by constant irritation converted into a cancer. It is also true that cancers of the lip occur with especial frequency in men who smoke clay pipes, or whose avocation compels them to hold irritating articles between the lips. The most frequent subject of cancer of the lip is the Irish laborer, who smokes a clay pipe all day and evening. In such patients, it is often observed that the cancer of the lip corresponds exactly in position to the teeth between which the patient holds his pipe, since these are usually worn away by this article of luxury. Yet it must be admitted that cancer occurs on the lips of individuals who do not use pipes, and that in many cases no source of irritation can be discovered. Yet cancers occur also in other parts of the body which are exposed to irritation, and we cannot doubt that, however they may originate, cancers are at least aggravated and developed by irritating agents.

Treatment.—The only cure for a cancer consists in early removal. This fact has been so well established that it seems astonishing that so many individuals can be persuaded, even by the dread of the knife, to waste precious time in applying pastes, and in other fruitless efforts, out of which unscrupulous men make handsome incomes. No instance is recorded in which a *genuine cancer*—one which had been so pronounced by competent surgeons—has been healed by any means whatsoever. This seems a sad fact for the many sufferers from the disease; but it *is* a fact, and it must be accepted as the inevitable. By deferring an operation until pastes, plasters and the like have been applied to the sore, the patient is simply losing valuable time, and perhaps throwing away his sole chance for life. For the danger to life lies not in the original cancer itself, but in the other cancers which subsequently grow in the internal organs of the body. A certain time elapses before these secondary cancers are formed; just how long a time it takes we cannot say. Under such circumstances, the wise course is evidently to remove the original growth as early as possible, for if once thoroughly removed, there is but little danger of the formation of cancers subsequently.

The lip is the most favorable, or rather the least dangerous, of all the localities of the body for the occurrence of a cancer; for the sore is so prominent as to attract the attention of the patient and of his friends at an early period of its growth; and the lip is so

formed that it affords the most favorable opportunity for the thorough removal of the tumor.

The operation must, of course, be entrusted to the surgeon; our object is merely to impress upon the patient the necessity for an operation, and the folly of wasting time by useless efforts to evade the unavoidable.

Polyp of the Nose.

The nose is the seat of tumors called *polyps*. These occasion a feeling as if the nose were "stuffed up," so that the patient seems to have a continuous cold in the head. This feeling and the accompanying discomfort are usually aggravated in wet weather. After a time there may occur an occasional discharge of blood in small quantity when the patient blows the nose violently; and there is apt to be an increased discharge from the affected nostril. Sometimes the patient can bring the polyp into view in the nostril by closing the opposite side of the nose with the finger and then expelling the breath forcibly through the remaining nostril. If the polyp be allowed to remain it keeps increasing in size, blocks up the nostril completely, forces the partition between the nostrils toward the opposite side, and may occasion serious deformity of the face.

Treatment.—The polyp must be seized with a pair of forceps and gently twisted off. This is usually a simple operation, if the tumor be small; when it has attained a large size considerable difficulty may be experienced.

Mortification of the Jaw.

Considerable portions of the lower jaw, or even the entire bone, may mortify as the result of mechanical violence, of decayed teeth, or of the abuse of mercury. A more frequent and more disastrous cause, however, is poisoning by *phosphorus*. This occurs with especial frequency in persons who have been long employed in match factories. The health is gradually impaired and the lower jaw becomes inflamed, swelled and finally mortifies, "with loss of appetite, sallow countenance and feeble circulation. The first indication of the disease is usually toothache, followed by the

Tumors.

ENGRAVED FROM PHOTOGRAPHS OF ACTUAL CASES.

dropping out of the teeth, more especially of the grinders, and then by the death of a portion of the jaw." If a portion of the jaw be lost it is not reproduced, as so often happens when pieces of bone mortify.

Tumors of the Mouth.

Tumors of various kinds are found in the mouth. The most common is a little swelling which may appear hard to the finger, but nevertheless contains a watery fluid. Such tumors may be found anywhere on the inner surface of the lips or under the tongue. They occasion no pain, and in most cases no annoyance, unless they happen to be so situated as to obstruct the movements of the tongue or of the jaws.

Treatment.—If these tumors are not sufficiently large to cause the patient much annoyance, they may be permitted to remain, since they do no harm. If it become desirable to remove them, this may be done by snipping out a piece of the sac which contains them and permitting the contained fluid to escape. Sometimes the tumor is permanently cured by this simple means; at other times it becomes necessary to repeat this operation a few weeks subsequently, since the tumor fills up again as before. In such a case, after permitting the contents of the tumor to escape the second time, the inside of the cavity should be lightly touched with a stick of lunar caustic. It is always better to refer the matter to a surgeon than to permit an inexperienced hand to meddle with it.

If the tumor increase greatly in size, it may attain such dimensions as to push the tongue to one side or to the roof of the mouth, and thus interfere seriously with speech, with swallowing, and even with breathing. In such cases, it is of course absolutely necessary that the tumor be removed.

Tongue-tie.

This affection consists in an unnatural shortness of the "bridle of the tongue"—the little band which binds the point of the tongue to the floor of the mouth. It is usually detected in the

infant by the difficulty which the child experiences in nursing. The affection is, however, not so common as is generally supposed; many infants are believed to be troubled in this way whose subsequent history shows that such is not the case. If it be definitely ascertained that the bridle of the tongue is really too short, the defect can be easily remedied by snipping this fold of mucous membrane with the scissors. This is a trivial operation, and yet must be done with great care, in order to avoid wounding an important artery which runs along the lower part of the tongue.

Cancer of the Tongue.

This is a frequent and serious affection. It begins as a sore usually on the side of the tongue, which remains open for a considerable time and does not yield to the treatment that ordinarily suffices to heal such ulcers. After a time the sore becomes deeper and its edges sharp and everted. The ulcer gives rise to considerable pain and may be the source of hemorrhages. Before it has attained large size it emits a peculiarly fetid odor which, with its appearance, may suffice to arouse a suspicion of the nature of the disease. In a few months the glands at the angle of the jaw become enlarged and hard.

If allowed to progress, the cancer finally destroys a large part of the tongue, and, if the patient live long enough, may spread into the throat.

The only hope of relief lies in the early extirpation of the ulcer and of the adjacent part of the tongue. If this be done sufficiently early, the patient may escape with his life; but if the cancer return, as it usually does when the operation is too long deferred, the most that can be hoped for is a relief from suffering for a few months.

Enlargement of the Tonsils.

The tonsils become enlarged as the result of frequent attacks of inflammation of the throat; and a permanent increase in size may remain after an attack of quinsy. This enlargement usually occurs in childhood, especially in scrofulous children, or in those whose health is from any other cause impaired.

This enlargement gives rise to many inconveniences; the tonsils are liable to repeated attacks of acute inflammation, after each one of which the swelling becomes greater and the irritation in the throat is augmented. When the tonsils have attained a certain size, the voice is rendered hoarse; breathing is labored and noisy, especially during sleep. Indeed, a child's slumbers are frequently much disturbed by fits of choking, from which he awakens in terror. Swallowing may also be impeded and laborious; sometimes the food and drink escape into the nose.

If this condition be allowed to proceed, there is apt to occur an impairment of hearing in consequence of the spread of the inflammation through the eustachian tubes into the ear. In rare cases suffocation has been caused by the collection of mucus in the throat.

Treatment.—In most cases the child's general health needs attention. He should be provided with the best of food and allowed plenty of recreation; in short, all those measures which evidently conduce to the improvement of the health should be employed. In addition, it may be well to administer tonic medicines. The following formula may be given:

Syrup of the iodide of iron, - -	One ounce.
Glycerine, - - - - -	One ounce.
Water, - - - - - -	Two ounces.

A teaspoonful of this may be taken after meals.

If the child be evidently scrofulous, as indicated by the pallor, enlargement of the glands in the neck, and the other usual symptoms, cod-liver oil should be administered.

Local treatment in the throat can sometimes be made effectual in reducing the size of the tonsils, or at least in preventing the occurrence of unpleasant symptoms. This treatment may consist in the use of astringent gargles, and in the application of remedies directly to the enlarged tonsils by means of a camel's-hair brush. The following gargle may be employed:

Alum, - - - - -	One drachm.
Glycerine, - - - -	One ounce.
Tincture of myrrh, - - -	Three drachms.
Water, - - - - -	Four ounces.

The local applications should be made by brushing the tonsils once or twice a day with the following solution:

Tannin,	Twenty grains.
Brandy,	One ounce.
Camphor water,	Five ounces.

This may be used to *swab* the throat. For this purpose a piece of sponge as large as a hickory nut may be tied firmly onto the end of a piece of wood or whalebone. The sponge is moistened with the solution, and then rubbed thoroughly over the surface of the tonsils and the neighboring part of the throat. It will generally be necessary to hold the tongue down with the handle of a spoon during this process. Care must be always taken to fasten the sponge firmly upon the handle, in order to prevent the possibility of its slipping off into the throat.

Benefit can also be derived from the inhalation of liquids by means of an atomizer. For this purpose the following solution may be employed three times a day:

Listerine,	One ounce.
Tannic acid,	Half a drachm.
Glycerine,	Two ounces.
Water,	Three ounces.

This may be used warm, with an ordinary hand atomizer.

It is rarely possible to reduce the swelling of the tonsils materially in this way. The most that can be hoped for is to prevent an aggravation of the difficulty, to keep the throat clear of mucus and to toughen the membrane somewhat, so that there will be less possibility of frequent acute attacks.

In most cases it will be desirable to remove the tonsils when these have attained a size such as to cause the more serious symptoms above related. The operation for removing the tonsils is a very simple one, and it occasions the patient but little pain.

Enlargement of the Uvula.

The uvula is the name applied to the projection from the soft palate which hangs into the throat, and can readily be seen when the mouth is open. It sometimes happens that this organ becomes enlarged to such an extent as to touch the top of the larynx. In this case it causes a constant irritation and tendency to cough.

If it be ascertained that the enlargement of the uvula is such as to cause the patient serious annoyance, it should be cut off at about the middle, so that it shall no longer cause a tickling of the larynx.

Foreign Bodies in the Throat.

Foreign substances frequently lodge in the throat during the act of swallowing. Although fish-bones are the most common, yet almost any solid body which is taken into the mouth, however small, may cause trouble by lodging in some of the nooks and corners which are found in the passage from the mouth to the stomach or to the lungs.

In most cases such bodies are soon expelled by the patient's own efforts in coughing; in other cases they are lodged high up in the throat, and can readily be seen and removed by a bystander. There are instances, however, in which the body becomes firmly lodged at a point beyond the reach of any one who is not provided with proper instruments and the skill necessary to use them. The consequences vary in different cases; sometimes the body is so situated as to prevent the entrance of the air to the lungs, and thus causes speedy suffocation; in other cases, the substance produces no immediately serious effects, but induces in time an ulceration in either the œsophagus or the windpipe, which may result fatally. The final result cannot be predicted in any case; instances are known in which a foreign body has ulcerated through the œsophagus and has found its way into a distant part of the body, without causing the patient serious illness.

In every case it should be borne in mind that the patient is sometimes deceived by his own sensations, and that no foreign body has remained in the œsophagus or the windpipe, although the individual may be firmly convinced to that effect. Instances are known in which surgeons have been induced to perform serious operations for the removal of supposed bodies which actually had no existence; one of the most famous of the world's surgeons, Nelaton, of Paris, made numerous unsuccessful efforts to remove a body which he was led to suppose was a foreign substance in the throat, but which he afterwards ascertained was merely the tongue-bone (hyoid-bone).

It may be well in every case for the friends to examine the throat so far as they can, since it is sometimes possible to remove very easily bodies which occasion the patient great annoyance, and even endanger his life. The mouth should be opened and carefully inspected, attention being particularly directed to the space just behind the tonsils and behind the root of the tongue. If nothing is detected, the forefinger may be passed into the mouth and swept around the throat regardless of the patient's gagging and efforts to vomit. It is sometimes possible to dislodge foreign substances, such as lumps of meat and the like, by this simple maneuver.

If relief is not obtained in this way, an emetic may be administered, provided the patient can swallow; a teaspoonful of mustard or of common salt dissolved in a glass of warm water should be swallowed. The act of vomiting sometimes serves to dislodge particles and to eject them from the throat, thus securing to the patient immediate relief.

If these means fail, the matter must be left in the hands of a surgeon, since the extraction of foreign bodies from the throat is one of the most difficult and delicate operations which the surgeon is called upon to perform. In many cases, however, the case terminates before it is possible to procure the services of a medical man. The foreign body is ejected or the patient dies of suffocation in a few minutes.

It seems scarcely necessary to remark that in order to avoid such accidents, care should be taken not to take a deep breath nor laugh while the mouth is full of food.

Stricture of the Gullet.

By a stricture of the gullet, or œsophagus, we understand a narrowing of the channel. The results of this decrease in the size of the tube vary according to its degree. In slight cases it may occasion the patient no particular annoyance, and he may not be aware of its existence. When the caliber of the tube becomes narrower, however, there occur symptoms which attract attention and may even interfere seriously with the individual's health.

The symptoms first noticed are difficulty of swallowing, which has usually lasted for years and has gradually grown worse. In addition to this there occur spasms during the act of swallowing which

sometimes compel the patient to reject the food taken into the mouth. Swallowing frequently produces pain in the chest which shoots upward toward the head and backward between the shoulders.

The causes of this difficulty are various; in many cases it results from the accidental or intentional swallowing of corrosive liquids, such as nitric acid or carbolic acid; in other instances it results from a constitutional taint, such as syphilis; in a great many cases there is no apparent cause for the difficulty.

Treatment.—The treatment of the affection consists almost entirely in the introduction of flexible instruments, made for the purpose and called *bougies*, into the œsophagus. If the surgeon can introduce an instrument through the narrow part of the œsophagus, he can usually succeed by gradually increasing the size of the bougie, in rendering the opening sufficiently large to relieve the patient from the most distressing symptoms.

Sometimes a stricture of the œsophagus is caused by the growth of a cancer at some point in the tube. In this case the patient is apt to vomit frequently, the matter ejected being streaked with blood. Sometimes severe hemorrhage occurs from the cancer, the blood escaping into the stomach or rising into the mouth.

When the stricture is dependent upon such a growth, there usually remains but one mode of relieving the patient—an operation must be performed whereby a tube can be introduced into the stomach, and food administered in this way. If the growth be a cancer, such an operation can, at most, prolong the patient's life some time, and relieve his suffering; he will, of course, ultimately die of the disease.

Goitre.

A goitre is an enlargement of a gland which is situated at the front of the neck, and is naturally so small as to occasion no noticeable prominence. Under certain conditions this gland undergoes enlargement, causing a swelling of the neck. This swelling may attain an enormous size, so that the circumference of the neck is much greater than that of the head. In some cases this enlargement of the gland occasions no further annoyance than results from the mechanical impediment to the movements of the head and neck;

in most instances, however, the enlarged gland presses upon the windpipe and gullet, as a result of which the patient experiences great difficulty in breathing and in swallowing; there is also a constant and obstinate cough, which greatly exhausts the patient and resists all treatment.

In young persons it can usually be cured; but if it have become hard, and the patient be advanced in years, a cure can scarcely be hoped for.

Goitre is what is termed an *endemic* disease; that is, one which seems to prevail only in certain localities, and to be, therefore, associated with some peculiarity of soil or climate. It occurs chiefly in the mountainous districts of Switzerland and Austria, especially in the Tyrol and along the valley of the Rhone; it is also prevalent in the chalky districts of England.

Various attempts have been made to trace this disease to some particular influence of the climate or soil in these localities, yet it is not yet ascertained exactly what the origin of the affection is.

The disease occurs chiefly among people in debilitated health, and is more often seen in females than in males.

In this country goitre is a rare affection as compared with its prevalence in many parts of Europe.

Treatment.—An important item of treatment is the removal of the patient from those influences, whatever they may be, which induce the disease; hence, a change of residence is almost essential. No medicines can be relied upon to check the growth of the tumor, though much good seems to have resulted in many cases from the use of *iodine*. This should be applied to the skin in the following form:

Tincture of iodine, - - - -	One ounce.
Glycerine, - - - - -	Two ounces.

This may be painted over the enlarged gland every day or two; if the skin show much evidence of irritation, the painting process may be performed less frequently.

At the same time the patient may take iodine internally in the form of iodide of potassium. The following prescription may be administered:

Iodine, - - - - - -	Four grains.
Iodide of potassium, - - -	Four drachms.
Syrup of sarsaparilla, - - -	Four ounces.

A teaspoonful of this may be taken three times a day after meals.

If the faithful and persevering use of these remedies fail in diminishing or in arresting the growth of the tumor, electricity may be employed. Cases are known in which the use of this agent has seemed to arrest the growth and even to cause its disappearance.

There are cases, however, in which the embarrassment of breathing and swallowing is so great as to call for immediate relief in order to save the life of the patient. In such cases the tumor has been frequently removed. This is a most serious and dangerous operation, which often results in the immediate death of the patient. It is generally undertaken only in those cases in which speedy death is inevitable if the growth be not removed. In the most favorable cases the patient recovers promptly from the operation, and is permanently cured.

Tumors of the Neck.

Tumors of many different kinds grow in the side of the neck and under the chin. Among the most frequent of these are enlargements of the lymphatic glands. These glands are present in considerable numbers in every individual, in that part of the neck especially which lies between the side of the jaw and the collar-bone. Under ordinary conditions these glands are so small that they do not occasion any prominence of the skin, nor can they even be felt with the finger. In certain diseased conditions, however, the glands undergo a gradual enlargement, and attain a size sufficient to cause marked prominence of the skin. Such enlargement of the glands occurs in the course of acute diseases which are accompanied with an inflammation of the throat. Thus they are very common in scarlet fever and diphtheria. After recovery from these diseases, the glands subside spontaneously, so that in a few weeks no trace of their former dimensions can be detected. In certain constitutional taints, however, the enlargement of the glands persists for a long while. The commonest of these constitutional conditions is *scrofula*. By scrofula we understand a depraved condition of the system, which occurs with especial frequency in the children of consumptive parents. In fact, scrofula and tuberculosis (consumption) seem to be manifestations of the same unnatural condition.

The enlarged glands of a scrofulous child are apt to occasion a great deal of trouble. For a long time they remain hard and painless; but, sooner or later, they become, one at a time perhaps, somewhat tender. It will then be noticed that the lump is no longer hard and firm as before, but has become softened and feels as if it were a little sac containing a thick liquid. Such is in fact the case. The gland has become softened by the formation of matter within it. In the most favorable cases, this matter may be taken back into the system without breaking the skin; but, in the majority of instances, the matter will find its way to the surface. If it be allowed to break through the skin spontaneously, it usually burrows for a considerable distance before escaping through the skin. The result is that the neck becomes honey-combed with a series of channels—technically called *fistulæ*—which are sometimes of considerable length. The matter oozes through these openings, but little escaping during the twenty-four hours. Yet the affection is an extremely obstinate one, and resists many efforts at cure.

It is therefore desirable, in the interest of the patient, that the matter should be let out with the surgeon's knife rather than allowed to escape spontaneously There will remain, of course, a scar for every incision; but this scar is very neat, and even positively handsome, when compared with the long, uneven and ragged scars which remain after the matter has been allowed to burrow under the skin before escaping.

Treatment.—The treatment of these scrofulous glands must begin, and in fact consists chiefly in the administration of remedies which shall improve the child's general health. For this purpose we rely largely upon sanitary measures. The child must be well fed and permitted plenty of sunshine, air and recreation. In addition, we may prescribe cod-liver oil, a teaspoonful of which may be given after meals. The patient may also take fifteen drops of the syrup of the iodide of iron in water three or four times a day.

The local treatment of the glands consists first in an effort to prevent the formation of matter. This will be impossible if the child be not placed in the best sanitary condition. For the purpose of preventing suppuration (the formation of matter) the tincture of iodine may be painted over the lump two or three times a week. If this be found to irritate the skin too much, the iodine tincture may

be diluted with glycerine. The following solution will be found less irritating :

Iodine, - - - - - -	Four grains.
Iodide of potassium, - - -	One drachm.
Glycerine, - - - - - -	One ounce.
Water, - - - - - -	One ounce.

After it has become evident that matter is already formed in the gland, it is advisable to have the swelling opened at once, in order to avoid the burrowing of the matter and the formation of troublesome fistulæ, such as will otherwise occur.

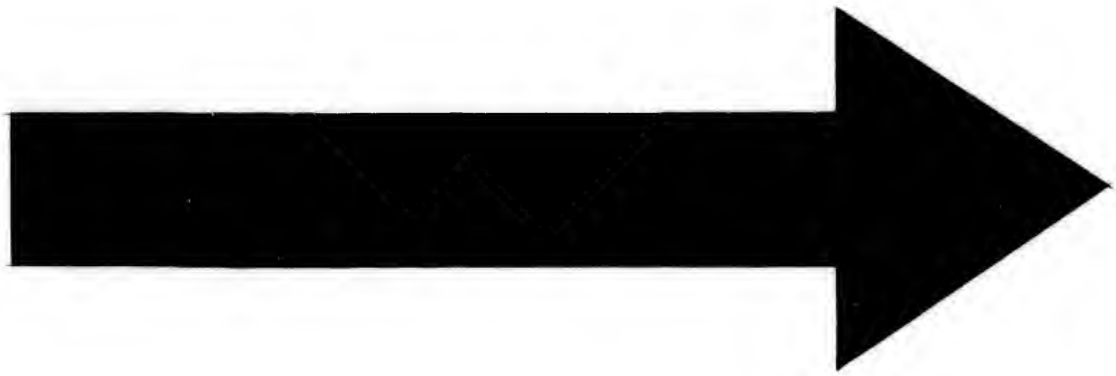
If these fistulæ have once been formed, it is usually necessary to lay them open freely with the knife in order to heal them.

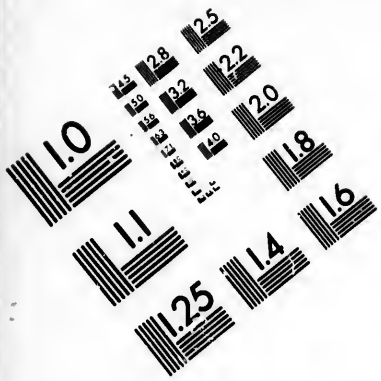
Wry-neck.

This peculiar distortion, in which the head is bent toward one shoulder or the other (usually the right), is due to any one of several causes. The most frequent cause consists in a contraction of a muscle which runs from the breast-bone to the bony prominence of the skull behind the ear. This unnatural state of contraction of the muscles may be the result of an inflammation, whereby the muscle is bound by adhesions to the surrounding tissues, or it may be merely a spasmodic affection. It occurs chiefly in feeble and sickly children.

The same result — wry-neck — may occur as the effect of a disease of the spine, or of some growth in the side of the neck. A similar deformity results also from extensive burns of the neck, since the scar which remains contracts and pulls the head downward.

Treatment. — The treatment must be adapted to the cause of the affection. If the difficulty results from a spasmodic or inflammatory condition of the muscle, it may be relieved by treatment addressed to the general health; tonics and medicines which regulate the stomach and bowels will be found most serviceable. If the side of the neck be very tender and painful, hot fomentations should be applied around the neck, and a dose of Rochelle salts or the citrate of magnesia should be given. If there be no especial ten-





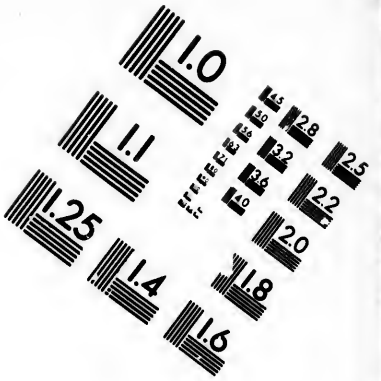
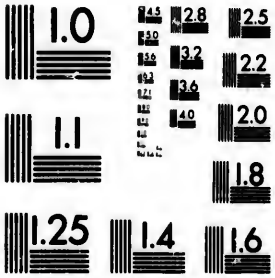
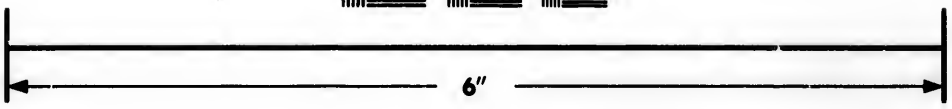
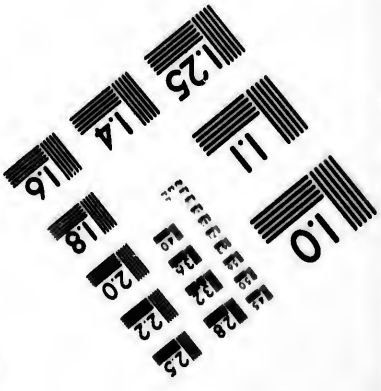


IMAGE EVALUATION TEST TARGET (MT-3)







Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

derness upon pressure, relief from the deformity can often be obtained by ironing the neck with a warm flat-iron, a piece of flannel being laid over the skin.

In some cases these and all other measures fail; in these instances the condition can be remedied by a surgical operation which consists in dividing the muscle where it is attached to the breast-bone and the collar-bone.

Weeping Sinew.

This term is applied to a swelling formed upon the sinews—that is, the continuation of the muscles. These tumors occur most frequently about the wrist and on the fingers. At first the swelling consists of a tumor, which is usually transparent enough to permit the flame of a candle to be seen through it. After it has lasted for some time, and has been the seat of inflammation, the swelling loses its softness and transparency.

At first such a tumor causes no other annoyance than results from mechanical interference with the use of the fingers and of the hand; but sooner or later it usually causes a dull, heavy pain, and renders the hand much less useful than it formerly was. In some instances these tumors attain an extraordinary size, projecting down into the palm of the hand, or upward onto the forearm.

Treatment.— These swellings should not be tampered with unnecessarily, since if improperly treated they may occasion the patient much suffering, and even imperil his life. So long as they occasion no especial annoyance or pain, they may be let alone. Afterward it may become necessary to take some measures for relief.

It will be well to begin by rubbing the skin over the tumor with pure alcohol several times a day. This has been known to cause their disappearance. If there be no sign of improvement under this treatment, the sac may be ruptured by a blow. This will be best accomplished by laying the patient's hand upon a pillow and then striking the tumor sharply with the side of a heavy book. The result is a disappearance of the tumor for the time being, since the liquid is forced out of it into the surrounding tissue. A band-

age may be now applied around the arm over a piece of folded lint, which is placed upon the location of the tumor.

In most cases it will be found that the swelling returns again after some weeks or months. In this case it will be well to refer the matter to a surgeon, since a delicate operation will probably be necessary.

Housemaid's Knee.

This affection consists of a swelling on the front of the knee, or rather on the upper part of the leg just below the knee. It consists of an enlargement of a little sac which naturally exists over the knee-pan. This sac becomes filled and dilated with watery fluid, constituting a soft fluctuating tumor. The swelling may vary in size from that of a hazel-nut to the dimensions of a walnut The swelling is at first painless, and remains so until irritated by mechanical violence; it may then become acutely inflamed and occasion much pain.

This affection is termed housemaid's knee, because it occurs with especial frequency in servant girls, presumably in consequence of kneeling upon hard, damp floors. So long as it remains painless it need not be interfered with, unless it attains such a size as to inconvenience the patient. In this case it may be punctured with a fine needle, and the fluid allowed to escape. If it become inflamed, the patient suffers great pain and high fever; the knee swells so that walking is impossible.

Treatment.— During an inflammation of such a tumor the patient should lie quietly in bed. Hot cloths must be wound around the knee and frequently changed, in order in keep up a constant warmth and moisture. In two or three days the pain and swelling usually subside, and the patient's condition remains as before. In other cases matter forms, and it becomes necessary to open the swelling with the knife.

The tumor can usually be made to disappear by passing a *seton* through it; this consists in inserting a needle armed with clean silk into and through the sac, the silk being permitted to remain. This causes some inflammation, as a result of which the sac gradually dries up. Several other plans of treatment are in use, but can be practiced only by the surgeon.

Wounds.

There are certain general principles involved in the treatment of wounds, which should be understood by all persons, especially by those who are liable to be injured in the country, where the services of a surgeon cannot be quickly procured. Many a life is lost by ignorance of the most elementary principles of the treatment of wounds; principles which it is extremely easy to comprehend and by no means difficult to carry into execution.

It is a fact that the natural tendency of healthy flesh is to heal a wound without the formation of matter or the occurrence of any untoward accident. There is no difference in this respect between the slight cuts which everyone receives occasionally, and the more severe and dangerous wounds. If the individual be in good health, and be free from constitutional taint, the natural course of a wound is toward immediate and perfect recovery. We are all familiar with the fact that a simple cut with a penknife usually heals without any difficulty or danger to the patient; yet it sometimes happens that death results from an apparently trifling injury of this kind. So, too, severe and extensive wounds are usually supposed to heal less readily and safely; yet the fact is that patients have recovered from the most severe and dangerous injuries as nicely and easily as from the cut of a penknife. Many instances are on record in the annals of surgery in which recoveries have occurred from the most frightful injuries. One of the most famous of these is the well-known case which occurred some years ago in New England, in which a heavy iron bar — a so-called "tamping iron" — was driven by a premature explosion of blasting powder, clear through the head of one of the workmen; yet the man recovered perfectly without serious trouble. So, too, instances are known in which persons have been literally disembowled, the abdomen being ripped up by sabres, bayonets razors, the horns of enraged cattle, etc., so that the intestines protruded; yet such wounds too may heal as quietly and nicely as the more trivial ones.

The difference between the rapid and uninterrupted healing of a wound on the one hand, and the interruption of the process by the formation of matter, the occurrence of erysipelas and other accidents on the other, is usually the result of the manner in which the wound is cared for and treated. There are, of course, instances

in which organs of vital importance are injured, or in which the location of the wound prevent the execution of proper principles of treatment; in such instances it is often impossible for the surgeon to carry out those measures which he knows to be necessary for the rapid healing of the wound; since, in order to do so, he would run the risk of injuring important organs, the damage to which might destroy the patient's life.

A most important revolution in the treatment of wounds has marked the progress of surgery in the last twenty years. It was formerly expected that the wound left by the amputation of a leg, for instance, would heal only after several weeks, and after a good deal of matter had been formed. At the present time, on the other hand, surgeons expect such wounds to heal far more rapidly, and without the formation of matter to any considerable extent; if the case does not progress so favorably as this, the blame usually rests with the surgeon, providing, of course, the patient is in good condition, and the limb was healthy at the point of amputation.

It is not necessary to enter into any detailed discussion of the methods employed by surgeons in the treatment of wounds. Certain general principals, however, must be mentioned, which can be understood and applied by any one without the experience, practice and skill which belong to the surgeon.

We may formulate these principles, which apply to the treatment of all wounds, in the following way:

First.—Stop the bleeding.

Second.—Cleanse the wound thoroughly from all foreign matter as well as from blood clots, unless these are necessary to prevent bleeding.

Third.—Restore the parts to their natural position so far as possible.

Fourth.—Keep the wounded member perfectly quiet.

In order to stop the bleeding it becomes necessary, of course, to prevent the blood from flowing to the surface of the wound. The exact method for accomplishing this may vary somewhat in different cases; but in general it may be said that we can temporarily check the bleeding at once by compressing the edges of the wound. Thus if the scalp be wounded by a knife, there will occur a profuse flow of blood which may in a short time obscure the wound and be sufficiently profuse to render the patient faint. In these cases we can at once stop the bleeding partially or completely

by simply compressing the edges of the wound. So in general we may control the bleeding, to a certain extent, by simple pressure; if the wound be in a soft part the pressure should be exerted by taking hold of the bleeding edge with the fingers and compressing the severed blood vessels in this way.

Cuts about the head are especially troublesome for the non-professional to manage, for several reasons: first, because the scalp is richly supplied with blood vessels and the bleeding is consequently apt to be very profuse. The appearance of an individual, who has received even a slight scalp wound, is apt to be unpleasant and terrifying in the extreme; for the blood streams down over the face, giving the person an unnatural and alarming appearance, and the clotting of the blood in the hair conveys the impression that the injury is really quite extensive. Another difficulty is the trouble in finding the actual extent of the wound, since it is concealed by the hair. It will usually be found, after the blood is washed off and the hair has been clipped away, that the injury is really far less extensive than was supposed; for a comparatively slight wound in the scalp is usually followed by considerable hemorrhage.

The next measure to be taken in arresting the flow of blood is *to tie the bleeding vessels*. This operation should be left to the surgeon, unless the bleeding is very profuse and cannot be arrested by pressure. If it become absolutely necessary to take some additional measures other than compression, for the stoppage of the bleeding, it will be best to bathe the cut surface with ice-cold water or with very hot water. The latter is sometimes remarkably efficient in stopping the bleeding. If the blood still flow, a piece of soft cloth should be folded into a pretty firm mass, wet with water and inserted into the wound in such a way as to cover the surface where the bleeding is most profuse; pressure may then be made upon this for a few minutes, at the end of which time the bleeding has usually ceased. This folded cloth will be still more efficient in controlling the escape of blood if it be sprinkled over with powdered tannin or alum; these agents act as *astringents*—that is, they have a tendency to close the cut ends of the vessels.

If the wound be located on the arm or leg, the bleeding can often be stopped without applying any astringents directly to the injured surface. It is always better to keep everything out of the wound (except water) until the surgeon's arrival; for the healing of

the wound is apt to be delayed by the presence of substances which are introduced after the wound itself has been made. If the injury be located in the arm or leg, it will be well to compress, not the edges of the wound itself, but the limb at some point between the wound and the body. For the blood goes into the arms and legs through large blood vessels—*arteries*—the location of which can be easily ascertained; and by compressing these arteries we shut off the flow of blood to the entire limb, and, of course, stop the bleeding from the wound.

The large artery which supplies most of the blood to the lower extremity passes from the trunk to the limb quite near the front surface of the body. If we place a finger upon the skin of the groin about half way between the bony prominence of the hip-bone and the inner surface of the thigh where it joins the body, we can usually feel, upon slight pressure, the beating of the artery. In fact, unless the individual be somewhat fleshy, the regular rise and fall of the skin can be distinctly seen when the person is bared. In case of a wound in the lower extremity we can, therefore, arrest the flow of blood by firm pressure upon the artery just at the fold of the groin.

If for any reason it be impractiable to employ this means of compressing the vessel, the same result can be attained, though less neatly and completely, by tying a cloth around the thigh. Some soft material, such as a large folded handkerchief or towel, should be employed for this purpose, since it will be necessary to tie the limb tightly, an operation which will injure the skin if such hard materials as rope be used. The best place for compressing the limb in this way is about four inches above the knee-pan, where the artery lies close to the thigh-bone.

In case of bleeding from a limb, benefit will be derived by keeping the limb elevated, since the flow of blood will naturally be diminished by such position.

The artery which supplies the blood to the arm passes from the body across the armpit just below the head of the bone of the arm. This artery may be compressed most advantageously at a point about one-third of the way from the shoulder to the elbow. By pressing the fingers firmly against the side of the arm next to the body at this point, we may feel the beating of the artery. Firm pressure against the bone of the arm will arrest the flow of blood through the vessel and stop the bleeding at any point below.

It will usually be advisable, however, to tie a towel tightly around the arm, since this limb is not so fleshy as the thigh, and pressure exerted in this imperfect way is usually quite sufficient to stop the bleeding.

If for any reason the arm cannot be compressed at this point; if, for example, the wound extend almost or quite to the shoulder, there is still another way for arresting the bleeding by pressure, for the artery which goes to the arm passes across the front of the chest just behind the collar-bone; in this position it lies above the first rib. We can, therefore, compress the vessel by exerting pressure against the first rib just behind the collar-bone, near the point of the shoulder. This can be done with the thumb or by means of a large door-key, which should be first wrapped with a handkerchief in order not to injure the skin.

Additional advantage in checking the flow of blood is obtained, if the wound be situated below the elbow or below the knee, by bending the arm firmly at the elbow or the leg firmly at the knee. In this way the artery is compressed, since it runs across the joint in such a way as to be pressed by this position of the limb. A bandage may then be put around the arm or leg so as to hold it firmly in this bent position.

It should be remembered that the flow of blood is necessary to the life and welfare of the tissues composing a limb; hence it is not advisable that a bandage which cuts off the flow of blood to the entire arm or the entire leg should be allowed to remain more than an hour; it will be much better to remove it before the expiration of this time, and to observe whether the blood still flows from the wound.

By the means thus described, bleeding may be checked from all wounds of the extremities; but wounds in the palm of the hand or sole of the foot are especially dangerous, and should never be permitted to go without the advice of a surgeon. For the arrangement of the blood vessels in these parts of the body is peculiar; and an injury to the arteries at these points may result in the loss of the hand or foot, even though the bleeding apparently ceases for a short time after the use of the measures already indicated. It is often necessary in the treatment of such wounds to perform an operation whereby the leading artery can be tied higher up in the arm or leg.

Bleeding from the Nose.

This accident is rarely attended with danger; even when the bridge of the nose is crushed by a blow, the bleeding is usually checked without the use of any other measures than those which have been already described. In most cases it will suffice for the patient to sit erect while the back of the head and neck are bathed with ice-water. If this be not sufficient to arrest the bleeding, a solution of alum in cold water may be injected up the nostrils with a syringe. In other cases it has been found that bleeding from the nose can be checked by inhaling the vapor of warm turpentine.

In some cases it becomes necessary to resort to mechanical means in order to arrest the bleeding. This is, to a certain extent, working in the dark, since it is not always possible to ascertain from what point the blood issues. It is always better to summon a medical man in cases of bleeding from the nose which resist the measures already described; but in the meantime a piece of soft cloth, such as an old handkerchief, may be rolled into the shape of a cone of such size that it can enter the nostrils easily. This may be wound with thread so as to make it firm and yet leave the surface smooth. After being dipped in alum water or spirits of turpentine, this plug can then be gently introduced into the nose and allowed to remain there.

At times it becomes necessary to plug the nostrils where they open into the throat as well as in front. This operation can scarcely be performed by any one except a surgeon. Some individuals have a bleeding from the nose periodically, and seem to feel better after it. Such persons usually feel dull and stupid and suffer from headache for a day or two before the bleeding occurs.

Bleeding from the Mouth.

Blood which escapes from the mouth may come from any one of several sources; the most frequent of these are the throat, the stomach and the lungs. The mouth itself rarely bleeds, except as the result of mechanical violence. Another source for the blood which may issue from the mouth is the *nose*, for bleeding from the

nose sometimes occurs at a point so far back in the nostrils that the blood escapes backward into the throat instead of running from the nose onto the face. Blood which thus falls into the throat is usually swallowed, and may not be noticed until the patient vomits, when it will be supposed that the blood is escaping from the stomach. This is a somewhat rare occurrence—that is, it seldom happens that the blood escaping from some point in the nostrils gets into the stomach without also issuing from the nose; the possibility of it must, however, be borne in mind.

We can usually discover from the appearance of the blood as well as from the manner of its ejection, whether it proceeds from the stomach or from the lungs. It is, of course, an important point to decide, both as to the treatment required and as to the significance for the patient.

When blood escapes from the *stomach*, it is distinguished by the following features:

First.—It is almost invariably of a darker color than that which we designate "red" blood, and also darker than blood which escapes from the lungs. It often resembles coffee-grounds in appearance. This remark may not apply if the blood escapes suddenly and in large quantity into the stomach, for in this case it may have the usual bright red hue.

Second.—The blood issues from the stomach chiefly during the act of *vomiting*, while it is ejected from the lungs mostly by *coughing*. A feeling of sickness at the stomach is frequently present when the blood proceeds from this organ.

Third.—The blood which comes from the stomach is often mixed with particles of food.

Bleeding from the *lungs* is apt to occur suddenly and without any warning in the shape of nausea or vomiting. It frequently happens that the patient is suddenly seized with a violent fit of coughing, during or after which a gush of bright red blood escapes from the mouth and nose.

We can, therefore, recognize the source of the blood when it proceeds from the lungs: first, by its bright red color; second, by its appearance during the act of coughing; and third, by the absence of premonitory symptoms.

Whenever blood escapes into the throat, whether it have proceeded from the lungs or the nose, some of it will be swallowed. In this case the patient frequently vomits, and hence blood may be

ejected which has the characteristic dark color and appearance of coffee-grounds; yet in these cases there need be no affection of the stomach whatsoever

Bleeding from the Bowels.

When blood escapes from the bowels the patient is usually afflicted with hemorrhoids, or "piles." Bleeding from this source need occasion no alarm; indeed the patient's sufferings are usually alleviated by it.

In other cases an escape of blood from the bowels is a symptom of disease higher up in the intestine. The affection which is most frequently accompanied by hemorrhage from the bowels is typhoid fever. In this disease severe bleeding sometimes occurs; and in some cases but little blood escapes from the body, so that the patient may even die from unsuspected loss of blood into the bowel.

We can usually distinguish blood which escapes from some point high up in the bowel from that which comes from piles by the color; blood which issues from piles is usually of a bright red color, while that which proceeds from the upper part of the intestine is generally very dark, or even black; its true nature may in fact escape detection, since it looks very much like pitch.

Treatment. — In every case in which blood escapes from the internal organs — the lung, the stomach or the bowels — medical advice is required immediately. Until such assistance can arrive, some of the following measures may be employed with the hope of arresting the bleeding.

Bleeding from the stomach should be treated by giving the patient pounded ice freely and telling him to swallow it at once. This may be followed by a teaspoonful of milk or water containing fifteen drops of the spirits of turpentine; this dose may be repeated in a quarter of an hour if necessary. It will be well not to burden the patient's stomach with many remedies, since to do so will simply provoke vomiting, whereby the bleeding may be increased. If the ice and the turpentine have been administered, nothing further or better can be done. If these agents be not obtainable, a teaspoon-

full of alum or of tannin may be dissolved in a glass of water, a tablespoonful of which should be given to the patient every twenty or thirty minutes.

If drugs can be readily obtained, the patient should have instead of the alum or tannin, a half teaspoonful of the tincture of ergot; this dose may be repeated at the end of fifteen or twenty minutes.

Bleeding from the lungs should be treated by permitting the patient to inhale the vapor of warm turpentine. A convenient way for accomplishing this is to pour an ounce or two of turpentine into a teapot filled with boiling water, the patient applying the mouth near to the spout of the vessel. Or turpentine may be poured upon a napkin which is folded into the shape of a cone and applied over the mouth and nose; the patient should take deep breaths and the turpentine must be renewed as soon as it evaporates. The chest may be meanwhile rubbed with brandy and water; the patient should be held in the sitting posture, the shoulders supported by a pillow; he should be enjoined not to struggle nor talk.

A popular remedy for bleeding from the lungs, as well as from the stomach, is common salt. A teaspoonful of this may be mixed with pounded ice, if nothing better can be obtained.

Bleeding from the bowels should be treated by giving half a teaspoonful of the spirits of turpentine in a tablespoonful of milk, and by the application of cold cloths over the abdomen. If these measures do not suffice, ice-water may be injected into the rectum, or pieces of ice wrapped in soft cloth may be inserted into the bowel. In these cases the tincture of ergot is a valuable remedy; half a teaspoonful of this may be given, and a similar amount taken at the expiration of fifteen or twenty minutes. The patient should of course lie perfectly quiet, and resist, so far as possible, the inclination to evacuate the bowel.

Bleeding from the Urinary Organs.

Blood frequently escapes from the body mixed with the urine, and it becomes important to know the source from which it proceeds. It may escape from any part of the urinary tract from the kidneys down. If it proceed from the kidneys, the patient rarely

detects the nature of the substance, because the urine does not present the usual red color of blood, but appears of a smoky hue.

If the blood appears in the urine, with its usual bright red color, it has probably escaped from some point in the bladder, or in the urethra. In women, it may, of course, have entered the urine from the vagina.

Bleeding from the bladder is a symptom of several affections. The most common of these is a severe inflammation of the bladder; this will be recognized by the other symptoms present, such as the great pain and frequent desire to pass water. Another source of blood in the urine is a tumor of the bladder. Such tumors are apt to occur in young or middle-aged men, and may cause no other symptoms than the bleeding. A microscopical examination of the urine will detect the nature of the difficulty.

Bleeding occurs from the bladder also in cases of stone in the bladder. In such cases there is usually considerable pain and frequent desire to void urine. The pain is greater when the patient exercises violently, and is usually less severe when he rests quietly in bed.

Bleeding may also occur from the neck of the bladder in patients who have had gonorrhœa. In such cases the blood appears at the end of the act of urination, and is therefore not mixed with the urine. If the bleeding proceed from the bladder, on the other hand, the blood is mixed with the urine and escapes during the entire act of urination.

Bleeding may also occur from tumors in the urethra. These can be recognized only by a surgeon well versed in the diseases of the genital organs.

Fainting.

This subject may be noticed appropriately in connection with loss of blood, since it frequently results from this cause.

Fainting, swooning, or, as it is technically called, *syncope*, is the result of a sudden weakness in the beating of the heart. At times, indeed, the heart actually ceases to beat for a moment. As a result, the blood is no longer propelled throughout the body, and the arrest of its flow to the brain results in a cessation of the functions of this organ. Prominent among these functions is, of course,

consciousness; hence fainting consists, primarily, in a loss of consciousness from weakness of the heart.

The brain has, however, several duties to perform in regulating the different functions of the body, in addition to its work in carrying on mental operations. One of these functions, which depends directly upon a stimulus derived from the brain, is *breathing*. Hence whenever the brain ceases to act for a moment, the breathing stops. This constitutes another prominent feature of fainting.

Fainting is, therefore, essentially the beginning of death, since both the circulation of the blood and the breathing are arrested. In some cases, indeed, death ensues, since these functions are not resumed. In the majority of cases, however, the beating of the heart commences after a few seconds or a few minutes. The rush of blood through the brain revives this organ, and sets in motion again the apparatus which is regulated by the brain; the breathing begins; the consciousness returns; the individual "comes to."

Fainting may occur from any cause which interferes with the action of the heart. Thus a violent emotion may arrest the contraction of the heart; over-exertion of the body may accomplish the same result. Loss of blood is also a frequent cause; blows in the region of the heart, on "the pit of the stomach," are efficient causes; general debility, such as results from lack of food, may cause fainting.

Symptoms.— Fainting is so familiar to all that detailed description is unnecessary. The face becomes suddenly pale and assumes even a ghastly hue; the breathing becomes rapid and shallow; the pupils of the eyes increase in size; the individual becomes dizzy and weak, so that he is no longer able to stand erect, and falls to the ground unless supported. The sufferer describes his sensations as a feeling as if everything were "swimming around." This is usually the last thing that he remembers.

The important point with reference to fainting consists in the recognition of this condition as distinguished from others in which the individual loses consciousness. For there are several other bodily states which are accompanied by sudden loss of consciousness during which the patient falls. The most frequent and important of these are *epilepsy*, *hysteria* and *apoplexy*. A detailed description for distinguishing between these affections has been already given in the chapters devoted to these diseases; it will suf-

fice to mention here a few prominent points which characterize these various affections.

In *epilepsy* the patient usually screams at the moment of falling, and his body becomes rigid, and a few moments afterward distorted by violent convulsions. He foams at the mouth, and his face assumes a livid hue.

In *hysteria* there is never a complete lack of consciousness; the patient does not exhibit the same ghastly pallor and muscular weakness characteristic of fainting. Furthermore, she usually manages to have a few convulsions before recovering.

In *apoplexy* the individual breathes loudly and deeply, the lips are puffed out during respiration, the pupils are usually contracted to a very small size, and the pulse is full and strong.

In most cases the circumstances surrounding the individual point with sufficient clearness to the nature of the difficulty.

Treatment.—The most important point in the treatment of a fainting person is to place the patient flat upon his back, without a pillow. Indeed we may sometimes to advantage lower the head, and even hold the individual in such a posture that the body and legs shall be on a higher level than the head. The object of this position is, of course, to get as much blood to the brain as possible; it is, indeed, merely an attempt to secure by the force of gravity the effect which is ordinarily accomplished by the contraction of the heart. In most cases the patient revives in a few moments if allowed to lie quietly upon the floor or upon a bed, and be permitted to breathe plenty of fresh air. Care should be taken to prevent bystanders from crowding around the fainting person; windows or doors should be opened, so that air may be admitted.

The clothing should be loosened around the neck and chest. Cold water may be dashed upon the face, or upon the breast if this be bare. A bottle of hartshorn may be held about three or four inches from the nostrils, so that its vapor is taken into the lungs.

These measures almost invariably restore the individual if the condition be merely that of fainting from ordinary causes; if they be inefficient, an ounce of whisky or brandy may be mixed with the same quantity of warm water and injected into the rectum.

After the patient shows signs of returning consciousness, he should not be permitted to rise nor even to raise the head from the bed; a low pillow may be put under the head for comfort.

Treatment of Wounds.

In the discussion of wounds, it was stated that the first object of treatment was to arrest the bleeding, the various means for accomplishing which have been already narrated.

The next object is to *cleanse the wound.* The importance of this measure cannot be over-estimated; the execution of it makes all the difference between a rapid and painless healing of the injury on the one hand, and the formation of matter and other accidents on the other.

The exact details for cleansing the wound vary according to the nature and location of the injury. In general, the best plan consists in filling a syringe with *clean*, cold water, which should then be gently squirted into the cut in all directions. It is often necessary to raise the cut edge of the skin in order to direct the water into the cavities of the wound. This is especially true of wounds of the scalp; for in such injuries it frequently happens that the scalp is detached from the skull for a considerable distance away from the edge of the cut. If foreign bodies (particles of dirt, pieces of clothing, etc.,) be allowed to remain, the wound will not heal nicely; it will remain open at some point for a long time and discharge considerable matter; furthermore, there is, under such circumstances, danger of the occurrence of erysipelas.

While we are thus careful to remove all foreign substances from the wound, we must be equally cautious in preventing the introduction of any matters which can injure the tissues. Care should be taken to employ only clean instruments and clean water in handling the injured part; and the hands themselves should be scrupulously cleansed before being allowed to come into contact with the wound. If time can be obtained, it will be well to procure some disinfectant in order to wash the wound, and to employ as a dressing. For this purpose, carbolic acid may be used; care must be taken, however, not to bring the *strong* acid in contact with the wound, since it will burn the parts severely. A solution of the acid in water can be employed, one part of the acid to twenty-five or thirty parts of water being about the best proportion. After mixing the acid with the water, the solution should be thoroughly shaken or stirred in order to secure thorough mixture; otherwise drops of the pure acid may remain in the water and cause a severe burning when applied to the wound.

Carbolic acid is objectionable in many respects as a disinfectant for popular use; many accidents have happened through carelessness or ignorance in substituting the strong acid for the proper solution in water; moreover, it takes time to prepare and thoroughly mix the acid. For these reasons, it is desirable to have some other substance which can be prepared for use more quickly, and which cannot, even in the hurry and excitement consequent upon an accident, be carelessly or ignorantly employed to the patient's disadvantage. The best agent which can be kept on hand for use in the household treatment of wounds, is a solution of several of our best disinfectants which is sold under the name of "Lambert's listerine." This preparation has come into general use among physicians as a most pleasant, reliable and convenient dressing for wounds. It will keep indefinitely, and hence, may be constantly kept in the house for use in emergencies. This liquid should be diluted with water in washing out fresh wounds, one part of the listerine being mixed with four parts of water.

After the wound has been washed out, care should be taken to restore the injured parts, so far as possible, to their natural position and to keep them there. If the edges of a wound are allowed to gape widely, the process of healing will be a slow and tedious one, and will probably be complicated by a profuse production of matter.

In order to accomplish this object the edges of the wound should be gently dried with a soft towel. Any blood clots which may lie in the cut or around its edges should be gently and carefully removed. If these seem to be firmly attached, or if they are formed at a point which has recently bled profusely, it will be well not to touch such clots of blood; for their removal might be followed by a recurrence of the bleeding.

The edges of the wound should then be drawn together so far as the nature of the injury permits. To hold them in position surgeons resort to three different measures, which may all be employed in the treatment of the same wound.

The first of these measures is the application of *stitches*. This is a delicate operation, which can moreover be made to inflict considerable injury rather than benefit, if performed by unskillful hands. It is, therefore, advisable for the non-professional bystanders to refrain from any attempt to stitch up the wound, leaving this to the discretion of the surgeon upon his arrival.

The second means for closing a wound is the application of sticking-plaster. The best variety of plaster is that which is made for surgical use. This can be applied, however, only by a somewhat practiced hand. The best form for popular use is, perhaps, that which is known as the "Mitchell Novelty" plaster, or a kind which is called Martin's adhesive plaster. One or both of these may be kept in the house for emergencies. If there be nothing at hand except the common "court plaster," or some of the numerous "moisture plasters," these may be employed until something better can be obtained.

This plaster should be cut into strips from one-quarter to one-half of an inch in width, and long enough to secure a firm hold on the skin on either side of the cut. The exact length will of course vary, according to the location of the wound. The vicinity of the injured part is then again cleansed and dried. If the wound be upon the head, or other part of the body covered with hair, the hair should be clipped as closely as possible on both sides of the wound in order to give the plaster an opportunity to adhere to the skin.

The strips of plaster should be applied one at a time, usually at right angles to the length of the wound. In order to accomplish this nicely, the edges of the wound should be carefully drawn together and held in position by one person while another applies the plaster. A strip should be applied to the skin on one side of the cut and at one or the other end of the wound, the middle of the strip being held over the injured skin. This is made to adhere upon one side of the cut, and while it is pressed firmly against the skin with one hand, it is gently drawn to the opposite side of the wound. The plaster is then pressed firmly to the skin on the other side of the cut, beginning close up to the opening. After it is attached at this point the remainder of the strip may be spread out and firmly pressed to the skin. A second strip of plaster is then applied in the same way, and so that its edge shall touch that of the first strip. If there be much tendency to gaping of the wound, it will be better to apply the second strip, so that its edge slightly overlaps that of the one already applied. A third strip is then placed in position in a similar manner, and so on until the wound has been closed along its entire length.

If the wound be a deep one, or if the edges be not clean cut, it will be well not to close the entire wound, but to leave the lower end of it uncovered; the object of this is to permit the escape of

matter and blood which may be formed and ooze into the wound. If the cut be closed along its entire length, and matter should be subsequently formed, the healing process will be retarded, the edges of the cut will swell and fail to unite; by leaving an opening through which the matter can escape, we can at least secure healing for the wound through the greater part of its extent. In such a case it will be advisable not to place the strips of plaster in contact, but to leave spaces between adjacent strips, so that the matter can escape at several points, if necessary.

If the wound be not a deep one, no further dressing is required than a simple wet cloth. This may be kept in position by a bandage pinned somewhat tightly around the injured part.

If, however, the wound be a deep one, so that it penetrates through the skin and fat into the red flesh beneath, it is necessary to employ the remaining means for keeping the parts in their natural position. This *third* measure consists in the application of a bandage and compress.

By a compress we mean simply a piece of lint or soft cloth, folded so as to make three or four thicknesses, and wet with cold water. This is laid upon the wound so as to cover the edges and the skin in the immediate vicinity. A stout muslin bandage may then be snugly applied to the limb, so as to exert considerable pressure upon the edges of the wound, though not so tightly as to cause the patient much pain.

The *fourth* object in the treatment of wounds is an effort to secure perfect rest for the injured member. The location of the injury must of course determine just what is necessary in order to keep the part in perfect repose. If the injury has been inflicted upon the lower extremity, the individual should keep the recumbent posture; if the arm be the seat of the injury, a bandage or sling should be arranged so that the patient cannot thoughtlessly use the arm, or even the fingers. This is an important item of treatment, the neglect of which will retard the process of healing, or even cause the half-healed wound to break out afresh.

If the injured member feels perfectly comfortable except for a slight smarting, the dressing need not be changed for a day or two; in fact, if the cut be not deep, a single dressing often suffices, and may be allowed to remain for a week or ten days. If, however, the wound be the source of pain, the bandage and the compress should be removed and fresh ones substituted, the bandage being

this time applied somewhat more loosely than before. If the sticking plaster become loosened and the edges of the wound show a tendency to separate, fresh strips should be applied. This is a matter requiring considerable tact and delicacy; two or three points should never be forgotten. First, each strip should be loosened at both ends, which are then lifted at the same time, so as to separate the plaster from both sides *toward* the cut, thus detaching the plaster last from the very edges of the wound. The object of this is, of course, to prevent these edges from separating, as will usually occur if we simply loosen the strip at one end and then pull it from the skin. A second point in applying the new strips is, care to put on each fresh strip before the old one lying next to it has been removed; the strips are, therefore, replaced one by one successively. If we take off all the plaster before applying the fresh strips, the edges of the wound are left without any support and may fall apart.

If there is no discharge of matter from the wound, no further dressing will be required than those mentioned. If, on the other hand, matter be formed, it will be necessary to arrange the bandage so that pieces of lint or soft cloths wet with cold water can be kept constantly applied. If the solution of listerine above mentioned be at hand, these cloths may be wet with this liquid instead of simple water.

Care must be taken to secure the free discharge of matter from the wound, and to prevent its accumulation in the dressings. For this purpose the dressings (all except the plaster) may be removed two or three times a day — or oftener, if necessary, to keep the wound clean — and the surface should be washed with the listerine solution. A sponge should be wet with this solution and squeezed so that the liquid falls upon and washes the surface.

If the edges of the wound be reddened and elevated, there is probably some collection of matter underneath. In this case the wound should be syringed out very gently with the listerine and water. The syringe used for this purpose should be of hard rubber and should be carefully washed and cleansed every time it is used.

With this treatment the wound can usually be healed without the occurrence of any untoward accident.

It should be remembered that a wound is sometimes the seat of severe inflammation, especially that form which is known as erysipelas. The occurrence of this accident is indicated by a diffuse

redness and swelling of the edges of the wound; at the same time the patient usually has a severe chill, or series of chills, followed by a high fever. For a complete description of the disease, the reader is referred to the chapter on erysipelas.

Another complication which sometimes follows upon wounds is the occurrence of blood-poisoning — technically called *pyæmia*. This accident is, however, seldom met with after simple wounds of the flesh, being commonly observed in cases of injury in which a bone has been damaged.

Punctured Wounds.

Hitherto we have referred chiefly to wounds made with sharp instruments, whereby the flesh is cut cleanly. Such wounds are called *incised* wounds. There are, however, injuries which claim especial attention, from the character of the wounds inflicted. The treatment varies somewhat, according to the nature of the wound and the way in which it was received.

Surgeons divide wounds, for convenience of description and discussion, into four classes: incised, punctured, lacerated and contused wounds. The special features of these are indicated by the names. A punctured wound is made by a pointed instrument, such as a needle or a bayonet.

A lacerated wound is an injury to the flesh, by which the skin and soft parts are torn.

A contused wound is one in which the flesh is extensively bruised.

Punctured wounds are made by many different instruments. The commonest ones result from the entrance of pins, tacks, nails, splinters of wood and the like, into the flesh. These wounds are often more serious than their extent would seem to indicate. This fact seems to result from the nature of the opening into the flesh, and from the tendency of the skin and muscles to close after the instrument is withdrawn. The injurious effects are often due to the accumulation of matter or blood in the bottom of the wound. The outer part heals over, but matter forms within, causing heat, redness and swelling of the skin. After a time the wound may break open again or a serious inflammation may proceed from this point and involve the surrounding skin.

Another accident which often accompanies punctured wounds, is the entrance of some foreign matter with the instrument. This matter may be scraped off by the flesh and remain in the wound, where it will excite inflammation.

The danger of a punctured wound depends upon the organs injured, upon the size of the wound, but especially upon the condition of the instrument with which it was made. A wound made with a clean instrument, or in such a way that it can be readily washed out, is not especially dangerous; but when the injury is inflicted by rough and dirty instruments, such as a rusty nail, healing does not occur rapidly nor kindly. In these cases the tissue is usually bruised and lacerated along the track of the wound, so that much of it mortifies and excites irritation, just like the presence of a foreign body. In such cases there is apt to be also some dirt or sand or the rust of the nail left in the bottom of the wound.

There is still another feature which renders a punctured wound especially dangerous; this is the liability to the occurrence of *lock-jaw*. This disease seems to follow injuries inflicted with dull, rather than sharp instruments, and seems to result from the bruising of a nerve somewhere in the course of the wound.

Punctured wounds are, of course, especially dangerous wherever the flesh is firm and bound together by strong sinews and sheaths; this condition prevails especially in the palm of the hand and the sole of the foot. It has been already mentioned that even clean-cut wounds are to be watched with especial care when they are made in the hand or foot; and this caution is doubly necessary if the wound be not clean cut or *incised*, but *punctured*.

The smaller punctured wounds are often more dangerous than those inflicted with larger instruments, simply because they afford less opportunity for the escape of matter and foreign particles.

Treatment. — In treating a punctured wound, we should first of all extract the instrument which has inflicted the injury, if it still remains in the wound; and we should be careful to ascertain that no fragment has broken off and remained in the flesh. Thus, when a splinter of wood has entered the skin, a piece of it is almost certain to remain imbedded in the flesh. If this be allowed to stay, matter will form around it and a sore will be formed proportionate to the size of the foreign body which causes the trouble. It is, therefore, advisable in every case in which a particle of for-

eign matter remains in the flesh, to enlarge the opening with a sharp knife, or other suitable instrument, and to remove the foreign body with pincers or forceps. This is far better and more satisfactory than to attempt to pry it out with a needle or pin; for such an attempt merely irritates the wound and rarely accomplishes the desired object.

If the point of a needle be broken off in the flesh, the part should be kept perfectly quiet until the opening can be enlarged; for such sharp objects soon disappear deeper in the tissues, if the limb be moved. It is surprising to see what journeys through the body needles sometimes perform; they may appear months or years subsequently at some distant portion of the surface. Fortunately, they rarely do any harm in these wanderings through the body.

If the needle can be felt in the skin, the flesh may be squeezed up so that one end or the other of the needle can be brought near to the surface; the skin should then be cut at this point, the needle pushed until the end appears in the cut, and then withdrawn with the pincers.

In every case in which a punctured wound of considerable size is made, the opening should be thoroughly cleansed with carbolic acid solution, or with the mixture of listerine and water above mentioned. After this a compress of lint saturated with the same solution should be applied over the opening and kept in position by a snug bandage. The limb should be kept perfectly quiet, and the compress may be moistened every two or three hours and reapplied.

This dressing may be continued for three or four days if the wound seems to progress favorably. At the end of this time it will be evident whether the patient is going to experience serious trouble from the injury. If such be the case, the flesh in the vicinity of the wound will be swollen, red and painful; the patient is apt to feel a burning and throbbing pain in the limb, at first confined to the immediate vicinity of the wound, but subsequently spreading up the arm or leg.

So soon as swelling, redness and a burning pain occur, the part may be covered with a soft, warm linseed poultice, and this should be renewed every two or three hours. This treatment will sometimes enable matter which may be forming to escape to the surface; if it does not, that is, if the pain and swelling continue unabated or even increase, it is pretty certain that matter has

accumulated in the bottom of the wound. There is but one course open when this accumulation of matter occurs; this consists in opening the wound down to the matter and permitting this to escape. A sharp penknife, carefully cleansed, should be introduced into the original wound and carefully passed into the flesh until, upon its withdrawal, matter appears upon the knife blade and in the wound. This is an extremely important item; for it does no good to enlarge the superficial part of the opening without permitting the pent-up matter to escape.

If this little operation be successfully performed, the patient will experience considerable relief in the course of a few hours; the poultices should be continued for another day, or until the swelling and the throbbing pain have subsided.

It is important that provision should be made for a free discharge of the pus; otherwise the skin may heal over again before the bottom part of the wound has healed. If the symptoms just related — the swelling and throbbing pain — occur a second time, the knife should be introduced as before, and, in order to keep the passage open until the bottom of the wound has healed, a little plug of white wax should be made and inserted almost to the bottom of the wound. This wax may be cut into the general shape required, and then moulded and its surface smoothed by immersion in hot water. As the wound heals from the bottom, the outer end of the plug may be gradually cut off.

By carefully providing for the escape of matter, we diminish very considerably the danger of lock-jaw.

Lacerated wounds usually give the patient considerable trouble from the slowness with which they heal. This tardiness does not result from any inherent difficulty in the healing process, but simply because the edges of such wounds cannot be accurately kept in position. When a wound is torn or lacerated, the edges of the skin and flesh are more or less ragged, and the ends or rags of flesh usually mortify.

Whenever it becomes impossible to bring these edges accurately together; whenever, therefore, raw spaces remain between the edges, the wound heals by the formation of new flesh and skin. The bottom of the wound becomes filled with numerous small elevations as large as pin's heads. These are of a deep red color, and are covered with a yellowish creamy liquid, which is called

healthy pus. These little red bodies, called *granulations*, are filled with blood, and bleed readily upon slight pressure.

These granulations are gradually converted into flesh, which fills up the bottom of the wound. As fast as the lower part of the wound is thus closed by new flesh, the granulations rise to the surface; in other words, the wound becomes shallower. When they have attained the level of the skin, it will be observed that the edge of the wound is lined with a very delicate white margin, which is continuous with the surrounding skin. This delicate margin is the new skin which is growing over the surface of the granulations.

If the parts remain healthy and free from complications no further treatment is required for a lacerated wound than simple cleanliness and protection from mechanical injury. The red surface of the granulations should be washed with water two or three times a day, care being taken that no pus remains collected in some nook or corner of the wound. After this washing, a little vaseline should be spread upon lint, and this may be laid over the wound, so as to cover the edges of the surrounding skin. A bandage loosely applied, or a few adhesive straps, complete the dressing.

It sometimes happens that these granulations are not perfectly healthy. In this case they become much larger than natural and usually have a pale red color. Such granulations are called by surgeons "flabby," and in popular parlance "proud flesh." This condition is especially apt to occur when the wound has been filled up to the level of the skin, the flabby granulations, or "proud flesh," rising above the general surface.

The conditions of the granulations can be readily improved, that is the proud flesh can be removed, by simply applying to the surface some burnt alum. This should be thickly dusted on those parts where the granulations are most prominent. Two or three such applications usually suffice to reduce the surface to the level of the skin. If the proud flesh resist this treatment, it may readily be removed by lightly touching it once a day for two or three days with a stick of lunar caustic.

The formation of the scar completes the process of healing. With reference to scars, it should be said that they always decrease in size within a few months or years after the infliction of the wound. It is sometimes surprising to see how small a scar has become in comparison with the size of the wound on which it was formed.

This tendency of scars to contract and grow smaller has, however, a disadvantageous as well as a beneficial side, for if the scar be extensive it may have a tendency to deform the surface by drawing it out of shape. Thus, burns of the neck frequently result in a form of "wry-neck," whereby the chin is drawn downward toward the shoulder.

Scars are at first quite red, but become in the course of time as white as the surrounding skin.

There is one feature in connection with lacerated wounds which may be borne in mind, namely, that they rarely bleed profusely. Hence the immediate danger from such a wound is far less than from a clean-cut incised wound of the same or even less extent.

In dressing all wounds, care should be taken to preserve the tissues so far as possible. In many cases especially of lacerated wounds it becomes necessary to trim off shreds of flesh and skin, but this should be done sparingly with regard to the skin. Every piece of skin, however small, is of value in hastening the process of repair and in diminishing the size of the scar.

When lacerated wounds are very extensive there often occurs considerable difficulty in securing skin enough to cover the wounded surface. It is not necessary that all the surface be covered with skin at the time the wound is dressed, but the skin should be so arranged as to divide up the raw surface into small patches instead of leaving it all in one large piece. The importance of this lies in the fact that when the wound is filled up with granulations, it often refuses to heal entirely. New skin will be formed at the edges to a certain extent, but it will not spread over the entire surface. Such cases require the care of a surgeon, and often tax his ingenuity and skill. Several ingenious devices have been introduced into surgery within comparatively few years and are now extensively practiced. One of these consists in what is called "skin grafting." Small pieces of skin are cut from other parts of the body, and are "planted" on the surface of the granulations. A dozen or two of these may be thus scattered around on the open surface of a large wound which refuses to heal under ordinary treatment. These little pieces may be either laid upon the surface or inserted into little openings made with the point of a knife. The wound is then covered with oiled silk, which is retained in position by strips of sticking-plaster. In the course of a few days small bluish white

specks may be seen upon the surface, which gradually enlarge until it becomes finally evident that each one of them is a little island of new skin.

Another device which has rendered excellent service, is what is called "sponge grafting." This consists in planting small pieces of fine, soft sponge at different parts of the surface of a wound covered with granulations. The granulations grow up into the meshes of the sponge, and thus new flesh is built up in and around the scaffolding of sponge. This measure has been found especially useful in cases in which pieces of flesh have been cut out and lost. In such cases the surgeon can sometimes build up the end of a finger or thumb, instead of having a deformed and unsightly flattened member.

Another point with reference to lacerated wounds should be mentioned here, namely, that no tissue should ever be thrown away if completely separated from the body, unless it be torn and mangled. A piece of skin which has been entirely removed from the surface wlll often grow again if it be carefully cleaned and re-applied to the raw surface. In fact the writer has cut out pieces of skin from legs which had been amputated three hours before, and has seen them grow when planted on wounds of other individuals. So, too, the end of the finger, or of the nose even, if completely severed from the body, may often be made to grow again in its proper position. To accomplish this it must be carefully washed with warm water, accurately fitted to its former position and firmly strapped there by means of adhesive plaster and bandages. The member should be wrapped in cloth wrung out in hot water, since the circulation will be promoted by warmth and moisture.

Contused wounds are those in which the skin has been not only severed, but also bruised. A bruise implies the rupture of some of the blood vessels in the skin and an escape of blood from these vessels into the meshes of the skin. So long as the skin is not wounded, that is, while the injury remains simply a bruise, no great danger is to be apprehended. But if the bruise be complicated by a wound, the injury is an important and serious one. The gravity of these wounds seems to depend upon the danger that the blood which escapes into the skin may undergo putrefaction. If it does, there will result mortification and formation of matter around the wound, with perhaps extensive death or "gangrene" of the surrounding skin; and there may occur a poisoning of the blood.

Contused wounds rarely bleed profusely, since the blood vessels are torn rather than cut, and the blood clots in the meshes of the skin.

Treatment.—The general principles required in the treatment of contused wounds are the same as those already discussed in describing incised and lacerated wounds.

The first object of treatment is to stop further bleeding. The necessity for this will be indicated by a constant swelling of the part rather than by an escape of blood from the wound; for it is to be remembered that the blood escapes into the meshes of the skin, and that considerable hemorrhage may occur without the appearance of blood externally. It is therefore advisable to apply cold water or ice to the part, and to raise the limb.

The difficult part of the treatment of contused wounds is the prevention of inflammation and perhaps gangrene of the part. For this purpose, that is to preserve the vitality of the tissues, there is nothing better than simple warmth and moisture. Hence so soon as the bleeding has ceased, the limb should be wrapped in cloths saturated with hot water, and these should be renewed every two or three hours or oftener if required to keep the limb very warm and moist. These cloths may be covered with oiled silk or rubber cloth to retard evaporation.

It is rarely necessary, or even advisable, to attempt to secure rapid healing of the skin by the use of sticking plasters; for if there be much bruising of the flesh around the wound, its edges will not unite promptly under any treatment.

In many cases it will be observed after a few days that some of the skin in the vicinity of the wound has become black and emits a fetid odor; this skin is dead or "gangrenous," and must be removed with the scissors.

Gunshot Wounds.

Under this term are included all wounds made by substances discharged from firearms.

The effect of a gunshot wound varies, of course, extremely with the nature of the missile as well as the part of the body injured. One of the usual effects is a condition which much resembles faint-

ing, and which is called *shock* or *collapse*. This condition may follow any severe injury, and will be discussed in a separate chapter.

Cannon shot grinds to powder any human tissues which it meets within five or six hundred yards of the gun. If it strike a limb, the ball carries it away or grinds it into pulp.

The bleeding from a cannon shot is not usually severe, since the vessels are torn across and the blood clots at once; moreover, the condition of shock supervenes, during which the heart's action is very feeble, and the blood is not propelled with much force.

After a cannon shot has traveled a greater distance and has thus lost much of its impetus, it is still capable of inflicting severe and even fatal injury. A curious feature about the course of such a spent cannon ball is, that its course may often be changed by objects which it meets, without affecting its power to inflict injury.

"A private in the First Royals was working in the trenches before Sevastopol. He was in the act of shoveling up some earth, with his body bent and his right hand in which he held the handle of a shovel low down in front of the space between his legs. In this position he was struck by a round shot. It shattered his arm, leaving it hanging only by the skin, and passing between the thighs at their upper parts, it tore away from each of them a large mass of the integuments and muscles, and laid bare the femoral artery on one side. It carried in front of it the genital organs, and guided by the curve of the buttocks, it swept away a large portion of the hip on one side."—*Druitt*.

Cannon shot, when nearly spent, may inflict severe injuries without breaking the skin. Even when rolling along the ground it retains power enough to take off a man's foot—a fact which has surprised many a soldier who attempted to stop one of them by putting out his foot.

A popular notion prevails that the "wind" of a ball, that is, the current of air set in motion by its flight, is capable of inflicting serious injuries without actual contact with the ball itself. Experience on the battle field has shown that this idea is erroneous; many instances are known in which a person's clothes have been torn away without causing him any serious injury. "A shot ricochetted with great force over one of the parapets, carrying away the cap from a seaman's head. The man was a little stunned, but no further mischief ensued. When the cap was picked up it contained a handful of hair which had been shaved from the scalp

by the shot. This would have been a 'poser' for the old wind contusionists."—*Duygan.*

Musket and rifle balls produce the greater number of injuries inflicted during a battle. Although they rarely cause such frightful lacerations as those produced by cannon balls, yet they are capable of destroying bones and flesh quite as effectually.

Small shot fired from a shotgun produce different effects, according to the distance which they may have traveled before striking. The shot always scatter after leaving the gun, and after they have become separated they rarely penetrate the flesh to any great distance. So long as they remain together, however, they inflict very serious injury, which may be indeed more severe than that caused by a musket ball.

Firearms which contain no ball may, nevertheless, cause serious damage by the impact of the wadding. Gunshot wounds of all kinds are furthermore complicated by the effects of the gunpowder, if the weapon be discharged at short distance from the individual who receives the charge.

Bullets frequently pursue a roundabout course in their passage through the body. They are apt to be deviated from their original direction by striking the bones or hard articles contained in the clothing. Even a suspender button may be sufficient to divert a ball from its course. In consequence of this fact, it is often impossible to tell what course the ball has pursued after penetrating the skin, or where it should be looked for. Instances are known in which a ball has entered the chest, struck one of the ribs and traveled clear around the body under the skin, without penetrating the heart or lungs; sometimes such a ball emerges at the side of the back-bone at a point opposite the wound made by its entrance at the front; in such a case the natural supposition is that the bullet has passed directly through the body, though it may really have inflicted no serious injury. The position of the limbs evidently modifies the course of the ball which may strike them; if the bullet strikes the arm obliquely for instance, it is very apt to glance off and emerge from the skin at a point a few inches from that at which it entered. Many curious instances are related, showing the remarkable effects upon the course of a ball which may be exerted by the simplest accident. Druitt relates the case of an officer who was struck in the abdomen by a musket ball. The bullet came into contact with a button of his trousers, which it bent double.

Its direction was changed by this obstacle, so that instead of entering the abdomen it turned down and lodged in the thigh. Another man was struck in the neck by a bullet; it entered the skin at the side of the larynx, "Adam's apple," passed completely around the neck, and was found lying in the hole where it had entered. When a bullet passes thus superficially under the skin, it often leaves a track which is marked by a dark red or blue line. This may, however, be so small as to escape attention.

It is often, for many reasons, important to know which of two orifices made by a bullet is the one at which the ball entered. This can usually be decided without difficulty. The opening made by the ball during its entrance into the body is usually smaller than the bullet itself, and its edges are turned inward. The orifice left by the bullet in leaving the body, on the other hand, is usually larger than the ball itself, and its edges are turned outward.

Treatment of Gunshot Wounds.—The plan of treatment adopted for the treatment of gunshot wounds has, like other departments of surgery, undergone essential modification in the past few years. It was formerly the custom of surgeons to probe the wound at once and to make every effort to extract the ball. Experience has shown, however, that the operation of probing may cause far more serious damage than the presence of the ball itself; in fact, if no other body than the bullet have been carried into the wound, no particular danger is to be apprehended from it subsequently; the damage done is inflicted by the movement of the bullet; after this has come to rest, it ceases to exert an injurious effect.

The popular impression still is that the bullet must be extracted at any cost, and that the patient has but little chance of recovery until the ball be removed. Many a surgeon has sacrificed his judgment to this popular prejudice and has attempted to find and extract a bullet when he really believed that it would be better for the patient to omit all efforts in searching for the ball.

There is one feature in many cases which warrants an attempt to find and remove a bullet; this is, the possibility that particles of clothing have been carried into and have lodged within the wound. If this have occurred, the wound often refuses to heal; considerable matter is produced and discharged, and the patient may suffer from severe fever and even blood-poisoning (pyæmia).

If the ball be lodged near the surface, it can usually be detected at once by a simple probe or by the finger; in this case it may be extracted with the pincers or forceps. It is, however, not desirable to search very vigorously for the missile. Sometimes the bullet can be found lying just under the skin; in such a case a cut may be made through the skin and the bullet extracted.

Generally speaking, we may lay down the following rules for the treatment of gunshot wounds:

First—Be sure that every instrument and finger which approaches the wound is *perfectly clean*. By this we mean not simply that the fingers and instruments shall be clean in the ordinary sense of the word, but also that they shall be thoroughly disinfected.

Second—Insert a simple probe or, if the wound be large, a finger into the wound and search for the ball; if it be not found at once, without attempting to enlarge the wound, desist from further probing.

Third—Syringe out the wound with one of the following solutions:

Carbolic acid, - - -	Two drachms.
Water, - - - -	Eight ounces.

Or, if more convenient:

Listerine, - - - -	One ounce.
Water, - - - -	Five ounces.

(The ingredients and fingers which are allowed to touch the wound should be thoroughly cleansed with one of these solutions before being introduced.)

Fourth—Place a compress, that is a piece of folded lint wet with one of these liquids, over the wound and hold it firmly in place with a bandage.

Fifth—Keep the wounded member perfectly quiet; if the wound be severe, the patient should be kept in bed for a day or two.

The bleeding from gunshot wounds is not often profuse or dangerous. The most severe cases are those in which the blood escapes into the interior of the body. In such instances the patient may bleed to death before the bystanders have any suspicion that such an event is possible, since little or no blood escapes from the wound.

The termination is preceded by rapid failure of the patient's

strength; he becomes blanched, his pulse is weak and rapid, and consciousness is gradually lost.

The treatment of hemorrhage into the interior of the body is in many cases ineffectual, though sometimes it becomes possible for a surgeon, acquainted with the anatomy of the parts, to reach and close the bleeding vessels. The only household remedies that can be employed are *tincture of ergot*, a teaspoonful of which may be given at once and repeated in half or three-quarters of an hour. The patient should be kept perfectly quiet, and his strength should be rallied by the administration of alcoholic stimulants, such as egg-nog.

Shock.

This term is applied by surgeons to the state of depression which occurs after a severe injury. This depression manifests itself by an impaired action of the nervous system, including weakness of the heart-beat and interference with breathing.

Symptoms.—After receiving a severe injury, the patient becomes cold, faint, perhaps semi-unconscious; the limbs tremble, and are unable to support the weight of the body. The pulse is very weak and rapid, and can sometimes be scarcely felt at all. The skin is cool, and often covered with clammy perspiration; nausea and vomiting occur. The patient's mind may remain quite clear, though more frequently he is bewildered and unable to answer questions coherently.

This condition of shock is more frequently observed after severe bodily injury, but may also be induced by excessive mental emotion, especially fright. The general symptoms are essentially the same in both cases, showing that the condition results from a depression of the nervous system.

Many interesting experiments upon animals illustrate the mechanism of shock in the human subject. Thus we may expose the heart of a frog and observe that it continues to beat regularly and quietly. If, however, a leg of the frog be crushed with a hammer, the motion of the heart is arrested at once.

Shock may follow an injury of trifling extent, if the wound be inflicted upon a vital part of the body. In nervous and timid indi-

viduals a comparatively slight injury, which does not affect any organs of vital importance, may also be followed by the ordinary symptoms of shock. Thus, an officer was observed to fall from his horse during a battle in the late civil war. Examination showed that a bullet had pierced his breast, and he showed all the symptoms of severe shock. Upon opening his clothes to dress the wound, the surgeon was surprised to find that the bullet had been stopped by a memorandum book in the breast pocket of the coat, and had not reached the skin.

The result of shock depends largely upon its severity, as well as upon the condition of the patient at the time of the injury. The danger lies in the weakened action of the heart. If this depressing effect exceed a certain point, the heart's action ceases entirely. In some cases the patient dies within a few minutes after the receipt of the injury. In other instances he rallies for a time, but sinks again in the course of a few hours. In the latter case he may have regained temporarily full possession of his mental faculties, and the heart may have resumed its contraction with a fair degree of force. If the patient sink a second time the face becomes pale, the skin cold and clammy, as before; the mental functions are more disturbed than they were immediately after receiving the injury. In most instances the patient dies during this second collapse.

Treatment.—The prime object of treatment is to strengthen the beating of the heart.

If the shock be caused by a bodily injury, the strength of the heart's action can be increased by the use of two remedies—*ammonia* and *alcohol*.

The ammonia may be given by permitting the patient to inhale it; the hartshorn should be held near to the nostrils, and the patient should be told to take long breaths. If the hartshorn be fresh and strong, it should not be approached closer than four or five inches to the nose; or it may be diluted and held still closer.

Alcohol should be given in the shape of whisky, brandy or wine; a tablespoonful of one of these liquors may be administered in water or milk every twenty minutes until the pulse becomes stronger and the patient shows some sign of reviving. If vomiting occur, the whisky or brandy should be mixed with an equal bulk of milk and injected into the rectum. In severe cases the stimulating effect of these remedies can be most rapidly obtained by

injecting whisky or ether under the skin with a hypodermic syringe.

The heart can also be strengthened by the application of warmth to the body. The patient should, therefore, be warmly covered, and hot bottles or flat-irons wrapped in flannel, so as not to burn the skin, should be applied to the feet, between the thighs, to the sides, and in the armpits. The hands and arms may be rubbed briskly for the same purpose.

In desperate cases extraordinary measures are sometimes required to tide the patient over the first half hour or hour of depression. Some of these measures are easily understood and applied. It is a general principle that the heart is stimulated to contraction by the presence of blood within it; this can be readily shown by removing the heart from a dog, for instance, and laying it upon the table, where it will continue to beat for a number of minutes, but finally become quiet. If we now inject some warm blood into the cavity of the heart, the organ begins to beat again with renewed vigor.

This principle can be applied in various ways to stimulate the failing part of a patient suffering from a shock. One of these ways is the injection of warm blood into the vessels of the patient—an operation known as *transfusion*. This operation has been extensively practiced, but because of its delicacy and of the dangers incident to it, it can be undertaken only by a medical man. To perform it, fresh blood is drawn from a bystander or from an animal, and briskly whipped with a bunch of clean straws until all the stringy part—the fibrine—has been separated from the rest of the blood and adheres to the straw. The part of the blood which remains liquid is then introduced into the arm of the patient.

The effect is often most remarkable; the pulse, which may have been so weak that it could not be felt at the wrist, becomes quite strong and full; consciousness returns, the face acquires a little color, and the patient rallies markedly from his former condition.

The good effects of the transfusion are apt to be transient, however; within three or four hours the individual may relapse into his former condition and require further stimulation.

The dangers which accompany the introduction of blood into an individual have led to the employment of various other liquids as substitutes. Prominent among these are milk and a solution of

salt in warm water. A detailed discussion of these measures is unnecessary in a work of this sort, since the operation is one of the most difficult and delicate in surgery, and should, of course, never be undertaken by a non-professional person.

There are, however, several ways for securing a stimulation of the heart through an increase in the quantity of blood. While the introduction of blood from another person into the heart of the patient is both difficult and dangerous, it is a very simple procedure to introduce the patient's own blood from other parts of his body into his heart. In other words, we can *transfuse the patient with his own blood.* To accomplish this we have simply to force the blood from other parts of the body to the heart, and to prevent it from returning again.

This plan can be carried into execution by elevating the legs of the patient, or by wrapping them firmly in an elastic bandage. In many cases the heart's action is much strengthened by simply raising the patient's legs from the bed, and by supporting them in this position for fifteen or twenty minutes. This should always be done whenever the patient's condition is such as to threaten imminent death.

The quantity of blood sent to the heart can be increased by enveloping the legs in elastic bandages. The bandage should be applied while the leg is elevated, being wrapped first around the toes and then extended up the leg to the middle of the thigh. This may be allowed to remain for half an hour, at the expiration of which time the other limb may be bandaged in the same way, the bandage being removed from the first. It is not desirable that the bandage be allowed to remain upon one limb more than thirty or forty minutes at a time, since the nutrition of the part may suffer if the blood be kept out of the limb for so long a time, and portions of the skin or muscles in the leg may mortify after the bandage is removed.

This measure, taken in connection with the use of stimulants and the frictions of the surface which have been already described, may often succeed in keeping the patient alive during the few hours which succeed the infliction of the injury.

It should be remembered that the use of stimulants during shock can be carried to excess. In this case the patient will be apt to suffer from fever and delirium after he rallies from the injury. It is therefore necessary to discontinue the alcohol when the signs of returning strength become apparent.

Poisoned Wounds.

It has been already stated, in the discussion of wounds in general, that the natural tendency of a wound is to heal, and that any failure to heal is evidence either of some constitutional taint in the individual or of the entrance of foreign particles or substances into the wound. In many cases these foreign substances are of unknown nature; they seem to be constantly present in the atmosphere and to adhere to all articles which are exposed to the air; hence, unless especial care is taken to prevent their access to the wound, their effects become visible in the delays and accidents which retard healing.

There are other cases in which the course of a wound is disturbed by the introduction of foreign substances of known origin. The chemical poisons of various kinds are frequently introduced carelessly or ignorantly into wounds which would otherwise heal without difficulty; and as a result of such introduction, the healing of the wound is retarded, and perhaps the life of the patient is imperiled. Then there are numerous animals and insects whose bite is accompanied by the introduction of poison secreted in their bodies. A familiar example of this is the musquito; the wound made by this pest is trifling in itself, less extensive, indeed, than the prick of a needle; yet this wound is followed by far more irritation than can be originated by the point of a needle. The explanation lies in the fact that the musquito deposits in the wound which he makes an irritating poison. The most common variety of poisoned wounds is that which results from the introduction of *putrid animal matter*. The process of decomposition or putrefaction includes the formation of numerous substances which possess poisonous properties. The exact time at which these substances are formed varies under different circumstances, occurring earliest of course in warm weather. Within a few hours or days after death the carcass of an animal putrefies to such an extent that some of these poisonous substances are contained in the flesh and juices. The introduction of this flesh under the skin of a man is followed by the most serious inflammation, and perhaps by that grave condition known as "blood-poisoning." It is not necessary that any wound of considerable size be inflicted in order to cause this result; in fact the most dangerous cases occur in individuals who were not aware, at the time that they came in contact with the putrid matter,

that they had any wound at all. The entrance of the poison—the *infection* as it is technically termed—occurs most frequently through slight scratches or "hang-nails," of whose existence the individual may not be aware.

The cases most frequently brought to the notice of the surgeon occur in the medical students or physicians who are infected while dissecting or making post-mortem examinations, and in farmers or others who are poisoned while skinning or cutting up live stock. One cannot be too careful, when engaged in such employments, to protect the hands in every possible way. The skin of the hands and arms, especially in the vicinity of the nails, should be carefully inspected to detect the existence of any slight scratches; in fact, it is advisable to place the hands in some slightly irritating solution, such as weak vinegar, in order to be sure that no tender points have been overlooked. In this way we may sometimes detect wounds and scratches so slight that they have escaped observation by the eye.

If any such scratch or abrasion be discovered, the safest plan is to avoid all contact with animal matter which shows the least signs of putrefaction. If it be absolutely necessary to perform such work, all scratches and abrasions should be sealed up by painting them with collodion. If the individual possess a pair of rubber gloves, these may be worn with advantage.

The danger from infection is especially great if the animal have died of some poisonous disease. One of the commonest sources of infection through handling dead animals is the disease known as "malignant pustule" or "wool-sorter's disease," a description of which has been given on a previous page. The carcass of an animal which has died of this affection is dangerous even before putrefaction has begun, since there exists in it a poisonous principle which is quite independent of the substances formed during putrefaction.

Another common source of infection is the disease known as *glanders* or *farcy*. It is generally known to those who come into contact with horses or cattle, that the discharge from the nose of an animal suffering from this disease can communicate the affection to man; and that this matter can be transferred by means of towels or cloths, with an equally deadly effect.

There is another source of danger for those who are compelled to be much in the vicinity of the carcasses of animals, even though they may not come into actual contact with the dead bodies; the

disease may be communicated to them through the bite of flies which have previously alighted upon the carcass.

If poison has been introduced into the skin through some slight scratch or abrasion, such as a hang-nail, there first appears a painful pimple or small boil at the spot. Considerable pain is felt at and around the spot, and it may extend over the whole hand and up the arm. In a day or two the hand becomes much swollen, and red lines can often be traced up the arm. These lead to tender lumps in the armpit — the enlarged lymphatic gland. By this time the patient has had one or more severe chills which are followed by fever and great mental disturbance, perhaps even delirium.

Treatment.—So soon as suspicion is aroused that the sore results from the introduction of poisonous matter into the skin, no time should be lost in laying the inflamed surface open. A free cut should be made with a sharp knife, so as to let out any matter which may be present. Many surgeons advise that two cuts crossing each other at right angles should be made.

After the bleeding has ceased, the wound should be thoroughly washed with a solution of carbolic acid, or of listerine, such as has been described in the discussion of wounds. If the sore has been obtained from an animal suffering with an infectious disease, such as malignant pustule or glanders, it is advisable to cauterize the spot thoroughly.

The best agent for this purpose, in the hands of a non-professional person, is the strong carbolic acid, since this cauterizes the tissues thoroughly, without causing such extensive destruction of the flesh as most of the other agents employed for this purpose. A piece of soft rag should be wound around the end of a stick, and dipped in the strong carbolic acid, after which it is pressed firmly upon the raw surface.

Instead of carbolic acid, we may employ the strong nitric acid or creosote.

The objection to the use of these liquids is the fact that they are apt to run from the diseased to the healthy flesh, and cause a much larger sore than is necessary. It will be most convenient perhaps, on this account, to employ a stick of lunar caustic, or the white-hot iron. The latter agent seems formidable, but is, really, one of the least painful of all caustics. To use it, the sharp end of a poker, or a large nail, may be heated *white*-hot and applied immedi-

ately to the wounded surface. If it be allowed to cool so that the metal becomes red instead of white, it will occasion much more pain.

After the wound has been thus opened and cauterized, soft flax-seed poultices should be applied for two or three days, or until the swelling and redness subside. Care should be taken that no matter collects in the wound. To prevent this the sore should be thoroughly syringed three or four times a day, and incisions should be made with a knife to afford free outlet to any matter which may be formed.

The constitutional treatment is also a matter of great importance. When inflammation has spread up the arm, and has caused tenderness of the glands in the armpit, there is usually decided constitutional disturbance. This condition is in fact a form of *blood-poisoning*.

The patient will require a nutritious diet in an easily digestible form. He should have eggs, milk and broths in abundance. The medicines required consist chiefly in *quinine* and *alcohol*. These should be administered freely. The alcohol may be given in the shape of whisky or brandy, an ounce of which (two tablespoonfuls) should be administered in milk as often as every two hours. There is very little danger of intoxicating the patient who is suffering from blood-poisoning. He can endure an amount of liquor which would render a healthy person "dead drunk."

The quinine should be given in the form of powder, which may be wrapped in gelatine wafers so as to conceal the taste. Three grains of the drug should be administered four times a day.

In addition to these measures it will be necessary to give the patient a warm bath every day, in order to reduce the fever.

The most serious complications are apt to arise in the immediate vicinity of the wound, especially if this be located on the hand. Matter forms and burrows under the skin and between the muscles. Incisions must be frequently made in different parts of the hand and arm. Sometimes the entire member below the elbow seems to be honeycombed with burrows made by the pus, and is riddled with openings, natural or artificial, through which this pus escapes.

Since such serious consequences result from poisoned wounds, it becomes a matter of much importance to prevent, so far as possible, the occurrence of such a wound; that is, the introduction of poisonous materials into any accidental scratches. For this purpose

it may be well to carry a stick of lunar caustic in the pocket, and to cauterize immediately any cut or scratch which may be discovered after the hand has been exposed to the introduction of poisonous material. It is also advisable to oil the hands thoroughly before introducing them into the carcass of a dead animal or handling any parts of the animal.

Bites and Stings of Insects.

The most frequent wounds of this kind are those made by bees or wasps. These are not of course dangerous, unless many be inflicted at the same time, or unless the sufferer be a young child. Single stings are, however, quite painful, and occasion much swelling if inflicted around the eyes or in the mouth.

When a large number of bees attack an animal, they inflict injuries which are usually fatal. Men, as well as horses, have been repeatedly stung to death by an infuriated swarm of bees.

In some parts of the country there are found certain other small animals which inflict painful and severe wounds. In the southern and western parts of our country individuals frequently suffer from the bite of a large spider called the *tarantula*. In the northern part of the country there is a small black spider which is often found in the neighborhood of old logs and trunks of trees, and which inflicts a painful wound.

In the Southern States, and more especially in tropical countries, the inhabitants are troubled with two pests, which inflict serious and even fatal injury. These are the *centipede* and the *scorpion*. These are fortunately found only in a small portion of the United States, where they attain but comparatively small size. In other parts of the world these animals are much larger and inflict more serious wounds. The bite inflicted by the centipede may be serious, and even fatal.

Treatment.— The bites of spiders and the stings of bees and wasps usually require no other treatment than measures to allay the pain. There are various popular remedies employed for this purpose. Sometimes hartshorn is applied to the skin in the vicinity of the wound; some people consider a cabbage leaf the best possible application. The fact is, that anything which serves to cool the sur-

face diminishes the irritation and pain. Cloths wet with cold water, or a mixture of equal parts of water and hartshorn, are usually very grateful to the sufferer; or a solution of ordinary baking soda, a teaspoonful of which is stirred up in a glass of water, will make a cooling and pleasant application.

If a person be stung in the mouth or throat, the swelling which results is apt to be so great as to embarrass the breathing. In such a case the patient should even before the parts are much swollen, employ faithfully gargles of hot water containing a little borax. A popular remedy is a mixture of vinegar and water, which is heated and used as a gargle. The swelling is sometimes so great as to render surgical interference necessary in order to prevent suffocation. The tongue may be punctured with a sharp penknife in several places, and the use of the gargles should be continued.

In many of these cases the pain is so great that opium must be given to alleviate it. For this purpose twenty drops of laudanum may be taken every two hours until three or four doses have been administered.

Snake Bites.

The most widely distributed and most dreaded serpent of the United States is the *rattlesnake*. The injury inflicted by a rattlesnake is not really a bite, but a blow. The animal is provided with two teeth or fangs, which lie horizontally in the mouth under ordinary circumstances, but are raised to the erect position when the snake becomes aggressive. These fangs are grooved with small canals which communicate with the gland that secretes the poison. The fangs are struck into the flesh, and at the same instant the poison is ejected through the canals along these teeth.

The effects vary with the condition and age of the individual, as well as with the part which is wounded. Children are more susceptible than adults. Wounds upon the extremities are usually less dangerous than those upon the trunk.

Many persons who are apparently bitten by rattlesnakes suffer no injury beyond the mere mechanical damage. The reason for this is usually that the fangs penetrate the clothing before reaching the skin, and that the poison is arrested in this way and does not enter

the flesh. It is furthermore true that the first stroke is the most dangerous, while the subsequent ones may be comparatively harmless. This fact is probably due to the ejection of most of the poison with the first blow, the subsequent strokes being accompanied with but little flow of the poisonous material.

Dr. Weir Mitchell, of Philadelphia, published in 1868 the results of a series of observations upon the poison of the rattlesnake. He found that this reptile cannot destroy itself by means of its own poison, as has been supposed. In fact it is generally true that poisonous reptiles are harmless toward others of the same species.

Dr. Mitchell further found that the poison of the rattlesnake may be taken into the mouth or stomach of a man without doing him any injury, provided there be no cut or abrasion in the lining membrane of these organs through which the virus could enter the system.

The first effects of the introduction of rattlesnake poison into the human body are very similar to the symptoms of *shock* as it occurs after the infliction of a severe wound. The patient becomes extremely pale and cold; sometimes the skin exhibits a yellowish hue; the surface is covered with clammy perspiration; the pulse is very rapid and feeble; nausea and vomiting frequently occur; loss of consciousness, delirium and convulsions are sometimes observed. In the meantime the skin in the vicinity of the wound swells to an enormous size and becomes mottled with blood which has escaped from the vessels.

In many cases the patient dies during this stage. The time which elapses between the infliction of the wound and the fatal result may vary from half an hour to five or six weeks.

If the individual survive the first effects, he is apt to suffer for days and weeks from a condition similar to that of blood-poisoning, which it undoubtedly is. Abscesses form in the neighborhood of the bite, and sometimes at distant parts of the body as well.

It is generally known among farmers that hogs possess an immunity against the bite of the rattlesnake. This curious fact is often utilized for the purpose of destroying these reptiles. If hogs be turned loose in a locality which is frequented by rattlesnakes, they usually manage to destroy a considerable number of the reptiles in a few days. In fact, if the hogs be deprived of other food, they usually devour the rattlesnake.

These snakes are considered most dangerous during the month of August. The fact is, that they inflict more bites about this time of year than at any other season; the reason for this seems to be that the rattlesnake sheds his skin early in September, and that while the old skin is coming off, the reptile is blind, and strikes promiscuously in the direction of any object which approaches it.

The one favorable feature of the rattlesnake, is the fact that the rattle is almost invariably sounded before the blow is inflicted —a circumstance which has saved many lives. There are several other venomous snakes whose bite is quite as deadly as that of the rattlesnake, and which are more dangerous because they give no warning.

Treatment.—The treatment of rattlesnake bites has been the subject of much discussion in the scientific as well as the public press. Any number of remedies has been vaunted as "specifics" against the poison of the rattlesnake. Then there have been numerous "snake-stones," which have been asserted to possess the qualities ascribed to the familiar "mad-stones"—that is, they are said to possess the power of drawing the poison out of the wound. Minute and apparently truthful accounts of the wonderful properties of these stones appear now and then in some of the daily papers, usually at a season when there is a dearth of news. Most careful inquiry has failed to reveal the existence of any such stone which could demonstrate its supposed powers when put to the test.

At different times various remedies have been presented by members of the medical profession as cures for the rattlesnake poison. Among these is ammonia, which is largely used by the Australian physicians, iodine, and the South American drug known as *curara*. None of these, however, have fulfilled the anticipations of those who introduced them to the notice of the profession. There is, in fact, no known remedy which can be relied upon to counteract the effects of rattlesnake poison.

In every case in which a person has been bitten by a rattlesnake, there are two things which should be done as quickly as possible. The first is to *tie a bandage tightly around the limb*, above the wound. Anything which comes handy can be used for this purpose, such as a strap or a handkerchief; and it should be drawn very tightly in the hope of stopping the circulation of blood in the limb completely. The object of this is, of course, to pre-

vent the introduction of the poison into the system, an object which can be attained only by arresting the circulation.

The next thing to do is to *suck the wound* thoroughly. There should be no hesitation whatsoever on the part of any bystander to perform this office for the sufferer, for if the lips and tongue be free from scratches and cracks, there is no danger whatsoever in taking the poison into the mouth, or even in swallowing it. Although the act may be an unpleasant one, yet it may save the life of the patient.

After this has been done, it will be well to cut out the skin and tissues around the wound. This should be done heroically and thoroughly. There need be no hesitation in making a free incision, since it will be at most a trifling loss of flesh which will soon be replaced if the individual live, while economy in the amount of flesh removed may lead to the retention of some of the poison and the death of the individual.

If no one can be found with sufficient nerve to perform this operation, the wound should be thoroughly cauterized in the following way: A piece of iron wire or a small nail is heated white hot and then inserted firmly into the opening made by the fangs of the reptile; or a piece of soft rag may be wound firmly about the end of a stick, dipped in nitric acid, and then used to cauterize the wounds.

Dr. Mitchell advises that after these measures have been used, the bandage around the limb should be relaxed for a moment and then tightened again. After a quarter or half an hour this loosening of the bandage for a few seconds may be repeated. In this way the poison — if any remain in the wound — is introduced into the system in small installments, and it will probably produce less serious effects than would result if the entire quantity reached the system at once.

Aside from this local treatment, the patient requires stimulation. For this purpose two remedies are especially recommended — alcohol and ammonia

In the Western States the great remedy for the bite of the rattlesnake is *whisky*. This is administered in such quantities as would appall an inhabitant of any other region. It seems to be a fact, however, that the sufferer from rattlesnake poison can swallow without becoming intoxicated a much larger quantity of whisky than he could otherwise bear. Any other alcoholic stimulant, such

as rum, brandy or gin, may be used instead of whisky. The liquor may be given until the patient shows signs of intoxication.

If there be signs of shock — a pale and cold skin, feeble pulse and semi-unconsciousness — a half teaspoonful of hartshorn should be given in the whisky every half hour.

If the patient vomit, and therefore cannot retain the whisky, it should be given as an injection into the rectum; for this purpose it is mixed with an equal quantity of milk.

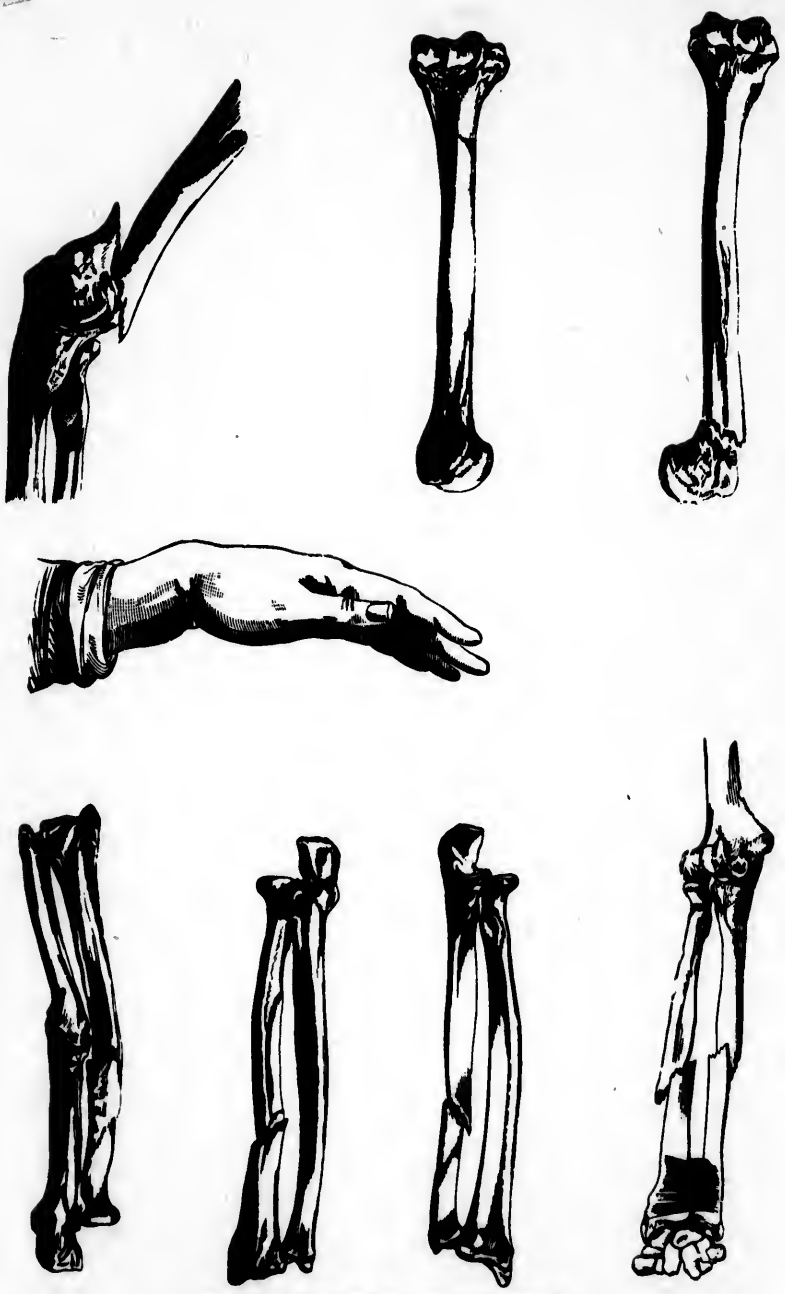
After the patient has recovered from the immediate effects of the bites, the wounded limb should be enveloped in cloths saturated with hot water, which are renewed sufficiently often to keep them warm and moist. The patient should be supplied with nourishing food in abundance, and his strength supported with quinine.

In India people are troubled with a most venomous and dangerous snake, the *cobra*. An English physician, Sir Joseph Fayrer, who has had long experience in medical practice in India, gives the following directions for the treatment of persons who have been bitten by this serpent:

"Apply at once a ligature, or ligatures, at intervals of a few inches, as tight as you can possibly tie them, and tighten the one nearest to the wound by twisting it with a stick, or other such agent. Scarify the wound and let it bleed freely. Apply either a hot iron or live coal, or explode some gunpowder on the part; or apply either carbolic or some mineral acid or caustic. Let the patient suck the wound while you are getting the cautery ready, or if anyone else will run the risk, let him do it. If the bite be on the toe or finger, especially if the snake has been recognized as a deadly one, either completely excise, or immediately amputate at the next joint. If the bite be on another part where the ligature cannot be applied, or, indeed, if it be on the limbs above the toes or fingers, cut the part out at once completely.

"Let the patient be quiet. Do not fatigue him by exertion. When, or even before symptoms of poisoning make their appearance, give eau-de-luce, or ammonia, or carbonate of ammonia, or, even better than these, hot spirits and water. There is no occasion to intoxicate the person, but give it freely and at frequent intervals.

"If he becomes low, apply mustard plasters and hot bottles, galvanism or electro-magnetism over the heart and diaphragm. Cold douches may also be useful.



BROKEN BONES.

" The antidotes in addition may be used by those who have faith in them; but, a I have said, I fear there is no reason to believe that they are of any use. Encourage and cheer the patient as much as possible. As to local effects, if there be great pain, anodynes may be applied or administered, and antiseptic poultices to remove sloughs; collections of matter must be opened.

" Other symptoms are to be treated on general surgical principles.

" This, I believe, is the sum and substance of what we can do in snake bite. If the person be not thoroughly poisoned, we may help him to recover. If he be badly bitten by one of the more deadly snakes, we can do no more."

To sum up, then, we may outline the treatment of bites by poisonous snakes as follows:

Tie a bandage or cord very tightly around the limb.

Suck the wound thoroughly.

Cut out the skin and flesh for a distance of half or three quarters of an inch around the marks of the fangs; or, instead of this, cauterize the wound thoroughly with a hot iron or with nitric acid or with carbolic acid.

Give the patient plenty of whisky and hartshorn. After cauterizing the wound, wash it thoroughly with water or with a solution of carbolic acid in water.

After this has been done, the bandage or cord may be loosened for a few seconds and then reapplied.

Repeat this loosening of the bandage every twenty minutes for two hours, at the end of which time it may be permanently removed.

Encourage the patient and give him plenty of good food.

Broken Bones — (Fractures.)

The composition of the bones varies at different times of life, and there is found a corresponding variation in the liability to breaking or *fracture*.

In childhood the bones are quite soft and flexible. In fact, several of the bones of the body are composed more or less of gristle until near the age of 18 or 20 years. As the person advances in life, the bones become harder, because the proportion

of mineral matter in them — lime and its compounds, especially — increases. Then, again, the weight of the body becomes greater, and, consequently, the force of a fall is increased.

As a result of these different factors, fractures of bones are far more frequent in adults than among children, and are most commonly met with among people in middle or advanced life. In consequence of the difference in occupation, fractures are more frequent among males than among females.

There are several causes which predispose to fracture, that is, which render the bones of some persons far more liable to fracture than those of others. Among these causes are certain diseases of the bone, especially *rickets*, long disuse of the limb, such as happens after accidents which compel the patient to keep his bed. There are, moreover, cases in which the bones are extremely brittle, as a result, apparently, of some error in the nutrition of the body, without any manifest disease.

Bones may be broken, first, by *direct violence*. A blow upon the head or the falling of a heavy body upon the arm illustrates this form.

Second, by *indirect violence;* that is, the force is applied to some other part of the body than that in which the bone is fractured. Thus a fall upon the shoulder frequently occasions a fracture of the collar-bone, and a fall, in which the individual throws out the hand to break the force of the blow, often results in a fracture of a bone of the forearm just above the wrist.

Third, fracture may result from muscular action. Thus the knee-pan is sometimes broken across by violent muscular efforts in jumping.

A fracture may be *complete* or *incomplete*. That is, the bone may be broken right across, or the break may extend only part way across — the remainder of the bone bending. This is illustrated by the attempt to break a green stick; and the fracture is accordingly called a "green stick fracture." This variety is especially apt to occur in children, whose bones are soft and flexible.

Another important distinction is the division of fractures into *simple* and *compound*.

A simple fracture is one in which the skin is not wounded.

In a compound fracture, on the other hand, the skin is broken either by the violence which caused the fracture or by the protrusion of one of the broken ends of the bone through the skin.

The Repair of Fractures.—It is important to understand the general principles concerned in the repair of the fractures of bones, since the treatment is regulated by these principles.

For the first few days after the infliction of the injury, but little change occurs around the broken ends. The violence which caused the fracture has, of course, crushed a great many blood vessels, large or small, and considerable blood escapes from these into the tissues around the broken ends. There occurs, therefore, a swelling of the part, which becomes in a few days "black and blue." This blood is gradually absorbed just as it is when a bruise is inflicted without fracture.

After a period which varies from three to seven days, the process of repair begins. This consists in the formation of material between and around the broken ends of the bone. This material may be likened at first to glue, which it resembles indeed somewhat in its chemical composition. This material is called *lymph*, and serves to unite the ends of the bones temporarily.

In the course of several weeks this lymph becomes converted into gristle, and finally into true bone. Meanwhile the seat of the fracture is marked by a lump, which consists of this lymph as it is changing into bone.

When we consider that this lymph is apt to be thrown out around the bone within a few days, and that it becomes gradually changed into bone, we can appreciate the importance of placing the broken ends in their proper position immediately after the fracture; for the position which they assume at this time will become permanent by the formation of bone around the broken ends.

This lymph can readily be disturbed and broken during the early weeks of the healing process; hence it is very important that measures should be taken for keeping the ends of the bones perfectly quiet.

The entire process of healing, that is, the transformation of all the new material into bone, requires a period of several months; but usually within six to ten weeks the process is so far advanced that the ends of the bone are kept firmly in position without artificial assistance.

Fractures heal far more rapidly in children than in adults; the power of repair diminishes in advanced life, so that in many aged individuals the ends of a broken bone never unite completely—

that is, there is no true bone formed between the broken ends, which are bound together by a membranous attachment.

There are some bones, fractures of which do not readily unite. In some of these the formation of true bone—*bony union*, as it is called—rarely occurs. Fractures in the hip-joint, that is the head of the thigh-bone; fractures of the point of the elbow and of the knee-pan are unusually troublesome in this respect. Moreover, if pieces of the skull are completely removed, the gap is filled up. not with true bone, but with a membranous material.

Symptoms.—There are certain general symptoms which are present in most cases of fracture. These are:

First—Pain usually immediately over the point of injury. In some cases, in which the other symtoms are obscure, the existence of a fracture is determined chiefly by the presence of a sharp pain when the finger is pressed upon a certain point.

Second — Swelling.

Third—Deformity. This often consists simply in a shortening of a limb. In fractures of the thigh or of the arm, for instance, we can readily see, even without measuring, that the injured limb is considerably shorter than the other one.

At other times the deformity consists in a lump or a depression. Thus the fracture which so frequently occurs just above the wrist is usually marked by a projection of one of the broken ends, so as to cause a painful lump under the skin.

Fourth—Unnatural mobility. This is a very important symptom, by which alone we can often detect the presence of a fracture positively. If the thigh be broken, for instance, there appears to be a new joint in the limb.

Fifth—Loss of power in the limb. If a bone be broken, the patient carefully refrains from every muscular effort to move the part, since every movement causes extreme pain.

Sixth—A grating sound and feeling. When the limb is moved so that the ends of the broken bone come in contact, the patient feels a rasping sensation, which is also communicated to the fingers of the surgeon. Sometimes a corresponding sound can be heard at the same time.

All of these six symptoms may be present in case of fracture, yet we must not assume the absence of a fracture because one or more of them cannot be detected. In fact, the only absolutely

positive proofs of the existence of a fracture are the unnatural mobility of the part and the grating sound, technically called crepitus.

In many cases it is a simple matter, even for the uninitiated, to detect the existence of a fracture. In other instances the symptoms are so obscure that the skill of the most experienced surgeon is taxed to decide the question. In every such case it will be well to proceed for some days upon the supposition that fracture has actually occurred; for if the bone be not broken, no damage will be inflicted by the treatment; while on the other hand, if there be a fracture, incalculable injury may result from neglect.

In every case in which the least doubt exists as to whether a bone be actually broken, the injured member should be closely compared with that of the opposite side. The sound limb should be completely bared, and the injured one compared with it as to outline, movement, etc. Then we should take a tape-measure and compare as accurately as possible the length of the corresponding parts of the two limbs. After this we may grasp the injured member with both hands, placing one above and the other below the seat of the injury. The hands should then be moved in opposite directions from the axis of the limb; thus one hand should be pressed backward and the other forward at the same time. In this way we detect any unnatural mobility and feel the grating sensation, if a fracture exist.

It is important to know *how* the fracture was made. For we can form a better estimate of the extent of the injury, as well as of the direction of the break, if we know in what way the force was applied.

Fractures which are produced by direct violence are usually more serious than others, because they are commonly accompanied by bruising or laceration of the tissues.

As to the direction of the fracture — that is whether the bone is broken squarely across or obliquely — we are thrown for information upon the position and appearance of the part. It is sometimes possible to feel distinctly the broken ends; this is especially often the case in those bones which lie close to the skin, such as the collar-bone, the shin-bone, and portions of the bone constituting the forearm. Fractures of long bones — that is, those of the thigh, leg, arm, and forearm — are usually oblique.

It is extremely important to ascertain as definitely as possible the line of direction of the fracture; since the "setting" of the bone

will require different manipulations according to the relative position of the ends of the fragment.

A fracture is sometimes mistaken for a severe *bruise*, for a *sprain* and for a *dislocation*.

Such a mistake may be made by even the most experienced surgeon, especially if the parts around the seat of the injury are much swollen and very tender. For unless the surgeon's finger can be brought into pretty close contact with the injured bone, there may remain a doubt in many cases as to what the exact condition of things is.

If there be much swelling, so that an accurate examination of the part is impossible, the limb should be enveloped in cloths saturated with hot water, which are changed every two hours. These cloths may be covered with oiled silk or a piece of rubber cloth, in order to retain the warmth and moisture as long as possible.

After a few days the swelling usually subsides, and the pain is so much decreased that the parts can be handled to much better advantage.

A bruise may be accompanied with as much pain, swelling and loss of power in the limb as a fracture. But these symptoms subside in a few hours or days, after which it becomes apparent that the loss of power was but temporary.

A sprain may resemble a fracture in many respects; there is apt to be a point of extreme tenderness just as is the case when the bone is broken. But the sprain, as well as the bruise, is distinguished from a fracture by the absence of unnatural mobility and of crepitus.

A dislocation is usually characterized by a *lack of mobility* of the limb. There is also in most cases a deformity which shows at once that the bone is out of place.

The distinction between a fracture and a dislocation is, however, in some instances extremely difficult even for the surgeon. In fact the two accidents are often combined. These injuries in the neighborhood of joints are the most puzzling of all which the surgeon is called upon to treat.

General Treatment of Fractures.—After it is apparent that a bone has been broken, a temporary dressing should be arranged until the patient can be transported to his home or to a hospital where he is to remain during the healing of the fracture.

The object of this temporary dressing should be simply to keep the limb quiet so that the broken ends shall not move and tear the flesh during transportation. If the wounded limb be a leg, a piece of wood long enough to stretch from the hip to the ankle should be obtained and applied to the back of the leg. This is to be kept in position by bandages placed around the thigh and the leg. A few laths will answer the purpose very well.

If the wounded member be the forearm, it may be slung temporarily in a large handkerchief knotted around the neck. If the arm be injured it will be well to apply a short piece of wood, fastened to the arm by bandages so as to render the part immovable.

The patient should be laid upon a hard bed which stands firmly. The fracture may then be more carefully examined, and the nature of the required dressing determined.

If there be much swelling at the seat of injury, it is in most cases advisable to delay the the application of splints for a day or two, until the swelling has been reduced. To accomplish this the limb should be wrapped in cloths saturated with hot water, which should be changed sufficiently often to keep the part moist and warm. Meanwhile the limb may be steadied and prevented from moving by rolling up two blankets and placing the rolls one on either side of the limb. If the operator have a little skill, a single blanket may be made to accomplish the purpose by making two rolls of it, one from either end, between which the limb can be laid; or sticks of wood may be wrapped in soft cloth and placed on either side of the injured member. If there be a wound at the seat of injury, a piece of rubber cloth should be laid under the limb. In any case the injured part may rest upon a pillow.

Setting of a Broken Bone.

The treatment of a fracture consists of two essentials:

First.—To restore the broken ends to their natural position.

Second.—To keep them in this position.

The first of these—the restoration of the bone to its proper position—is what is popularly known as "setting" the bone.

The chief difficulty, both in replacing the ends of the bones and in holding them in position, lies in the resistance of the muscles of the limb. These muscles are irritated either by the original injury

or by the sharp ends of the bones which project into them. As a result of this, as well as of the natural tendency of the muscles to contract, the limb is *shortened*. The amount of shortening varies extremely, both with the strength of the muscles involved and with the obliquity of the fracture. Thus a fracture of the thigh is always followed by a considerable degree of shortening, which it is indeed very hard to overcome. A fracture of the leg is also accompanied by shortening, though this is somewhat more readily remedied.

In setting the bone we must first of all remember that we have to overcome the muscular force by which the limb is rendered shorter than the other; for if we neglect to do this, and apply the dressing without returning the limb to its proper length, the broken ends of the bone will unite in this unnatural position, and the limb will remain permanently shorter than its fellow.

To overcome this muscular contraction, we place the limb in a position in which the muscles are relaxed as much as possible. Thus if we have to treat a fracture of the forearm we bend the arm at the elbow, and usually at the wrist, so that the fingers are turned upward toward the front of the arm.

The simple position of the injured member sometimes suffices to overcome the contraction of the muscles and to restore the broken bone to something like its natural position. Yet, in most cases, it becomes necessary to employ additional means to accomplish this object by *pulling* the lower fragment away from the upper. This must be done with care and yet with considerable force. One person should grasp the limb firmly below the point of injury, while another seizes it above this point. Care should be taken that the upper fragment is grasped below the next joint above the wound. Thus if the leg be broken five or six inches from the ankle, one person should grasp the calf, not the thigh; for if a joint be allowed to intervene between the points which are grasped in the hands of the operators, the force which should be expended in pulling the lower fragment away from the upper, will probably do little more than stretch the ligaments of the joints and separate the surfaces of the bones. Thus if the leg be broken above the ankle, and the attempt be made to restore the position of the limb by pulling on the foot while another person holds the thigh, it is probable that although the ankle and the knee-joint may be severally stretched, the broken end of the bone will *not* be forced into position.

In every case, therefore, care should be taken that the force is applied directly to the two fragments of the broken bone itself and not to distant parts of the same limb. Thus in the example which we have taken for illustration (a fracture of the leg five or six inches above the ankle), one person should grasp the limb just above the ankle as well as the foot, while another should take hold of the leg just below the most prominent part of the calf.

As to the degree of force which should be employed in restoring the bone to its proper position, we can only say that this restoration must be accomplished, and that so much force must be used as is necessary to effect it. The degree of force required varies of course with the size and strength of the muscles whose contraction is to be overcome. Thus a fracture of the forearm can usually be set without the exercise of much strength, while a fracture of the thigh can be placed in position only by the most strenuous efforts.

In consequence of the difficulty which is thus experienced in overcoming the muscles of the injured limb, and of the pain which is inflicted upon the patient by this effort, surgeons usually administer ether when they have occasion to set a broken thigh, or even a broken leg. The administration of ether accomplishes two objects.

First, the patient suffers no pain during the setting of the bone.

Second and chiefly, the muscles are relaxed by the effects of the ether, so that they offer no further resistance to the surgeon's efforts in replacing the broken ends of the bone in their natural position. This measure is absolutely necessary in order to accomplish the perfect setting of a broken bone which is surrounded by large and powerful muscles.

Cases occur in which the bone retains its natural length even after a complete fracture, so that no effort is required on the part of the surgeon to lengthen the injured limb. In these cases the bone is broken square across. These instances occur most frequently in the forearm and in the leg, where the member contains two bones. If only one of these bones be broken, and the fracture be made transversely — that is, square across — the limb often remains in position, because its shape and length are preserved by the second and uninjured bone.

We may know that we have succeeded in "setting the bone" if the limb resumes its natural length and outline. In many cases

we can feel, moreover, that the fragments are now in position instead of projecting one over the other as before. In order to be perfectly sure, we must measure the length of the limb and compare this with that of its sound fellow.

If the thigh be broken, a strip of stout inelastic cord or tape may be used, one end of it being placed at the navel, while the other end is carried to the outside edge of the kneepan at its middle. After this has been done on one side, the length between the navel and the corresponding point of the kneepan on the other leg should be measured. The two should coincide either exactly or within a small fraction of an inch. A certain difference — amounting in cases of fractured thigh to half an inch — may be disregarded; first, because there is often a difference between the length of the two limbs in persons who have never suffered any fracture; and second, because a certain amount of shortening is usually inevitable in fractures of the thigh.

In making comparative measurements of the two limbs in this way, care must be taken to avoid sundry errors into which we may readily fall. Thus it must be carefully noted that the patient's limbs lie parallel with the axis of the trunk — that is, that they form no angle with the body at the hips — for if the legs are not straight, if they happen to be inclined a little to the right or the left, the distance from the navel to the knee will, of course, be greater in one than in the other.

Dressing of Fractures.

After having placed the fragments in position, our next care is to take such measures as will keep them in place; otherwise the movements of the patient and the contraction of the muscles in the injured limb would soon cause a displacement of the broken ends. Indeed, in many cases it is necessary to apply the bandages while the limb is held in position by the assistants; for if the parts be relaxed long enough to put on the necessary dressings, the limb shortens and takes the same position as before.

In order to attain this object and keep the parts in position, we employ supports, splints, bandages and apparatus of several kinds.

Bandages. — For the application of dressings to fractured limbs, the best material for bandages is muslin or cotton cloth. This can be procured at the various depots for surgical appliances; yet bandages can be readily prepared in the household by tearing up sheets. The width of the strips into which the sheet is torn should vary according to the locality requiring the bandage; in general, we may say that from two to four inches is the breadth required.

The length of the bandage also varies; of course several shorter ones can be made to answer the same purpose as one long one. For bandaging a leg from the foot to the knee, we require ordinarily about five yards. The strips may be sewed together end to end, so as to make the length required.

In order to apply a bandage properly, this must be first rolled firmly and evenly around a stick. It should then be carefully applied, the roll being held close to the leg as it is carried up the limb. If much loose bandage is allowed to intervene between the roll and the leg, it will be impossible to apply the bandage nicely. Care should be taken that the bandage is put on evenly; that is, it should not be applied tightly in one place so as to cut off the circulation, and loosely in another so that it will slip.

In order to apply a bandage nicely and smoothly on any part of the body which tapers — such as the arm or leg — it is necessary to turn the bandage over at every circle around the limb. This process is called *reversing*, and can be learned only by personal instruction.

In bandaging the hands and feet, we should leave the ends of the fingers and toes uncovered, in order that we may see their color and feel how warm they are. This is an important item, especially when the bandage is applied by an unskilled hand; for if it be too tightly applied so that the circulation is impaired, it is necessary to loosen the bandage at once, and reapply it less tightly. We can observe the existence of this condition by a blue or livid color of the fingers or toes, which are at the same time unnaturally cool. This coolness and lividity are caused by the interruption to the circulation through the limb.

In order to hold the bones in place we need in some cases only a bandage. Thus fractures of the skull, and many of those of the trunk, can be kept in position by adhesive plaster and simple bandages.

Fractures of the long bones, however—indeed of any bone in one of the extremities—are to be treated by the use of *splints*.

Splints may be made of various materials; the commonest are those of wood, leather, pasteboard and plaster of Paris. The selection of the splint depends upon the requirements of the case. In every instance the two requisites which are to be chiefly sought, are *strength and lightness*.

For ordinary purposes, splints can be made out of thin wood, such as shingles or siding, which can be cut to the length and shape required. Another convenient material is sole-leather. The advantage of this is its ready adaptability to the shape required. It can be moulded to the limb by first soaking it in hot water. Stiff pasteboard is useful in many cases where no great strength is required.

In order to fit a splint of pasteboard or sole-leather to a limb, a pattern should be first cut in paper; the leather or pasteboard can then be cut after this pattern, soaked in hot water until it is quite flexible, and applied to the limb. A bandage should then be applied so as to hold it in position. After it has become dry on the limb, it will retain its form. It should then be removed, the edges trimmed and padded with cotton. In fact, every splint, of whatever material it be made, should be covered with cotton sheeting, which is to be made especially thick at the prominent points of the limb, where pressure on the part may be expected. Thus, in applying a splint to the leg, especial care should be taken to pad thickly the projections at the ankle and at the knee. The cotton should also be made to overlap the edges of the splint, so that there can be no chafing of the skin.

These are important points in the preparation of the splint; by observing them, we can avoid many of the unpleasant incidents and accidents which are apt to occur during the treatment of a fracture.

In many cases, a lighter and weaker bandage than one of these will answer every purpose; such bandages can be readily made of glue or of starch, or of a mixture of the two.

To make a starch bandage, a quantity of thick starch is prepared and kept warm, while a bandage is smoothly and evenly applied over the limb which is previously well padded with cotton to avoid chafing. The starch is then applied to the bandage which covers the limb, and allowed to cool. A second layer of starch is

then rubbed into the bandage, and still a third, if necessary to give it the proper degree of stiffness. In applying the starch, it is best to use the hands rather than a brush, since it is important to rub the starch thoroughly into the bandage and into all the crevices.

A bandage of glue and starch can be made in a similar way, and has the advantage of being somewhat stiffer than one made of starch alone. To do this, take equal parts of boiled starch and melted glue, heat them together and mix thoroughly while still warm. The limb is enveloped in cotton so as to protect the skin; a bandage is evenly applied, and is then smeared with the warm mixture of glue and starch.

If such a dressing be found too yielding, it may be strengthened by applying a second bandage outside of the first and saturating this with the starch or with the mixture of glue and starch. In fact, three, four, or five layers of bandage may be thus applied, if necessary, each layer being smeared with starch in turn. The last layer should be covered with a simple bandage unstarched.

If it become necessary to employ a very stiff and firm dressing, which shall surround the limb, it will be well to use the *plaster of Paris*. These are prepared in the following way:

A muslin or soft cotton bandage, two and a half or three inches wide, is dusted over with the dry plaster of Paris. To do this well, the bandage is unrolled and the plaster thoroughly rubbed into the meshes of the cloth, beginning at one end. There is usually danger of getting too little plaster into the bandage, in which case the dressing will be weak and flexible. Every care should be taken, therefore, to get as much as possible into the cloth. After this, they should be loosely folded up, ready for application.

The limb, meanwhile, is enveloped with a double layer of sheet cotton, with extra thickness at the bony prominences of the ankle, the knee, the elbow, or any other parts of the body which must be covered. When the limb is ready the bandages, whose meshes are already full of plaster of Paris, are placed in lukewarm water, where they are allowed to remain until wet through, a process which usually requires three or four minutes. These bandages should not be allowed to remain in the water too long, because the plaster of Paris becomes hard and brittle and will crumble when the dressing is applied. Hence it is advisable to put only two or three of these rolls in the water at a time, a fresh one being added so soon as one is removed for application to the limb.

The bandages are then applied closely and evenly to the limb. One or two thicknesses are usually sufficient, and we should never put on more than three or four, since the bandage will thereby acquire an unnecessary weight and rigidity. After the dressing is thus applied, a mixture of plaster of Paris and water, having the consistency of cream, should be plastered over the entire dressing with the hands.

It is important that the plaster of Paris employed for this purpose shall not have been long exposed to the air and moisture; for plaster which has been subjected to this exposure will not harden well, and a dressing made of it will not possess the necessary stiffness and firmness.

An important feature in the application of rigid dressing is that the limb shall not be completely enveloped. Hence it is necessary to cut open the starch or glue or plaster of Paris dressing. The reason for this lies in the fact that the limb almost invariably swells somewhat after the application of the dressing; and unless this can be loosened the patient will suffer much pain and perhaps injury in consequence.

Hence whenever a dressing of starch or glue or plaster of Paris has been applied, it should be cut open so soon as it has dried. The plaster of Paris dressing is usually dry in twelve hours; the starch or glue dressing may require twenty-four hours. In any case we can determine when they are dry by feeling of them and noting their rigidity. After they have dried, a pair of scissors may be inserted under one end of the bandage and made to cut the entire dressing open. It will be necessary in every case to select for this purpose that part of the dressing which is least important in supporting the broken bone. Thus if the part enveloped in the dressing be the leg, the bandage may be cut open along the front just over the shin-bone. In cutting open the plaster of Paris bandage it will be necessary to employ a very heavy, strong pair of scissors.

After the dressing has been thus opened, a bandage may be applied around it lightly so as to hold it firmly in position. This may be removed every second or third day in order to see how closely the dressing is fitted to the limb. In many instances the part swells considerably for the first day or two and then becomes smaller; it will be necessary therefore to gradually tighten the bandage which is employed to hold the dressing in position.

If there be an open wound anywhere — and there often is at the seat of the fracture — this should be exposed to view and relieved from pressure by cutting an opening in the dressing over the wound. The edges of this opening should be covered with lint spread with vaseline, in order to prevent the discharges from the wound from escaping upon and under the dressing.

If the fracture be located near a joint, the splint should be made to include this joint so as to secure perfect repose for the limb in the vicinity of the injury.

Special devices are employed in the treatment of certain fractures. A favorite one for the treatment of fractures of the leg is what is known as a *fracture-box*. This will be described in treating of this particular affection.

Results of Fractures.

It is highly important that people should understand certain facts regarding the probable results of fractures. That there is a vast amount of misunderstanding on the subject is shown by the frequent suits for malpractice brought against physicians, and even against the most skillful surgeons. As these suits almost invariably result in favor of the surgeon, and, in fact, merely serve to advertise him and increase his practice, it would be well for those who suffer from fractures to understand that in the majority of cases the limb will not recover its former value and beauty even in the hands of the most skillful surgeon.

The first danger to be apprehended is, of course, *loss of life*. This danger is much greater in people of feeble constitutions and impaired health, though the fatal result may occur even in robust individuals The danger to life is much greater when there is a wound communicating with the break in the bone — that is, in *compound* fractures. Fractures are more dangerous in the lower extremities than in the upper, and most dangerous when located between the hip and the knee.

There is, furthermore, some chance that the *bones will not unite*. This is a rare incident, more frequent in old persons than in others. There are certain parts of the body, fractures of which are more apt to be followed by trouble of this kind than others.

Thus, fractures of the kneepan and of the upper end of the thigh-bone occasionally fail to unite.

In these cases the ends of the broken bone are bound together by a membranous material, forming a so-called *false joint*. This may in time become quite manageable, and give the patient but little annoyance. In other instances the limb remains practically useless in consequence. There are certain operations known to surgeons whereby the healing of the broken ends can be furthered if they show signs of refusing to unite.

A most common result of fracture is *permanent shortening of the limb*. This is especially apt to occur in fractures of the leg and of the thigh. In fact, fractures of the thigh are, for practical purposes, *sure* to result in shortening of the leg.

In many cases this shortening is inconsiderable, and does not materially impede the patient's movements nor detract from his comfort. If the limb be only half an inch to an inch shorter than its fellow, the patient will rarely experience any difficulty. This fact can be better comprehended when we remember that there is a difference of nearly half an inch between the length of the two legs in the average healthy person who has never suffered a fracture. If, however, the fracture result in the shortening of the limb, amounting to one and a half or two inches, the patient may be compelled to wear a shoe with an extra high heel. The important point for the public to remember is, that such a shortening may result in the very best surgical hands, and that it is not, therefore, necessarily evidence of any lack of skill. Such a shortening is especially apt to occur in a robust and muscular individual.

Another feature to be borne in mind is that a limb which is just as long as the other one when removed from its splint, may become shorter in the course of a month or two. This seems to result from the fact that the new bone formed at the seat of the fracture is so soft that it gives way when the weight of the body is brought upon it in the patient's efforts to walk.

In many cases a *deformity* results inevitably from fracture. Such deformity may, of course, be the result of improper treatment; the bone may not have been properly set, or even if originally set in the proper way, the dressing may have become loose, so that the broken ends of the bone have been pulled out of their proper position by the action of the muscles, and the bone has healed in this unnatural position. Yet there are instances in which it

is an utter impossibility to keep the broken ends in proper position during the healing of the fracture. One of the most common places for these intractable fractures is the collar-bone. It is well known to surgeons that more or less deformity is the rule after the fracture of the collar-bone, notwithstanding all the efforts of the most skillful surgeon to prevent it. Another fracture which is apt to be followed by deformity is the one which so frequently happens when people in falling put out the hand to break the fall. This often results in a fracture of one of the bones of the forearm just above the wrist, technically known as *Colles'* fracture. The deformity which so often results from this fracture has led to innumerable suits for malpractice against surgeons. Patients might save many lawyer's fees by remembering the fact that it can be proven in court, by the testimony of the entire medical profession if necessary, that this fracture is in many cases inevitably followed by deformity, and that a deformity is not, therefore, sufficient evidence of lack of skill on the part of the surgeon.

Another accident which sometimes results in fracture is *stiffness of the limb*. It is a fact that simple disuse of a joint for several weeks is, in most cases, sufficient to cause stiffness of the joint. This stiffness may gradually disappear if persistent and systematic efforts are made to bend the limb; in some instances, on the other hand, the stiffness is permanent.

Such a loss of motion is especially apt to occur if the fracture has been located near a joint, so that the dressing has necessarily prevented movement of the joint during the healing of a fracture. Yet it may happen when the injury is located somewhat remotely from a joint.

In fractures of the thigh there remains almost invariably some stiffness of the knee as well as of the hip. When the patient first rises from his bed he may be quite unable to bend the knee. This stiffness, however, usually passes off in the course of a few weeks or months.

All these accidents may occur as a result of *simple* fracture — that is, fractures in which the bone is broken without any wound of the skin communicating with the break. If the latter feature be also present — that is, if the fracture be *compound* — the probabilities of disastrous results are much increased. This fact results from several causes: first, because an injury which results in a compound fracture is often more extensive and severe; and, second,

because the presence of the wound interferes in many cases with the application of dressings, so that it is impossible to employ the appliances necessary to keep the broken ends in their proper position.

There are certain complications which may follow any fracture, but are almost invariably met with in connection with compound fractures, that is those in which the skin is wounded over the break in the bone. It is especially important, therefore, that compound fractures be carefully watched.

In treating such a fracture it is important that we do everything possible to promote the discharge of matter which may form in the wound. The retention of this matter may result in an infection of the body, which often terminates fatally, and is known under the name of *pyæmia*, or blood-poisoning.

We should, therefore, in every case of compound fracture see that a free opening is made for the discharges. It has been already stated that, in treating such a fracture, a hole should be cut in the dressing over the wound; and it is also necessary that the wound be syringed out two or three times a day with an antiseptic solution. For this purpose we may keep on hand one of the following liquids:

Carbolic acid,	Half an ounce.
Water,	One pint.

Instead of this, it will be better to employ the following solution:

Listerine,	Two ounces.
Water,	Eight ounces.

After syringing the wound thoroughly with one of these liquids, it may be dressed by laying upon it a piece of lint or soft cloth spread with vaseline.

If the wound be extensive and the bone be badly crushed, it is often necessary to amputate the member. The services of the surgeon are, of course, in this case indispensable. In some such cases surgeons are enabled to save the limb by immersing it in warm water, into which a little carbolic acid (about 2 per cent.) has been poured. For this purpose a trough of tin or zinc is made so as to contain the water and to hold the limb comfortably. The injured member is permitted to remain in this trough for a week or two, or until the severity of the inflammation has disappeared. In such cases it is, of course, impossible to keep any dressings applied for

the purpose of retaining the limb in position. In fact, in such instances the question is not whether the patient shall have a perfect limb without deformity or shortening, but simply whether he shall have any limb at all.

The treatment of compound fracture usually includes also the use of opiates to quiet pain. For the first two or three days it may be necessary to give an eighth of a grain of morphine every five or six hours.

The patient will also usually have considerable fever during the first week after the injury. This should be treated by the use of Rochelle salts in sufficient quantity to secure free movement of the bowels at least once a day. It may be advisable also, in case the fever is high, to sponge the patient twice a day with warm water and to give him the following prescription :

Quinine, - - - -	Twenty-four grains.
White sugar, - - - -	One drachm.

Mix and make twelve powders. Take one every four hours.

His fever will be allayed to a certain extent by the following mixture :

Acetate of potash, - - -	Five drachms.
Sweet spirits of niter, - - -	Two ounces.
Water, - - - - - -	Two ounces.

Mix and take a teaspoonful four times a day.

If there be unusual redness around the wound, and especially if the skin show signs of a black discoloration, the injured member should be immersed for a few hours every day in hot water to which a little carbolic acid has been added, and the portion of the skin which has become dark should be cut off; for this discoloration is due to death or gangrene of the tissue, and if it be not cut off it will finally be separated by the formation of matter, after the patient has experienced much annoyance and some danger from it.

The chief danger to be apprehended in these cases of compound fracture is

Blood Poisoning—(Pyæmia).

.is disease occurs usually in patients who are suffering from wounds which produce considerable matter. It is especially frequent in cases in which the bone has been injured, such as compound fractures and amputations. It results from the collection of

matter in the wound, and can usually be avoided if the matter be promptly and freely removed from the wound. In other words, perfect cleanliness gives security, and the only security, against blood-poisoning in cases of fracture in which the skin is broken and a wound connects the fracture with the external air.

Symptoms.— Pyæmia may occur at almost any period after the infliction of the injury except the first few days. The first indications are usually seen in a change in the appearance of the wound. So long as everything proceeds favorably, the edges of the wound remain smooth and white, and the matter discharged is of a creamy appearance. If blood-poisoning is to be expected, the edge of the wound usually becomes swollen and red, quickly changing to a purple or livid hue; this change of color soon extends to the skin surrounding the wound, which becomes dark.

The wound gapes, and the process of healing ceases quite abruptly. In some cases portions of the wound, which seem to be already closed, re-open. The matter discharged diminishes in quantity and exchanges its creamy appearance for that of a bloody fluid.

While these changes are going on the patient experiences one or more severe chills, followed by high fever. He usually complains also of pain in the vicinity of the wound, though this may have been for days or weeks quite painless and comfortable.

The subsequent history of the case may present either one of two distinct types. If the symptoms referred to have appeared within the first week after the receipt of the injury, the patient usually exhibits the symptoms which indicate an overwhelming blood-poisoning — technically called *septicæmia*. In this case he has one or more severe chills, followed by a very high fever, which continues without intermission. The mental functions are deranged; the patient is completely prostrated, frequently has convulsions or delirium, and lies in a state of semi-unconsciousness, from which he is aroused with difficulty. This condition almost invariably terminates fatally within eight or ten days; death may occur in two or three days.

If the symptoms of blood-poisoning do not occur until after the first week from the infliction of the injury, the symptoms presented usually follow a different type. The patient has not only one or two chills at the beginning of the difficulty, but suffers from

repeated chills so long as the state of blood-poisoning exists. These chills may occur every two or three days, or several of them may be observed in the course of the same day.

The chills are followed by high fever, which, however, is not constant but intermittent; that is, for some hours or days the heat of the patient's body may be about natural.

The sufferer is prostrated also by profuse sweats, which may appear just after the fever, or may occur without any such preliminary. In most cases he suffers also from diarrhea.

The mind is usually clear and the patient perfectly rational; in this respect his condition is easily distinguished from that just described, called septicæmia.

He is usually troubled with an obstinate dry cough, which resists the treatment ordinarily employed to relieve such an affection.

In the course of a few days the patient complains of severe pain in one of the joints, usually the elbow or knee. The joint swells, though it may not exhibit any heat or redness, such as generally accompanies inflammatory swelling. After a time it becomes evident that the joint contains some liquid substance, and if a needle be inserted into this liquid it will be found that the contents of the joint consist of matter or pus. In a few days one or more of the remaining joints will become similarly affected, and before the patient recovers or dies — usually the latter — a series of abscesses involving the different joints are developed.

Meanwhile the patient rapidly loses strength and flesh; the emaciation is often extreme.

Treatment.—The treatment of the severe form of blood-poisoning — septicæmia — is usually unavailing; the patient succumbs in a few days or a week. He should be liberally plied with alcoholic stimulants. An ounce of whisky and an equal quantity of milk may be mixed and given every three or four hours. In case the patient vomits, or is so stupid that he cannot be made to swallow, the whisky and milk may be given as an injection into the rectum. The diet should consist of milk, eggs, broth and similar nutritious food.

As medicine, we may administer three grains of quinine four or five times a day.

The second form of blood-poisoning, that in which the patient

has repeated chills and an intermittent fever, offers somewhat better prospects for recovery, though even here the chances are that he will die.

The first thing to be done is to secure perfect cleanliness of the wound. For this purpose the dressing should be entirely removed, and the wound and its vicinity carefully scrutinized to ascertain the existence of black patches of skin or tissue. Any of these which may be found should be at once removed. All the corners and nooks in the wound should be thoroughly syringed out, and incisions must be freely made in order to lay open anything which seems to be a collection of matter. The limb should be immersed in a trough containing hot water, with which carbolic acid or listerine had been mixed. If carbolic acid be used, about an ounce of it should be put in every quart of water. If listerine be employed, about two ounces to the pint of water will be required.

If the patient be suffering from a compound fracture no dressing should be applied. The first object now is to save the life of the patient, and not to secure the perfect healing of the limb.

All instruments, dressing, bandages, etc., which come in contact with the wound should be thoroughly cleansed with a solution of carbolic acid or listerine, and should be carefully kept from contact with other wounds, for the matter which is formed in the wound, as well as the blood of the patient, is highly infectious — that is, if introduced into the body of another person they will produce the disease in him.

It will be better that all such dressings be burned as soon as used.

The room should be carefully and freely ventilated, and kept at a temperature of 65 or 70 degrees F.

The medicines which have sometimes seemed beneficial in improving the condition of the patient are *quinine*, the *salicylate of sodium*, and the *tincture of the chloride of iron*. The following prescription may be administered:

Quinine, - - - - - -	One drachm.
Tincture of the chloride of iron, -	One ounce.
Syrup of orange peel, - - -	One ounce.
Water, - - - - - -	Two ounces.

Mix and give a teaspoonful in water five times a day.

The salicylate of sodium seems to accomplish some, though not

all, of the good which may be expected from the quinine; and because of its comparative cheapness it has been much employed as a substitute. This should be given in doses of ten grains each four or five times a day.

The patient will need alcoholic stimulants, which should be administered early in the disease; it is a mistake to wait until the sufferer is so weak and emaciated that he can scarcely swallow or retain any remedies. Whisky should be given in the shape of egg-nog or mixed with an equal quantity of milk. There is but little danger of intoxicating the patient, who can endure an extraordinary quantity of alcoholic beverages without exhibiting the usual effects of alcohol.

The food plays a very important part in sustaining the strength of the patient. He should have an abundance of milk and eggs and strong broths. In many cases the patient will prosper upon raw meat, which should be cut up very fine.

Food should be administered at short intervals, say three or four hours, and in small quantities.

In many cases it will become necessary to nourish the patient by the injection of liquid food into the rectum.

No time nor effort should be wasted in attempts to control the diarrhea or the sweats of the patient, for these are probably efforts of nature to eliminate the poison from the system. At any rate, they resist the action of medicines so long as the general condition of blood-poisoning persists.

Pyæmia often lasts for weeks, and even months; and for a long time it may be doubtful what the ultimate result will be. The case of the late President Garfield is an instance known to all, in which the patient wavered between life and death for nearly three months.

In some cases the disease has been cut short by the amputation of a wounded limb. This is readily comprehensible when we remember that the poison in the blood which causes the symptoms proceeds from the wound. In fact, it seems as if each chill was an evidence of the entrance of a fresh installment of the poison from the wound into the blood. At any rate it has been frequently observed that after the patient manifested unmistakable signs of pyæmia, indeed, after the disease had lasted for weeks, recovery has occurred immediately after the amputation of the limb which had received the injury. A question so serious must, of course, be left to the decision of a surgeon.

Erysipelas.

This is another of the diseases which frequently ensue, especially upon compound fractures; while not so commonly fatal as pyæmia, it is nevertheless a serious complication, and one which may terminate the patient's existence.

The occurrence of erysipelas in a wound is usually preceded by a severe chill, followed by high fever. The edges of the wound become swollen and red, and the patient experiences pain in and around the site of the injury. The surface of the skin is often studded with little blisters filled with a clear liquid; these become somewhat darker in color and increase in size. After a time the blisters dry up into scabs, or open and reveal raw surfaces beneath.

If the attack be not very severe, the patient's general condition remains good; he suffers from fever, his tongue is furred, appetite diminished, and bowels constipated. The redness and swelling extend a short distance over the surrounding skin, but fade out at the end of a week or so.

If the attack be severe, on the other hand, the swelling and redness spread continually; the skin becomes soft and has a peculiar *boggy* or doughy feeling. The wound becomes at first dry, and there is secreted from it a thin watery fluid, instead of matter; after a time, however, matter forms in large quantities in the inflamed skin

Meanwhile, the patient's condition becomes serious; he is completely prostrated, often delirious. The temperature is very high, and chills occur repeatedly. In fact the condition resembles very much that of blood-poisoning; this latter affection indeed often results from, or at least follows upon, erysipelas in a wound.

Treatment.—If the attack be not severe, but little treatment is required aside from the measures which are commonly employed in all feverish conditions.

The patient's bowels should be evacuated by the use of some saline cathartic, such as Rochelle salts, a teaspoonful of which may be taken at night.

Locally we may apply to the inflamed skin cloths saturated with a solution of carbolic acid in water (an ounce of the acid to a

quart of water); or we may employ for the same purpose the following solution:

Sugar of lead,	Two drachms.
Tincture of opium,	One ounce.
Water,	Eight ounces.

The patient should also take the *tincture of the chloride of iron* internally. The following prescription may be given:

Quinine,	Half a drachm.
Tincture of the chloride of iron,	One ounce.
Water,	Three ounces.

Mix, and take a teaspoonful in water every four hours.

In severe cases it becomes necessary to support the patient's strength and to give exit to the matter which is formed in the inflamed skin. The latter object can be accomplished only by incisions with the knife, which should be freely made wherever it is evident that matter has formed in the skin. In this affection also, the dressing of a fractured limb should be removed, and the attention devoted simply to the removal of the erysipelatous condition.

After these incisions are made, the wounds should be frequently syringed with a solution of carbolic acid or listerine, which have been described in the discussion of pyæmia. The inflamed skin may be rubbed with vaseline or pieces of lint upon which this salve has been spread.

Internally, the patient should take the prescription given above, containing the tincture of iron and quinine. The dose may be given every two or three hours. In addition, we should administer alcohol in some form, preferably as whisky or brandy.

In many cases the patient can secure ease only by immersing the limb in a bath of hot water. Carbolic acid should be added to this in the strength already mentioned.

It rarely becomes necessary to administer opiates for the relief of pain.

The diet should be carefully attended to. The directions given under the head of pyæmia will apply also to erysipelas.

Ventilation should be attended to. It is to be remembered, also, that erysipelas is *infectious;* if there be any other person afflicted with wounds, or if a woman have been recently confined in the house, it is very important that the sufferer from erysipelas should be removed to another dwelling; otherwise we may expect.

in spite of the most careful attention to ventilation and disinfection, that erysipelas will appear in the one individual or child-bed fever in the other.

Fracture of the Skull.

The skull can be fractured only by considerable violence, such as blows or falls upon the head.

The extent and shape of the fracture, as well as its location in the skull, vary with the amount and direction of the force. A blow with a large blunt weapon, such as a hammer, or a fall upon the head, usually results in a long, irregular fracture; a blow with a sharp instrument is apt to cause a star-shaped fracture or series of fractures.

In many cases the skull is broken at a part somewhat distant from the point at which the force was applied. Thus, if an individual be precipitated from a height, and strike upon the top of the head, there may be only a severe bruise and laceration of the scalp at the point where the head strikes the pavement, without any fracture of the bones; yet there is apt to be an extensive fracture at the *base* of the skull, which may entirely escape notice.

Symptoms.—The symptoms and the effects accompanying a fracture of the skull depend largely upon the damage done to the brain. In some cases fracture of the skull causes but little more injury than a severe scalp wound; while in other instances a fracture which is insignificant in appearance may cause speedy death.

The effects vary also with the age and condition of the patient. A child endures such a fracture far better than an adult.

The features which render fracture of the skull dangerous to life are these:

Concussion of the brain.

Bleeding inside of the skull.

The splintering of fragments from the skull bones, which penetrate the substance of the brain or cause pressure upon it.

Inflammation of the brain and its membranes consequent upon the injury to them by the fragments of bone.

Fractures of the skull are usually compound—that is, the scalp is wounded at the place where the bone is fractured.

In any case it will be possible to feel the edge of the bone at the point of fracture. If the scalp be uninjured, this edge cannot, of course, be felt with the same distinctness, but is, nevertheless, perceptible in the great majority of cases.

There are certain other conditions which may sometimes be mistaken by the inexperienced for a fracture of the skull bone. Thus a blow upon the head sometimes causes the formation of a blood clot under the scalp which may cause a ridge similar to that produced by the edge of a broken bone.

If there be a wound of the scalp at the point of injury to the bone, the finger inserted into the wound will readily feel a rough, jagged edge, projecting above a bony surface.

It sometimes happens that fracture of the inner layer of the skull bones occurs without any break in the outer layer. To understand this we must remember that the bones of the skull are somewhat peculiarly constituted. There are, in fact, three distinct layers, the outer one somewhat flexible, the middle spongy, like a honey-comb, and the inner one extremely hard and brittle. In consequence of these qualities, it sometimes happens that a severe blow will cause merely a slight depression of the outer layer, which by virtue of its elasticity, rebounds again without breaking; while the inner layer, because of its extreme brittleness, is broken.

These fractures of the "inner table" of the skull are extremely difficult of detection. Since there is no break in the outer part of the skull, we are unable to feel the roughness which may actually exist in the inner part of the bone at the surface of the brain. In fact, this fracture can be recognized only by the symptoms which indicate the presence of bone splinters in the brain substance.

In many cases a blow upon the head causes symptoms similar to those of fracture, which may be due to an escape of blood onto the surface of the brain or to simple concussion without any fracture. In such cases the exact cause of the symptoms may remain in doubt for some days. If there be no fracture, the symptoms usually subside in the course of a week or two, while if there be a fracture, the difficulty is apt to persist much longer.

In children the bones of the skull are much softer and thinner than in adults; hence depressions of the skull may be produced without any actual breaking of the bones. Such depressions usually result in complete recovery.

Fractures at the base of the skull are especially dangerous,

because of the important nature of the parts of the brain adjacent to the base of the skull. Such fractures usually result fatally.

They may be suspected if there be some of the following symptoms:

Profuse bleeding from one of the ears. The blood is usually of a dark rather than of a bright red color.

The escape of a clear watery fluid through the ear.

The absence of fracture on the top of the head, if the patient have fallen directly upon this part.

Stupor or semi-unconsciousness; paralysis of muscles of the face; loss of feeling in one part of the face or tongue.

The ultimate result in cases of fracture of the skull varies much with the location and extent of the injury, as well as with the age and condition of the patient. In every case such an injury is, of course, serious.

In some instances the danger seems to proceed almost entirely from pressure of the fragments upon the brain. When this pressure is removed by raising the fragments to their former position, so that they no longer press upon the brain, the serious symptoms subside.

In other cases it becomes necessary to remove splinters of bone which have penetrated the substance of the brain. So long as these remain in the brain the individual fails to recover his usual functions.

In many cases the patient ultimately recovers entirely, even though the original injury was an extensive and serious one. In other cases the patient suffers for many years from occasional derangements of the mental functions. Epilepsy has been known to result from the pressure of the fragments upon the brain. The disease has been repeatedly cured by removing pieces of bone at the seat of the injury.

Other affections manifested in various parts of the nervous system, as well as in the operations of the mind, sometimes result from injury to the brain caused by a fracture of the skull.

Treatment.— A fracture of the skull is always a most serious and dangerous accident. A little mismanagement may cause the death of the patient, while the exercise of proper care and skill may restore him to a perfectly natural condition. It is, therefore, very important that the services of a surgeon be immediately secured;

yet, since it sometimes happens that many hours, or even several days must elapse before the arrival of the surgeon, simple directions will be given for the management of these cases, aside from the part which consists in operations.

The fracture will usually be accompanied by a wound of the scalp, which often bleeds profusely. The first requirement is, therefore, an effort to check the bleeding, directions for which have been given on a previous page.

After the bleeding has ceased, the wound may be carefully washed with water containing carbolic acid (one ounce of the acid to a quart of water), or with a solution of listerine (one ounce of listerine to five of water). Extreme care must be taken that no foreign material of any sort be introduced into the wound by means of instruments, fingers, sponges, etc. It is also necessary to keep the hair out of the wound; for this purpose the scalp should be closely clipped, or even shaven, for a distance of two inches around the edges of the wound.

It will not be advisable for a non-professional person to meddle with the fragments themselves. For it is to be remembered that the most delicate and one of the most essential organs of the body, the brain, lies immediately under and in contact with the broken bones; hence any awkwardness in manipulating instruments might result in serious and even fatal damage to the brain.

After the wound has been cleansed and the bleeding stopped, a *compress* — that is, a piece of lint or soft cloth folded so as to make three or four thicknesses — should be wet with cold water and applied over the wound, covering its edges completely. This compress should be moistened every half hour or hour; it may be retained in position by a bandage lightly applied.

The attention is then directed to the general condition of the patient. So far as the wound in the head itself is concerned, nothing more can be done except by means of an operation; the danger to be apprehended is that inflammation of the brain may occur, and this can be best averted by the application of cold water to the head, and by the measures to be presently described.

The patient should be kept perfectly quiet in a darkened room; the head should be laid rather low. Noise and all other influences which could disturb the sufferer must be carefully avoided. The inquiries of curious friends should not be permitted to disturb the

patient; hence it would be better to admit no one to the room except those whose attention is necessary.

Free evacuation of the bowels must be secured; a teaspoonful of Rochelle salts given once a day will usually accomplish the desired object.

In addition the patient should take one drop of the tincture of aconite every half hour or hour. This is a very powerful remedy and its effect must be carefully observed; so soon as the pulse at the wrist shows a decided decrease of strength, the remedy should be discontinued or administered in smaller quantities.

This treatment is adapted to those cases in which the patient is perfectly conscious and shows no impairment of the mental functions. There are, of course, instances which require especial treatment. Thus sometimes the patient suffers from *shock*, a condition which has been already described. In this case we must employ the treatment which has been recommended in discussing the subject; hot bottles should be applied around the patient's body, ammonia (hartshorn) held near his nostrils, and a teaspoonful of whisky mixed with the same quantity of milk or water, should be given by the mouth or by the rectum, as occasion requires.

Sometimes the patient's condition resembles *apoplexy*. In fact, fracture of the skull often induces precisely the same condition as that which we call apoplexy, when it occurs without a wound — that is, an escape of blood into the brain. In this case we should employ essentially the same treatment as that which has been recommended in treating of this disease.

The danger is augmented somewhat if the brain itself be wounded. Yet, we cannot predict in every case just what the effect of this complication will be, for many instances are known, in which a portion of the brain has been entirely removed without preventing or even retarding recovery. The well-known case in which a tamping-iron was driven clear through a man's skull, creating an immense wound, from which he recovered perfectly, is a familiar example.

If foreign bodies are lodged in the brain, the danger of inflammation, and hence of a fatal result, is somewhat increased. Such bodies should be removed as soon as possible.

There sometimes results from a fracture of the skull, a protrusion of the brain through the wound, a condition called *hernia* of the brain. This can sometimes be cured by pressure upon the pro-

truding part, made by applying a bandage tightly over it; but the treatment of such a complication should always be left to the surgeon.

It is impossible to give in detail the measures which may be required in various injuries of the brain; each case must be seen and treated by itself. It may be said in general, that surgeons have in later years acquired more confidence and success in operating upon the skull and the brain. In former times the surgeon was inclined to avoid most scrupulously any interference with this delicate portion of the body; within the last ten or twenty years, however, the brain has been frequently and successfully operated on in case of injury. One of the authors of this book once found it necessary to open a passage with the knife almost into the middle of the brain, and to introduce a rubber tube to this point, where it was allowed to remain for several weeks. The patient recovered completely.

One of the most serious complications arising in connection with fractures of the skull, is

Inflammation of the Brain.

This inflammation, affecting the brain and the membranes that cover it, is the cause of much of the mortality which follows injuries to the skull.

It begins one, two or three weeks after the infliction of the injury. Its course is, in some cases, abrupt and severe, terminating in a short time in the death of the patient; in other cases, the disease begins insidiously, and may not be suspected for some time, until the patient suddenly becomes unconscious or paralyzed.

Symptoms.—The patient complains of sharp and severe pain in the head, aggravated by motion, by exposure to the light, and by noise. At the same time there is apt to be some nausea and vomiting; the pulse becomes rapid and the mind somewhat confused.

After these symptoms have lasted a day or two, the patient has a severe chill, followed by high fever; the pulse becomes very rapid and full. The pain in the head is by this time excruciating,

the pupils of the eyes become very small; light and noise cause the patient extreme pain and annoyance. There is obstinate vomiting, and the bowels are constipated. In many cases delirium and convulsions follow, terminating in unconsciousness.

After these symptoms have lasted for a few days or a week, there is an entire change in the appearance of the patient. He no longer complains of pain or of annoyance from light or sound; he is apt to lie unconscious or in a state of low delirium. In many cases the muscles of the face are paralyzed, so that the patient squints and exhibits various distortions of the countenance; the pulse is slow and dull, the breathing deep and labored.

If there be much discharge of matter from the wound, the patient usually has several chills at irregular intervals. The edges of the wound become dry and swollen; the matter usually disappears and a thin watery liquid escapes in its stead. If any bone be exposed, it becomes dry and white.

If there be no wound, the vicinity of the injury becomes swollen and doughy.

The condition arises from inflammation of the brain. This inflammation usually proceeds to the formation of matter. When examined after death, the surface of the brain is found to be covered with matter. There may also be formed collections of matter—abscesses—in different parts of the brain, though these are more frequently found some months or years after the injury.

Treatment.—The treatment of inflammation of the brain consists of local applications and of remedies to be taken internally.

The head should be closely shaven and surrounded with ice contained in rubber bags or wrapped in soft cloths. In some cases benefit is derived from the application of fly-blisters to the nape of the neck. Mustard plasters may be applied to the feet and to the calves of the leg.

Internally medicines are administered to cause free evacuation of the bowels. For this purpose we may give the following prescription:

Calomel, - - - - -	Twenty grains.
Bicarbonate of soda, - - -	Two drachms.

Mix, and make eight powders; take one four times a day. If this does not suffice to secure copious evacuation of the bowels, we

may administer one or two drops of croton oil, placing it upon the tongue.

It will be necessary also to support the patient's strength, since the disease rapidly causes exhaustion. For this purpose we should see that the diet is nutritious and easily digestible. If there be so much vomiting that the stomach is unable to retain food, milk and broths should be administered as injections into the rectum. An ounce of milk mixed with the same quantity of whisky may be injected every four hours if the patient seems feeble.

Two grains of quinine should also be given four times a day.

In many cases all these measures are unavailing; the patient sinks rapidly and dies within ten days after the first signs of inflammation were manifested. In some of these cases it becomes evident that the brain is being compressed by the accumulation of matter on its surface; in such cases surgeons have frequently relieved the patient and have sometimes effected a cure by an operation called *trepanning*. This consists in boring through the skull and removing a piece of the bone. In this way the matter can be evacuated and the pressure upon the brain removed. This operation is, however, extremely dangerous, and is not always successful in saving the life ofthe patient.

Fractures of the Lower Jaw.

This is a frequent and troublesome fracture. The bone is broken by violence applied directly to it, such as the kick of a horse or the blow of a fist.

Symptoms.—This condition is easily recognized by the unnatural movement of the fragments. By placing the fingers over the painful spot, we can easily detect a grating upon slight movement; and upon looking into the mouth we can usually see the fissure in the bone. The teeth, also, are displaced, and some of them are often loosened. The jaw is usually turned toward the injured side.

Treatment.—The treatment of a fracture of the lower jaw is extremely troublesome, especially if the bone be broken at the side, as is usually the case. The difficulty lies in keeping the fragments at rest.

Many dressings have been employed in the treatment of fractures of the jaw. The two measures which are of most value are a splint on the outside of the jaw and a wire to pass between the teeth.

The splint should be made of felt, pasteboard, gutta-percha, or glue. These should be fitted to the jaw in the way described in discussing dressings in general. The splints should pass around the entire jaw from ear to ear, and should extend under the chin from side to side. After it has been fitted, it is held in place by a bandage which passes around the head and under the jaw.

Dr. Hamilton, of New York, uses for the dressing of a fractured jaw a strong leather strap. This passes under the chin and buckles over the top of the head. It is held in place by another strap which passes around the head above the ears and across the forehead. A third strap is attached to the last-named at the back of the head and passes over the crown to be attached to the strap which runs under the jaw. In using this apparatus care should be taken not to buckle the straps too tightly. This contrivance answers exceedingly well in many cases.

It is generally advantageous to hold the two fragments close to each other by twisting a wire around the two teeth which are nearest to the break in the bone. For this purpose, a silver wire is used. If the teeth be sound and firm, considerable force can be employed in this way in holding the fragments in position.

If none of these methods be employed, a reasonably good dressing can be made by applying two bandages. A strip of muslin or sheeting, three feet long and six inches wide, is prepared for this purpose. At the middle of it, and about three-quarters of an inch from one edge, a slit is cut, long enough to permit the chin to pass through it. The ends of this slit should be stitched so that it will not tear when applied. This is then arranged so that the chin projects through the opening, while the ends of the bandage are made to meet behind the head. Another strip is then passed at right angles to this, running under the jaw and over the top of the head. The two may be then tied together by another bandage, which passes from the knot at the back of the neck to the one at the top of the head.

Whatever dressing be employed, it is important that the patient should himself use every effort to prevent movement of the fragments; for none of these dressings are so perfect as to permit free

movement. To further this object, the patient should have liquid food only — milk, broth, etc. Difficulty is sometimes experienced in introducing food without opening the mouth. Most persons have some defect in the teeth through which a straw can be readily introduced, and the liquid thus sucked into the mouth. In other cases, a sound tooth has been extracted to afford an opportunity for introducing the straw. In order to avoid such a sacrifice of a sound tooth, surgeons sometimes place a thin piece of cork, shaped like a wedge, between the upper and lower jaw, at the seat of fracture. This should have a groove above and below, so that it will be held firmly by the teeth. In this way the jaws are held apart so that food can be readily introduced.

Fracture of the Upper Jaw.

This is a rare accident which occurs only when the face is severely injured. The bones should be replaced with the fingers, and can usually be held in position with adhesive straps — sticking-plaster and bandages.

Fracture of the Nose.

The upper part (the " bridge ") of the nose is composed of two small bones, one on either side. These are frequently broken by a blow. The lower part of the nose consists of cartilage or " gristle," which cannot be fractured, though it may be detached from its junction with the bones above.

A fracture of the bones of the nose is not always easy to detect, because the parts are so much swollen that it is impossible to feel the outline. It is generally necessary to examine the inside of the nose — a matter which can be successfully done only by an experienced hand.

Treatment.—So long as the parts are much swollen, no attempt should be made to set the broken bones. Cloths saturated with cold water should be applied until the swelling subsides

The bone should then be raised into position by inserting a small pencil into the nostril and prying the depressed fragment outward ; we may assist this effort by the judicious use of the fingers

on the outside. We should not discontinue the attempt, even though there be pretty free bleeding from the nose, for if the bone heals in its unnatural position there will, of course, remain an unsightly deformity.

If the bones do not stay in place, a plug of tightly-rolled cotton should be inserted into the nostrils to keep them in position. This cotton should be covered with rubber or with oiled silk, and be smeared with sweet oil or vaseline. It should be taken out for half an hour every day in order not to cause rawness and ulceration of the nose; it will be better to make a fresh plug each day.

Fracture of the Collar-bone.

This is one of the most frequent fractures with which the surgeon has to deal. It usually results from the application of violence to the shoulder. It often occurs in children.

The bone is usually broken near the middle, and the fracture is in most cases oblique, so that one end rides over the other.

This fracture will be detected by simply feeling along the course of the collar-bone and comparing it with the corresponding bone of the other side. There will be felt a roughness and usually a projection at one point, pressure upon which causes the patient acute pain. By manipulating the bone at this point we can usually detect a grating sensation.

The patient is unable to use the arm; the shoulder droops toward the chest. This drooping is due to the removal of the natural support of the shoulder, the collar-bone.

In children, a fracture of the collar-bone presents somewhat different signs. It will be remembered that fractures of bones in children are frequently incomplete, a portion only of the bone being broken, while the remainder yields to the pressure and bends. As a result, the shoulder often retains its natural position in children who have suffered this "green stick" fracture of the collar-bone. The chief signs in these cases are extreme tenderness at some point in the bone and swelling in the vicinity of this painful spot.

Treatment.—Fractures of the collar-bone are very easily set, but are kept in position with great difficulty. In fact more or less deformity is the usual result; cases in which the bone heals with-

out any deformity are to be regarded as exceptions, and indicate good fortune rather than exceptional skill on the part of the surgeon.

The difficulty lies simply in the impossibility of keeping the fragments at rest. Every movement of the arm and shoulder has a tendency to disturb the broken ends of the collar-bone.

It would be out of place in this work to describe the various kinds of apparatus which have been devised and employed in the treatment of broken collar-bones. Good results have been obtained with nearly all, though none can be relied upon to prevent deformity.

The chief object of the apparatus is to keep the shoulder pressed firmly backward, for in this way the broken ends of the bone are brought into their proper position. To accomplish this object, straps are applied around the arm just below the shoulder, and around the shoulder itself. These are then drawn backward and attached to straps proceeding from the other shoulder. By inserting buckles at the back between the shoulders, these straps can be tightened so as to hold the shoulder of the injured side firmly in position.

Another way is to attach broad bands of adhesive plaster around the arm and shoulder of the injured side, and to make these adhere firmly across the back and under the arm of the opposite side.

The writer once secured a perfect result — that is, union of the fragments with absolutely no deformity — by fitting a plaster of Paris jacket over the shoulder and arm of the injured side. The jacket extended down onto the chest and back, and was re-enforced by muslin bandages extending around the body and over the opposite shoulder. When the dressing was removed it was almost impossible to detect any difference between the collar-bones of the two sides. This result, however, has been obtained by other dressings, and does not necessarily prove the superiority of the plaster of Paris.

When the patient lies flat upon the back, the shoulder falls backward, and the fragments drop into their natural position. If, therefore, the patient can be passive enough to keep this position most all the time for a month, the best possible chance for recovery without deformity is thereby afforded. Most individuals would prefer to suffer a slight deformity rather than to endure the monotony of such a measure. It may be, however, worth the trouble if the patient is a girl.

Fracture of the Shoulder-blade.

This is an unusual accident, which results from a severe blow upon the back of the shoulder.

The signs of this affection are pain in moving the shoulder and tenderness upon pressure over the shoulder-blade. By careful manipulation we can sometimes detect a grating sensation between the two fragments.

Treatment.—The muscles attached to the back part of the shoulder-blade must be relaxed, in order that the two fragments shall be kept in their proper position. This is done by passing a sling made of a large handkerchief under the elbow and around the neck. This is drawn somewhat tight, so that the shoulder is a little higher than the opposite one. The elbow is then to be bound to the side of the body by a broad bandage passed around the arm and chest. The healing process usually requires four or five weeks, and care must be taken in avoiding muscular effort with this arm for some weeks more.

Fractures of the Arm-Bone—(Humerus).

The arm—that portion of the upper extremity between the shoulder and the elbow—is frequently broken by direct violence. For convenience of description and discussion such fractures are divided into three classes:

First—Fractures of the upper end of the bone, near the shoulder.

Second—Fractures of the middle part of the bone, technically called the *shaft*.

Third—Fractures of the lower end of the bone, near the elbow.

Fractures of the Upper End of the Humerus.—These fractures are usually caused by a blow upon the arm, or by a fall of the individual. In some cases the end of the bone is at the same time driven tightly against and into the shoulder-blade at the joint, or the lower fragment is wedged firmly into the upper portion. Such fractures are called *impacted*.

In most cases the two fragments remain separate and distinct; these, the usual ones, are called non-impacted.

A non-impacted fracture of the arm near the shoulder can usually be recognized without much difficulty. The signs by which such recognition is effected are:

First—Swelling and pain at a certain point.

Second—Unnatural movement of the arm.

Third—A grating sensation when the arm is moved by grasping the elbow, the shoulder, meanwhile, being held fast.

Fourth—Loss of power in the arm.

If the fracture be impacted, there will be no grating sensation perceptible, and the movements of which the arm is capable will not vary essentially from those of a healthy arm except that they are accompanied by great pain.

Fractures of the arm near the shoulder-joint are sometimes confounded with dislocations of the shoulder. It is not a difficult matter to distinguish a dislocation from a fracture which is not complicated in any way; but in many cases a fracture at the upper part of the arm is accompanied by a dislocation of the upper fragment, so that both conditions are present at the same time. These are the cases in which errors are often made, and which, even when recognized, offer serious obstacles to successful treatment.

A few points are given whereby an uncomplicated fracture of the arm can be, in most cases, distinguished from a simple dislocation of the shoulder:

First, in case of fracture, the hand of the injured arm can be placed by the patient or by another person upon the shoulder of the opposite side, while the elbow is at the same time kept in contact with the chest.

In case of *dislocation*, the hand of the injured arm cannot be placed upon the opposite shoulder, either by the patient or by another person, *unless the elbow is allowed to recede* from the chest.

Second, in case of fracture, the elbow of the injured arm usually lies against the body. If there be a dislocation on the other hand, the elbow almost invariably stands out from the body.

Third, in case of fracture, the end or *head* of the arm-bone can be felt in its proper position under the prominence of the shoulder. If there be a dislocation, the shoulder of the affected side looks unnaturally flat and square. A sharp prominence can often be felt,

constituting the point of the shoulder. By comparing it with the other side, the difference in shape strikes even the inexperienced eye.

Fourth, in case of fracture, the grating sensation can usually be felt. In dislocations no such sensation can be detected.

Fifth, in fractures the arm can be moved with unusual freedom. In dislocation the arm is fixed and almost immovable.

Treatment. — The treatment of fracture of the arm in the vicinity of the shoulder-joint is a somewhat difficult procedure. It is important that we distinguish whether or not the fracture is *impacted;* that is, whether the two fragments are forced together, or remain loose and separate from each other.

If the fracture be impacted, it is very important that we should not separate the fragments by rough manipulation or pulling upon the arm ; for the upper fragment is usually very short, and if we detach it from the lower, we are unable to grasp and place it in position again. Even if there should be a slight bend in the bone at the point of fracture, the result will certainly be much better than we can hope to attain if we separate the fragments and then attempt to set the bone again.

If we find that the fracture is impacted, therefore, we should aim to keep the arm quiet in the position most favorable to healing. A sling suspended from the neck should be passed around the forearm and elbow, so that the arm is drawn well up toward the shoulder. We may then put a pad, consisting of a folded towel or a piece of lint, in the arm-pit, between the arm and the chest. A bandage is then applied several times around the body and the arm, so as to prevent any motion of the injured limb.

If the fracture be not impacted, it is necessary to apply a splint. For this purpose various plans are employed. The best for domestic use consists in making a splint out of leather or stiff pasteboard. This should be cut of such size and shape as to extend from the elbow up on the shoulder, and to come about half way around the arm from front to back. In order to fit this nicely to the shoulder, it should be split up about three inches from the shoulder end, and the edges of this slit should be cut away so that the opening has the shape of a V. When this is applied to the outside of the arm, the sides of this V-shaped cut can be brought together and the splint thereby nicely fitted to the curve of the shoulder.

A second splint, made of the same material, should extend along the inside of the arm from the elbow to the arm-pit. In this way the two fragments are brought between the two splints and can be held firmly in that position by a bandage.

These splints should be carefully padded with cotton; the edges, especially at the end of the inner splint which lies in the armpit, should be covered with several layers of cotton in order to prevent chafing of the skin.

After these splints have been prepared, and several rolls of bandages two and a half inches wide are ready for use, the injured arm should be drawn forward from the body a little; an assistant then grasps the arm at the elbow and draws it firmly downward, while another assistant holds the shoulder and prevents it from being drawn with the arm. While the member is thus held in position the padded splints are applied, one on the outside and the other on the inside of the arm. They are then bound firmly in position by means of the bandages. The arm is then slung in a handkerchief, which is then knotted around the neck and covers the fore-arm and elbow.

If the patient be stout and muscular, it will be necessary to employ in addition to this bandage a pad made of a folded towel or napkin which is placed in the armpit.

This dressing must be kept on the arm four or five weeks, at the end of which time we may expect that the broken ends have united. It will be well, however, not to permit the original dressing to remain the entire time; for in many cases the arm is considerably swollen at the time of the injury, and hence a splint which fits it well at that time becomes loose a few days subsequently. If, therefore, there be much swelling when the first dressing is applied, this should be removed after four or five days and altered so as to fit the arm more closely. Five or six days later the dressing may be loosened so that the skin can be inspected at the points where the ends of the splints come in contact with it. It will often be found that the splints have chafed the skin somewhat, and if the dressing be not removed, severe ulceration may follow. If any chafing of the skin be discovered, pieces of lint spread with vaseline may be applied over the sore spot, and in re-applying the dressing, care should be taken to prevent pressure upon these chafed spots. In any case it will be well to renew the padding of the splints, especially at their edges and ends.

If the patient do not complain of soreness after this first removal of the dressing, this may be allowed to remain till the end of the four or five weeks.

If the patient's skin be especially delicate, it will be necessary to remove the splint every five or six days, and to bathe the skin with a mixture of alcohol and water in equal parts. Every time that the dressing is removed, and the broken bone is thus left without support, extreme care should be taken that the arm is not moved either by an effort of the patient himself or by the careless handling of others.

After the dressing is removed, the arm should still be carried in a sling for a week or ten days. It may be removed from the sling every day, and should be gently bent and extended by an assistant. This exercise may be performed for ten or fifteen minutes the first day, the time being gradually extended as the arm becomes accustomed to it.

At first the arm will be very stiff as well as weak; but both motion and strength will be regained in the course of time.

In unfavorable cases there occurs some impairment in the movements of the shoulder-joint, as a result of an extension of the fracture up to the end of the arm-bone. If this have occurred, some loss of motion is inevitable; such a loss of power cannot therefore be attributed to lack of skill on the part of the surgeon.

Fractures in the Middle of the Arm-bone.—These are the most favorable of all the fractures in the arm-bone, since they do not interfere with the movements of the joints, and they are readily accessible for treatment.

Such fractures are recognized by the usual signs: the arm is swollen, and very painful at some particular point; there is a loss of power in the arm and hand, unnatural movement — such as might occur from the formation of a new joint. By gently moving the upper and lower parts of the arm we can distinguish a grating sensation.

Treatment.—There are certain fractures near the middle of the humerus which require special dressings; these we cannot describe in detail. For our purpose it will suffice to mention the dressing which is applicable to most cases of fracture in this situation.

A splint should be prepared which consists of two pieces united at their ends at a right angle. This splint is to be applied

to the front of the arm and fore-arm, the right angle fitting into the front of the elbow joint when the arm is bent. The upper piece should be long enough to extend almost to the armpit, while the lower one reaches nearly to the wrist.

A second splint is prepared long enough to reach from the elbow to the shoulder along the back of the arm.

These splints are carefully padded with cotton in the manner already described.

The arm should then be drawn downward by an assistant who grasps the limb at the elbow. While it is held in this position the splints are applied and bandages are wound firmly around the arm from the wrist to the shoulder. The arm is then rested in a sling.

The object in including the forearm in the splints is simply to prevent movement at the elbow. This is an important part of the treatment, since such movement often results in delay, or even failure, of the fragments to unite.

This dressing may be allowed to remain (if the patient do not complain of pain from the splints) about two weeks. At the end of this time the splints should be removed and others applied which extend only as far as the elbow. The object of this change is to permit movement of the elbow, which otherwise often becomes quite stiff.

At the end of four or five weeks the splints may be removed entirely, if union have taken place between the fragments. The arm should be carried in a sling for another week or two until the new bone has become firm enough to endure ordinary movements without breaking.

Fractures of the Arm-bone near the Elbow.— No fractures in the body tax the knowledge and the skill of the surgeon more severely than those involving the elbow-joint. The arrangement of the bones and ligaments is so delicate and intricate that an injury to this joint is usually followed by some loss in the movements natura to it. Fractures of the humerus in its lower portion frequently extend into the joint and cause serious impairment of the power and motion of the arm. They are often complicated with some dislocation of the bones forming the joint.

There are, however, some fractures which break the bone of the arm almost transversely across just above the joint. It is of such fractures, uncomplicated with dislocation of the bones, that we shall speak in this chapter.

A fracture of the lower part of the humerus is indicated by the usual signs.

First—There is pain at some point in the arm, increased upon pressure with the fingers.

Second—By moving the forearm backward and forward while the arm is firmly held, we can often distinguish a grating sensation.

Third—The lower end of the upper fragment of the bone can often be felt by placing the fingers over the front of the arm just above the elbow.

Fourth—The movement of the arm at the elbow is not impaired.

Fifth—There is often some shortening of the arm, which can be detected by measuring on the inside of the arm from the elbow to the shoulder, and by comparing this measurement with the corresponding distance on the sound side.

Sixth—If the arm be bent and allowed to rest naturally, there will be an unusual prominence of the elbow.

This fracture is sometimes confounded with a dislocation of the bones of the fore-arm. The latter can, however, usually be recognized by the following signs:

1. The arm cannot be bent at the elbow.
2. There is no grating sensation to be felt when the injured member is moved.
3. There is an unusual prominence at the back of the elbow.
4. There is no sharp edge to be felt at the front of the arm; the lower end of the arm-bone can be felt as a smooth, rounded and thick body, situated just in the bend of the elbow.
5. There is no shortening of the distance between the shoulder and the elbow.

Treatment.—The chief danger to be apprehended from a fracture of the arm near the elbow is that stiffness of this joint will remain permanently. This is a point which is to be borne in mind in the application of a dressing; for if the elbow be permanently stiff, it is highly important that the arm should be dressed in such a position as will give it the greatest possible usefulness when the elbow becomes stiff.

It is therefore customary to apply splints to a fracture of this description in such a way that the arm is bent at the elbow almost at a right angle across the body, the thumb being turned upward.

During the first few days there is so much swelling around the elbow that it is impossible to apply a splint with advantage or even to ascertain exactly what the injury is. This swelling should be treated by wrapping the arm in cloths saturated in hot water, and surrounding these with oiled silk or rubber sheeting. After the swelling has been reduced the splints may be applied.

These should consist of two pieces. The outer splint should extend from the shoulder to the wrist on the outside of the arm, being bent at a right angle at the position of the elbow. The inner splint should also consist of two pieces with a similar angle at the elbow. Some surgeons use only the outer splint, and seem to secure good results.

These splints must be very carefully padded, extra thicknesses of cotton being arranged to cover the bony prominences of the elbow. They are then applied in the way indicated, and are fastened in position with a firm bandage. The arm thus dressed should be supported in a sling.

The splint should be worn from three to five weeks; the older the patient the longer it becomes necessary to support the arm, since union occurs less promptly in advanced life than in childhood. At the end of this time the splint should be removed, and the elbow should be gently bent.

In most cases it will be found that there is decided stiffness of the elbow-joint; in fact at first it may be impossible for the patient to bend the arm at all. By gently exercising it for a few minutes every day, however, there will be a gradual decrease in the stiffness of the joint. Sometimes motion is completely regained, while in other cases a certain amount of stiffness remains permanently.

In order to obviate this stiffness of the elbow, surgeons have sometimes employed a single splint provided with a hinge at the elbow. This is applied to the back of the arm, and after the first ten days, the arm is gently bent at the elbow for a few minutes a day. This can often be done without disturbing the ends of the fractured bone.

Fractures of the Fore-arm.

The fore-arm consists of two bones called the *ulna* and the *radius*. The relative position of these two bones with reference to each other and to the bone of the arm, must be understood in order to appreciate the recognition and treatment of fractures of the fore-arm.

When the arm is held so that the palm of the hand is turned upward and the thumb outward, the radius lies on the outer side, the ulna on the inner side of the fore-arm. When the hand is turned over so that the palm is downward, the radius makes a revolution about the ulna, the latter remaining in its former position. The rotation of the hand, therefore, about the axis of the fore-arm is accompanied by a rotation of the radius around the ulna. In order to accomplish this it is evident that the radius shall not be very firmly fitted into the bone of the arm at the elbow-joint. In fact the radius merely lies in contact with the humerus at the elbow.

The ulna, on the other hand — the bone which lies on the side of the fore-arm corresponding to the little finger — is firmly fitted to the arm-bone at the elbow; this joint consists chiefly, therefore, of the adjacent surfaces of the humerus and of the ulna. The projection at the back of the elbow, popularly known as the "crazy bone," is the upper end of the ulna.

The movements executed by the bones of the fore-arm are most delicate and complicated, hence, even a slight interference with them by fracture or dislocation, is apt to be followed by a decrease in the freedom and extent of motion of the fore-arm.

Fractures of the Fore-arm near the Elbow.—The most frequent fracture affecting this portion of the fore-arm consists in the breaking off of the upper end of the ulna—the portion called the crazy-bone. This occurs as the result of a fall or blow upon the elbow, and sometimes in consequence of violent muscular contraction of the arm.

This fracture is easily detected, since the bone is covered in this position only by the skin. By feeling along the edge of the ulna we find that the point of this bone is separated from the shaft. We can often distinguish a little block of bone which is pulled a short distance from the elbow up the arm. By straightening the

arm the ulna approaches somewhat this fragment, which has been broken off and separated from it. In other cases the fragment is not separated much from the rest of the bone, and we can feel distinctly a groove between it and the body of the bone. When the arm is straightened we can detect a grating sensation at the point of injury.

A perfectly characteristic feature of this fracture is, that while the movement in the elbow-joint is perfectly free, so that another individual can bend the fore-arm backward and forward without difficulty, the patient himself is unable to straighten the arm. This results from the fact that the arm is straightened by the contraction of a muscle which is attached to the point of the ulna, that is to the "crazy-bone." In this injury the point of the bone where the muscle is attached is broken off, and hence the patient cannot exert any force upon the fore-arm so as to straighten the arm.

Treatment.—While it is usually an easy matter to replace the broken fragment, it is often impossible to secure a bony union. The fragment becomes united to the rest of the bone by means of a membrane or ligament. If this occur—and it may happen in the hands of the most skillful surgeon—the patient will never be able to straighten the arm completely. When he attempts to do so the fragment to which the muscle is attached is pulled away from the rest of the bone.

The first object of treatment is to keep the arm perfectly straight. Probably the best splint for the purpose is that of Dr. Hamilton. This consists of a piece of wood as wide as the broadest part of the arm, and long enough to reach from the wrist to a point three or four inches from the shoulder. At a distance of about three inches below the bend of the elbow, this piece of wood should be notched deeply on either side. This splint, thickly padded with cotton, is placed on the front of the arm so that the notches lie in position about three inches below the elbow. A bandage is then carried around the hand and up the fore-arm, over the splint. When it reaches the notches, the bandage is passed upward above the elbow, so as to secure a hold behind the broken fragment. When the bandage is carried around to the notch at the other side of the arm and tightly drawn, this fragment is drawn downward so as to come into contact with the bone from which it was broken off. The bandage is carried twice through the notches

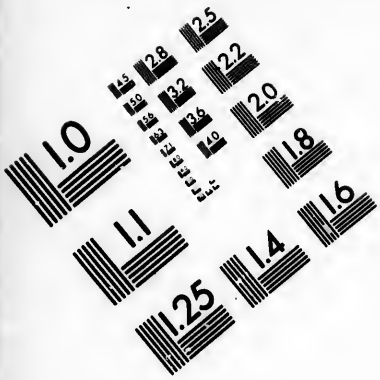
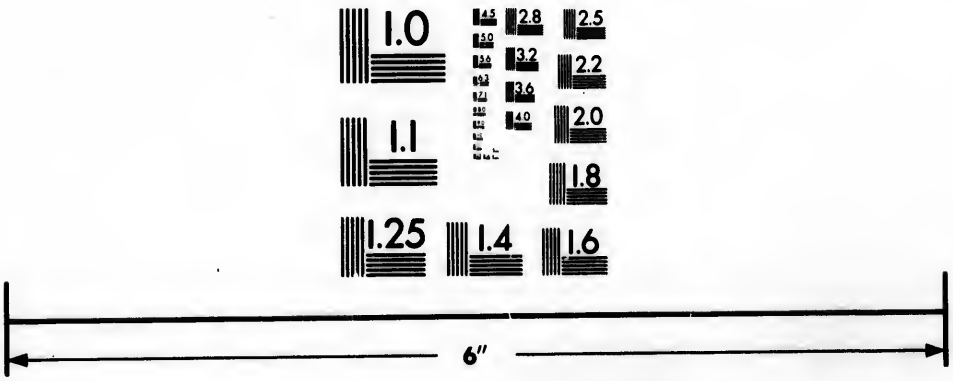
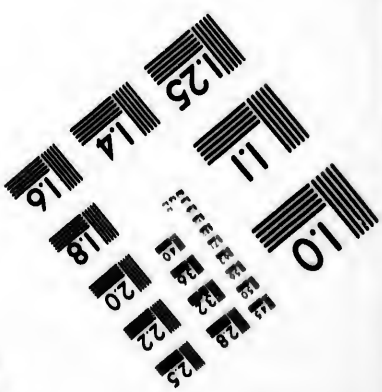


IMAGE EVALUATION TEST TARGET (MT-3)





Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

in this way so as to secure a firm hold on the fragment After this the bandage is continued up to the end of the splint.

In order to prevent any soreness or rawness of the skin, it is well to cover the broken fragment with cotton before the bandage is applied.

This splint is to be kept in position three or four weeks. At the end of this time the bandage may be removed and the bone examined to see whether the fragment is firmly united to the bone. If it still seems loose, the splint should remain in position for a week or two longer.

This fracture is apt to be followed by some stiffness of the joint, which, however, disappears if the arm be gently bent regularly.

Fracture at the Middle of the Fore-arm.

This fracture is usually caused by direct violence such as a blow, though it sometimes results from a fall upon the hand.

If both bones be broken, the usual signs of fracture will be apparent. There will be an unnatural mobility of the arm—a grating sensation and loss of power.

If, however only one bone be broken, these signs are less apparent, for the other bone maintains the form and length of the arm. Sometimes, too, it is impossible to detect the grating sensation.

In every case we should find the point at which pressure causes the patient acute pain, and observe whether this is on the outer or outer or inner side of the arm; that is, whether it is located over the radius or the ulna. We then pass the fingers along the course of the bone, feeling carefully for any point at which a little pressure is followed by a yielding of the bone. If we find such a point, we can sometimes, by placing the thumb of one hand over it, and the thumb of the other hand two or three inches higher up, distinguish a faint grating sensation.

The peculiar impairment of motion may also enlighten us as to the location of the fracture. The radius, as has been said, is especially concerned in the rotation of the hand; any injury to the radius is apt to be followed by an impairment in the power to turn the hand over.

Treatment.—It has been already stated that injuries to the bones of the fore-arm are frequently followed by some impairment in the movements of the hand. It is extremely important that the fact be recognized in the treatment of the fracture. The first object of treatment must, therefore, be an effort to separate the bones at the point of fracture. In consequence of the arrangement of the muscles in the fore-arm, the broken ends of either bone are apt to be drawn toward the other bone; unless this position is relieved, the two bones may grow together at the point of fracture, a condition which will result in serious loss of motion, since the hand cannot be rotated or turned over.

In order to avoid this two splints of wood should be prepared, long enough to reach from the elbow to the wrist. The splint which is applied to the front of the arm should extend down to the palm of the hand, so that the fingers can be bent up over it. These splints should be well padded and applied to the arm; the padding (of cotton) should be made somewhat thicker in the middle, so that it shall sink in between the bones and keep them separate.

In applying the splints care should be taken that the arm lies so that the palm is turned upward; this is necessary in order that the bones shall be kept apart. In this position of the hand, the two bones of the forearm lie parallel and widely separated, while when the hand is in any other position the radius lies across the ulna and close to it.

After the splints have been applied and fastened by means of a bandage, the arm should be supended in a sling, the palm of the hand being turned inward with the thumb uppermost.

The dressing should be worn for about a month, and the arm should be carried in a sling for a week or two afterwards.

Fracture of the Fore-arm Near the Wrist.

The most usual fracture in this location is what is variously designated as Colles' fracture, or "silver-fork" or "back-door" fracture. The first name is derived from an Irish physician Dr Colles, who first called attention to this fracture. It is called silver-fork fracture from the peculiar appearance of the wrist and hand; for the back of the arm and hand is no longer straight, as in the

natural condition, but presents a series of curves much resembling the shape of a silver fork. It is called "back-door" fracture because it so frequently occurs in women when they step out of the back door of their kitchens onto an icy pavement.

It is one of the most troublesome of all fractures. No matter what plan of treatment be adopted, there almost invariably remains either some deformity of the wrist, or some impairment of motion, or both. This fracture is, therefore, the subject of innumerable suits against surgeons for malpractice; it would be well for people to understand that the wrist can rarely be restored perfectly in both form and movement, and that the result will almost inevitably be unsatisfactory.

This fracture is easily recognized by the outline of the wrist to which reference has been already made. The patient will be unable to bend the hand or to turn it toward the thumb side of the arm.

Treatment.—It is important to observe whether the fragments are loose and movable, for in many cases the ends of the bone are firmly driven into each other, that is, *impacted*. If this be the case, and if the patient be old, the fragments should not be separated unless the deformity is very great. For, by permitting them to remain, we are sure of having them held in place more securely than can always be done by a dressing.

If the fragments are impacted with great deformity, it becomes necessary to separate them; this is to be done by pulling firmly upon the wrist.

When the fragments are movable, it is very easy to "set" the bone, but not always easy to keep it in place. By simply clasping the hand of the patient and pulling it away from the arm as well as toward the little finger side, the bone falls readily into place; in fact, it can often be put into position by simply pressing upon the broken ends with the thumbs. In order to keep it in position various methods have been devised. Several objects are to be accomplished by the dressing.

The lower fragment is to be drawn down into its position and kept the[illegible].

The hand must be prevented from falling toward the thumb side, as it naturally does when the bone is thus fractured. The arm must be kept at rest.

The usual method for dressing this fracture consists in the

application of a splint which, because shaped very much like a pistol, is ordinarily termed the "pistol-splint." This consists of one piece, the longer limb of which is applied to the fore-arm, while the shorter limb, which is bent at an angle of about 135 degrees, covers the palm of the hand. This is carefully padded and applied to the front of the fore-arm and hand, where it is held in position by a firm bandage. By thus turning the fingers toward the opposite side of the arm, we prevent the lower fragment from riding over the upper one and hold it in position. Some surgeons are in the habit of placing a pad, made by rolling up a piece of bandage, between the splint and the edge of the lower fragment; this is rarely necessary. By having the padding of the splint thicker in the middle than at the sides, we keep the fragment of the radius from touching the ulna, and thus prevent the two bones from growing together.

Some surgeons use two splints in dressing a Colles' fracture: one similar to that just described, and the other, a straight splint, which is applied to the back of the fore-arm and covers the wrist. Professor Gunn, of Chicago, often dresses this fracture by simply applying a broad strip of adhesive plaster around the wrist at this point.

Whatever dressing be applied, the arm should be supported in a sling which is suspended from the neck.

The dressing should be carefully inspected every day, to see that the arm suffers no damage. Somtimes the bandage is applied so tightly as to cut off the circulation in the hand; this will be indicated by coldness and blueness of the fingers, and must be remedied at once by loosening the bandages. If the patient complain of great pain, the bandage should be loosened and the seat of the fracture examined to see that the parts are in the proper position.

After the hand has been thus treated for two weeks, the dressing may be removed and replaced either by a simple strip of adhesive plaster around the wrist, or by a single short splint on the front of the arm, which extends only to the wrist. In this way the hand is permitted to move freely, and the stiffness of the wrist, which often results if the first dressing remain too long, is in great measure avoided. So soon as this second dressing is applied, the hand should be gently bent backward and forward by a second person. In the second week the hand may be slightly rotated, that is, turned over and back. By thus exercising the joints we may succeed in avoiding the stiffness which otherwise results.

Fractures of the Hand.

The bones constituting the hand are sometimes broken by a blow upon the hand or by striking the fist against some hard object.

It is sometimes difficult to recognize a fracture of one of these bones, because the swelling is so great that accurate examination is impossible. In most cases, however, we can detect a painful spot at which a grating sensation is felt; this feeling is much plainer when the patient bends the fingers. There is some deformity, part of which may remain after the bones unite; but the usefulness of the hand is not thereby impaired.

Treatment.—A piece of wood long enough to reach from the knuckle to the middle of the fore-arm and as wide as the palm, is padded with cotton as already directed. This is applied to the front of the arm, a pad being interposed between the end of it and the palm of the hand. A bandage is then applied so as to keep the palm pressed against the splint. If only one of the bones be broken, the splint need not be so wide.

These fractures are sometimes dressed by simply clasping the fingers around a large ball of yarn or cotton, and then bandaging the hand over this.

Fractures of the Fingers.

These are usually by direct violence, and are commonly associated with wounds of the flesh. In the latter case the treatment must often be directed to the wound rather than to the fracture.

If we have a simple fracture to deal with, it will be an easy matter to recognize the condition. The outline of the finger is changed, and we can usually see and feel the broken ends without difficulty.

Treatment.—Fractures of the fingers should be treated very carefully, since a deformity in this location is very annoying. In setting the bone, which can easily be done by simply pulling upon the end of the finger, care should be taken that the fragments are accurately replaced.

A splint of wood or pasteboard should be cut sufficiently long to extend from the end of the finger onto the forearm. After this has been padded it should be bound to the finger with a narrow bandage. The ends of the fingers should be left uncovered, that we can see whether the circulation is interrupted; if this end become blue and cold, the bandage should be loosened and re-applied.

If two fingers be broken, each should have its own splint; for if we apply but one splint and a bandage around both fingers, there is apt to result a deformity, since the broken fragments often heal at an angle.

Many surgeons employ a plaster of Paris dressing for broken fingers. This holds the parts firmly, but has the disadvantage that the fingers cannot be so easily and readily inspected.

In any case the hand should be suspended in a sling; it is important to avoid movements of the hand and fore-arm, since these are accompanied by muscular action which often disturbs the position of the fragments.

If the fracture be accompanied by severe wounds of the flesh, the treatment is more complicated and must be devised for each particular case. In every instance an effort should be made to save the fingers, even though they be badly mangled, since even deformed fingers are often very useful.

Fractures of the Ribs.

The ribs are usually broken only by direct violence, because in consequence of their elasticity they readily yield to a force applied from without. In elderly persons the ribs break more easily than in the young, and it is chiefly among persons in advanced life that these cases are observed.

Fracture of the ribs can usually be detected by the following signs:

The patient suffers extreme pain upon breathing, which he refers to one particular spot. He is unable to lie down upon the injured side without pain; the difficulty in breathing is usually increased in the recumbent posture. If one of the fragments have penetrated the lung, the patient coughs up bloody mucus mixed with air; sometimes air escapes from the lung into the cavity of the

chest, and even into the connective tissue under the skin. In the latter case the skin is puffed up and crackles when pressed with the fingers.

By feeling along the course of the ribs we detect a painful spot; pressure with two fingers placed an inch or two apart reveals a grating sensation at this point. By placing the ear over the skin at the seat of the suspected fracture we can hear a grating sound during the movements of the chest in breathing. If there be any difficulty in detecting the seat of fracture we can usually find the spot by placing one hand upon the back and the other upon the breast-bone and pressing with considerable force; the patient will experience a sharp pain at the seat of the fracture.

Fracture of the ribs is sometimes simulated by a severe bruise of the side; in this case there is no grating sensation, but there is so much pain upon pressure that the patient cannot endure a careful examination. If the injury be only a bruise without fracture, the pain and tenderness will subside in a few days; if there be a fracture, on the other hand, the pain during breathing persists.

A simple fracture of the ribs unites readily even without dressing. If, however, there be some injury to the lung, inflammation of the lung, or of the membrane covering it — the *pleura* — may involve the patient in a serious illness. If no such inflammation follow, a rapid recovery may be expected even though the skin be puffed up with air which has escaped under it. It is surprising to see the effects sometimes produced by this accident; the entire side of the chest, indeed the whole body, may be enormously swollen; the skin is simply full of air, and crackles whenever the fingers are pressed upon it. No danger is to be apprehended from this condition, however, unless the air has also escaped into and filled up the cavity of the chest between the lungs and the ribs; in this case the lung may be compressed so that the patient cannot breathe, and dies of suffocation.

Treatment.— In most cases there is no perceptible deformity, unless several adjacent ribs have been broken. If there be an evident displacement of the fragments these are to be reduced by pressure with the fingers.

The object of treatment consists in measures which restrain the movements of the chest on the affected side, as a result of which the fragments are kept at rest and have an opportunity to

heal. This object can be accomplished by applying broad bands of adhesive plaster around the injured side from the spine to the breast-bone. These strips of plaster should be about two inches wide, each one overlapping the one beneath; a sufficient number should be applied to cover five or six inches of the side of the chest. If adhesive straps cannot be obtained, the movements of the chest may be arrested by a bandage placed around the body drawn as tightly as the patient can bear it.

In some cases the application of such a bandage may at first increase the patient's discomfort. This, however, lasts but a short time, and in a few hours great relief is afforded.

The dressing must be worn four or five weeks.

Fractures of the Spine.

This injury occurs only as the result of severe mechanical violence.

The consequences depend upon the damage inflicted to the spinal cord. For it must be remembered that the spine is a bony canal, containing the nerves which run from the brain to the limbs and trunk. Any injury to the spine which causes pressure upon these nerves must of course occasion interference with the functions of the body and limbs.

It sometimes happens that portions of the spine are broken off without affecting the contents of this bony canal, for the back-bone is composed of different joints, each of which is provided with a bony projection or *spine*, which extends backward from the spinal column. It is these bony spines which constitute the ridge of the back-bone. The application of violence is sometimes followed by a fracture of one or more of these spines, without injury to the part of the back-bone which contains the nerves. In this case there is no further damage than the pain at the point of injury. We can sometimes detect a movable piece of bone, and possibly feel the grating sensation customary in fractures. There may also be a marked deformity due to the displacement of the broken bony projection. If this be replaced, and the patient kept quiet, union occurs without difficulty and no permanent injury results.

In most cases, however, a fracture of the spine involves those parts of the bones which constitute the bony canal surrounding the

spinal cord. In this case the cord itself, including the bundle of nerves which proceed from the brain to the limbs, is injured. It is not necessary, in order to interrupt the nervous current, that the spinal cord should be actually wounded or cut, for simple pressure upon it suffices to interfere with the passage of the nervous influence along the cord.

It sometimes happens, therefore, that a very slight fracture — one which cannot be detected by the usual signs — is quite sufficient to compress the spinal cord and to arrest the passage of nervous force from the brain to the limbs. Indeed, it has been observed in many cases that if there be no displacement of the broken bone, but simply an escape of blood into the spinal canal, the same symptoms follow as if a piece of the bone were driven into the spinal cord.

Symptoms which follow an injury to the spine resulting in wounding or compression of the spinal cord, vary according to the location of the injury. If the fracture occur in the lower part of the back, there results paralysis of the legs and of the bladder and rectum. The patient is unable to move the lower extremities or to evacuate the bladder or bowels voluntarily; there is usually a loss of feeling in the lower half of the body, though during the first few hours or days there may be an extreme sensitiveness of the extremities so that the slightest touch, even the contact of the bedclothes, causes extreme pain.

If the injury be situated at some point higher up in the spine, there will be paralysis of the trunk as well as of the limbs, and if the spine be injured in the neck the entire body except the hand will be paralyzed. In the latter case death sometimes occurs instantaneously.

Treatment. — The treatment of fracture of the spine consists usually in the treatment of the symptoms of the various organs caused by injuries of the spinal cord The bowels and bladder give the patient a good deal of trouble, since he has no control over either; the bladder usually becomes severely inflamed

In some rare cases it has been possible to set fractures of the spine with the effect of relieving somewhat the symptoms of the patient. In the majority of cases, however, no treatment applied to the seat of the injury itself is of any avail in overcoming the injury; for the damage is done at the time of the fracture, and a

replacement of the bone cannot undo the injury done to the spinal cord.

The subsequent history of these cases varies in details, but always includes permanent paralysis to a greater or less extent. In the most favorable instances, the power of movement in the limbs is recovered to a certain degree; in most cases the spinal cord undergoes degeneration at the seat of injury; the flesh mortifies, forming large bed-sores, and the patient finally dies of exhaustion.

The injured person should be kept in the recumbent position, and regular evacuations of the bladder and of the bowels should be secured by the use of the catherer in the one case, and of warm-water injections in the other. Medicines will rarely accomplish any good. Sometimes benefit is derived from the application of croton oil to the skin at the seat of the injury.

Fractures of the Hip.

The hip is formed by the edge of a bone which constitutes a large part of the *pelvis* — the bony basin which contains the bladder, rectum, and some of the organs of generation. The hip-bone itself is very strong and well protected; hence it is seldom broken except in case of severe injury, such as crushing between cars or wagons.

The fracture of the bone is not an especially serious injury, and recovery may occur without deformity or subsequent difficulty. In most cases there occurs not simply a fracture of the bone, but also injury to the organs contained in the pelvis; as these organs are extremely important, injury to them is a most serious accident, and one which frequently terminates in death.

A fracture of the hip-bone is not always recognized even by the experienced surgeon; for the bones are so completely surrounded by flesh and so immovable that the ordinary signs of fracture are not presented. In some cases it is possible to detect crepitus (a grating sensation) when the bones are firmly pressed together; a hand should be placed upon either hip and pressure exerted by pushing the edge of the hip-bone inward. If this occasion great pain at some other point than that pressed upon by the hand, there is a probability that the bone is fractured. In most cases,

however, the diagnosis must rest upon the symptoms rather than upon any signs which can be detected by the eye or the hand.

Treatment.—If there be any marked deformity, this should be rectified by replacing the fragments, so far as possible. The patient should then be placed upon a hard bed with the knees drawn up; a broad bandage is firmly applied around the hips and the upper part of the thighs. In special cases it may be necessary to place the patient in some other position, in order to correct some particular deformity.

In every case care should be taken to see that the patient evacuates the bladder regularly, because this organ is often injured by the accident, so that the urine is retained. If this be the case a catheter should be regularly introduced.

Fractures of the Thigh-bone.

The thigh may be broken at any part of its length; fractures most frequently occur, however, at two points — first, at the part of the bone which fits into the socket of the hip-joint; and second, at a point somewhat below the middle of the bone.

Fractures at the first-named part of the bone — which is called the *neck* of the thigh-bone — most frequently occur in old people, as a result of a fall upon the hip, though they may also result from a fall upon the feet. Fractures at the lower part of the bone are usually the consequence of direct violence, such as the passage of a wagon-wheel over the thigh or the fall of a heavy weight upon it. Fractures of the thigh-bone are usually oblique, so that one end of the broken bone rides over the other. The muscles attached to this bone are very powerful, and as a result of these two factors, the fracture is almost invariably accompanied with a great deal of shortening of the thigh.

Signs. — The signs of a fracture of the thigh anywhere below the neck of the bone, are usually so clear that the conditon is recognized without difficulty. There is great pain and swelling in the thigh; the limb is often bent at some point, and it may even be possible to execute such movements with the lower part of the thigh as would indicate the presence of a joint between the knee

and the hip. We can also distinguish a grating between the ends of the bone; the thigh is shortened sometimes one or two inches. A characteristic sign of a fracture of the thigh, is the position of the foot, the toes being turned outward away from the other leg.

Fracture of the thigh is usually accompanied by severe and extensive injury to the flesh; this may have resulted from the violence which caused the fracture, or may be the result of laceration by the broken ends of the bone, which are usually sharp. Sometimes dangerous hemorrhage results from injury to large blood vessels; in other cases the laceration of the flesh is so great as to require amputation.

If a fracture be simple, that is, if there be no wound of the flesh communicating through the skin, the parts usually heal without difficulty; the fracture involves no danger to life. In many cases the thigh never recovers its former strength, and sometimes breaks again at the same spot upon the infliction of much less violence than before. It is necessary to keep the dressing applied for two months after the injury, and the weight of the body should not be borne upon the limb for another month.

A complication of fracture of the thigh is stiffness of the knee; this results simply from the enforced inactivity of the knee during the time when the dressing was applied. This stiffness can usually be relieved to a great extent, though in some cases motion is never fully recovered in the joint.

Treatment.—A fracture of the thigh is one of the most difficult to treat satisfactorily. There are several difficulties which are met with nowhere else in the body. First, the muscles of the thigh are so powerful that it is a matter of great difficulty to overcome their contraction sufficiently to keep the broken ends in position; second, the limb is so large and heavy that especial dressings are required in order to hold it in place. The ends of the fragment are oblique, so that the broken surfaces are large and slow to heal.

The dressing must therefore fulfill several conditions: First, it must be applied to the limb in such a position that the muscles are relaxed and do not pull the fragments out of place; second, it must overcome the tendency of the fragments to override each other, a tendency occasioned by muscular contraction, as well as by the weight of the limb.

In the treatment of fracture of the thigh a most important item is the effort to avoid shortening of the limb. This effort is rarely entirely successful, since the difficulties in the treatment are so great that they cannot be always overcome by any dressing at present employed. By careful treatment, however, we can diminish the amount of shortening to a minimum.

In order to avoid shortening of the limb, it is necessary that the length of the leg be measured every few days after the dressing is applied. This is a delicate process, which must be done with much care and accuracy in order to avoid erroneous results.

The length of the limb is to be ascertained in the following way:

The person should be bared as far as the waist, or at least the outside of the thighs and legs is to be uncovered. The patient lies upon a hard bed, care being taken that the legs lie parallel and exactly in a line with the body.

A tape measure, which must be inelastic, is employed for the measurement; one end of this is to be pressed firmly against the sharp corner of the hip-bone at the front of the body. The tape is then unrolled down the leg and pressed firmly against the bony prominence of the ankle, either on the outside or on the inside. Extreme care must be taken, in securing the comparative length of the two limbs, that the tape is pressed upon exactly corresponding points on the two sides of the body.

After measuring in this way, it will be well to repeat the measurement, starting from the navel as the upper point. The inaccuracy of these measurements will readily be shown if we repeat them a few times between the same points on the same individual; it will be found that no two measurements of the same distance will exactly coincide.

The fractured limb should be so dressed that its length as it lies in the splint equals at least that of the sound limb. When healing occurs, there will usually be some shortening; this will not matter if it do not exceed half or three-quarters of an inch, since the difference will not necessarily cause any limping. In fact the two legs of the same individual are rarely of the same length.

The choice of a splint for dressing a fractured thigh depends upon circumstances as well as upon the individual preference of the surgeon. It would be out of place in this work even to enumerate all the different varieties of splints which have been recommended

and are used for the treatment of this fracture. It will be sufficient to mention briefly three varieties, which will be found to answer the requirements of all cases and to afford the best results.

The first of these consists essentially of a *double inclined plane.* This is made by joining two pieces of board at their ends at an angle of about 90 degrees. The pieces must be sufficiently broad to support the thigh and the leg. This is carefully padded with cotton, and the leg is placed upon it so that the angle formed by the two pieces rests under the knee. The patient's bed is raised at the foot so that the weight of the body tends to draw the upper fragment away from the rest of the limb. The leg is bound to this splint with bandages, and the splint itself should be fastened to the foot of the bed so that it will not follow the movement of the trunk.

Another method consists essentially of the following apparatus:

Long adhesive straps are placed one on either side of the limb, from the point of the fracture down to the ankle; they project then several inches beyond the sole of the foot. These adhesive straps are held in position by a bandage firmly applied about the limb from the ankle up to the seat of the fracture; a piece of wood the center of which is perforated by a single opening is then fastened to the ends of the straps projecting beyond the foot, so that the wood lies parallel with the sole of the foot. A piece of clothes-line or stout cord is then knotted at one end and passed through the hole in the center of this block. This rope is then passed over a "standard," that is a block of wood fastened to the foot of the bed and supporting a small pulley which should be at the level of the ankle. To the end of the rope which is passed over the pulley and hangs at the foot of the bed a weight is attached sufficiently heavy to pull the lower fragment of the thigh-bone from the upper. If the patient be a robust adult, two bricks will usually be necessary to accomplish this; if the patient be a child a year old, a weight of one pound will usually answer; a half-pound should be added for each additional year of the child's age. In every case it will be better to regulate the weight by the effect produced upon the thigh than by any rule.

In applying the strips of adhesive plaster along the side of the leg care should be taken to pad with cotton the bony prominences at the ankle; otherwise the skin will become raw and sore.

The bed upon which the patient lies should be inclined, the foot of the bed being raised; in this way the weight of the body tends to keep the upper fragment of the thigh-bone pulled away from the lower fragment, which is meanwhile drawn in the opposite direction by the weights attached to the rope.

A modification of the same principle consists in a so-called "side splint." This consists of a piece of board, siding or similar light stuff, long enough to reach from a point above the hip-bone to another point several inches below the sole of the foot. It should be about three inches wide, or may be made to taper so as to be broader above where it is to lie in contact with the thigh and trunk.

This splint is well padded with cotton, especially at the edges. It is then to be applied to the outer side of the limb, the upper end extending above the hip-bone. It may be fastened to the limb either by a roller bandage which is applied from the toes up to the body, or by strips of adhesive plaster, which are placed around the leg and the splint at intervals of five or six inches. It is advisable to employ both of these measures, the strips of plaster being applied first and the bandage put on afterward.

Some surgeons modify the procedure by using a weight in connection with this side splint. Two strips of adhesive plaster are applied one on the inside the other on the outside of the leg, as high as the knee. These strips are fastened to the leg by means of a bandage. A block is placed between the strips, below the sole of the foot, in the way already described. To this a weight is attached and carried over a pulley in a standard. The side splint is then applied in the way just described.

In using this side splint care must be taken to "set" the bone before the bandages are applied, for the fragments are kept apart by the pressure of the bandage which holds the limb against the splint. The bone is set by two persons, one of whom grasps the thigh at the groin, so as to pull the body toward the head of the bed; the other, meanwhile, seizes the ankle or the knee and draws the lower fragment downward toward the foot of the bed. The splint should be bandaged to the leg while the limb is thus held.

This dressing is not so satisfactory as the preceding, if the patient be robust and muscular, for it will be impossible to maintain the broken ends of the bone in their proper position, and considerable shortening will result.

In dressing fractures of the thigh in children, a special splint is used. This consists of two pieces extending up the leg with a cross-piece between the ends below the foot. Strips of plaster are applied to the sides of the leg as before, and the rope which runs through the block under the sole of the foot is fastened to the cross-piece of the splint. This in turn is supplied with a piece of clothes-line and a weight, the latter being suspended over a pulley and standard.

The object of this dressing is to keep the limb perfectly quiet, an object which cannot be otherwise attained in treating restless children. Indeed, surgeons sometimes employ a splint of this kind in which the cross-piece is so long that both legs of the child lie between the side-splints, and can be attached to the dressing so that movement in the bed is impossible.

The disadvantage in all these methods is, that the patient is compelled to keep his bed for five or six weeks, and is not permitted any freedom of movement even in the bed. The condition becomes extremely monotonous and even painful; the result is that the dressing must be loosened and changed so often that the fragments of the broken bone are not retained in position and the limb heals with considerable shortening.

Several splints have been devised which obviate, to a greater or lesser extent, the necessity for perfect quiet on the part of the patient. One of these, which is now in general use in our large hospitals, is the invention of Dr. Smith, of New York. It consists of an iron frame, which can be made either of small gas-pipe or of solid iron rod half an inch in diameter. This is bent so that one piece lies on either side of the limb, being joined to its fellow by a cross-piece just below the foot. The inner rod extends up to the body on the inside of the thigh, while the outer one is made long enough to reach the top of the hip-bone. The two side-pieces are bent at an angle of about 150 degrees at the point where the knee is to rest. Such a splint can readily be made by a blacksmith.

Strips of bandage are then pinned across from side to side of this splint, in such a way as to allow the limb to rest easily upon them. Two broad strips of adhesive plaster are then applied to the sides of the leg, which is then bandaged in the usual way. The block of wood attached to the lower end of these strips is fastened tightly to the cross-piece of the iron splint.

The splint is then to be suspended by a rope, which passes

through a pulley in the ceiling, so that this rope shall pull the splint toward the foot of the bed. This part of the bed is elevated by placing bricks under the feet, and the rope, which passes over the pulley, is tightened so as to draw the limb toward the foot of the bed. In this way the broken ends of the bone are drawn apart and kept separate, since the weight of the body keeps a constant traction on the upper fragment.

The advantages of this splint are several: the patient is permitted considerable movement in the bed and can thus avoid the monotony and annoyance inseparable from the other splints already described. The limb, moreover, is kept above the bed and can be more readily inspected and adjusted as occasion requires.

It would be advantageous to make a splint which would permit the patient to be up instead of lying flat upon his back. An attempt has been made to secure such a dressing by the application of plaster of Paris bandages. Experience has shown, however, that such a bandage is inefficient in holding the fragments apart if the limbs be large and muscular; since in this case the bandage does not secure sufficient hold upon the flesh to overcome the contraction of the powerful muscles of the thigh. Furthermore, the limb always decreases somewhat in size from disuse; hence a bandage which fits perfectly when first applied soon becomes so large that it fails to grip the leg as tightly as the requirements of the case demand.

A plaster of Paris bandage, therefore, cannot be recommended for the first dressing, but it is often useful after two weeks have elapsed, by which time the fragments have united firmly enough to retain their proper position if the limb be kept quiet. A plaster of Paris bandage answers the requirements, since when it is applied the patient is unable to exert the muscles of the thigh, and hence cannot displace the fragments; yet he can rise from his bed and remain up the entire day, thus avoiding in part at least the dreariness of his enforced confinement.

We can, therefore, in many cases remove the splint which has been originally applied, between two and three weeks after the accident, and replace it by a plaster of Paris dressing. The mode of application of this dressing is thus described by the late Dr. Hodgen, the eminent surgeon, of St. Louis:

"The first point is to secure a thorough extension of the limb while the plaster is being put on and is hardening. If the lower

fragment can in some way be drawn down and held there while the plaster sets, the limb will then be incased firmly, and the patient may sit up and move about upon crutches without disturbing it.

To secure this extension, prepare an ordinary table by boring through its end a hole two inches in diameter, through which a bar may pass, extending two feet above the surface of the table, reaching the floor below and made fast to a cross-piece between the legs. From the top of this bar another one passes to the other end of the table and rests on a bar like the first, or upon a box or other support. One or two hours before the main dressing is applied, a plaster of Paris bandage should be put on the foot and leg up to the calf, the surface of the foot and leg being first covered with cotton batting or soft cotton cloth, making it thicker over the ankle than above or below. When this dressing is hard a bandage can be tied around it and attached below the sole of the foot to a rope which passes through pulleys. A very strong force can thus be applied to draw the limb down without cutting or improperly compressing it.

Having now the table prepared, a hard plaster splint on the foot and lower part of the leg, and bandages filled with plaster in readiness, you are prepared to apply the dressing. Place the patient upon his back on the table under the horizontal bar, with the upright bar or stanchion between his thighs pressing up by the side of the injured limb. This upright should be well covered with soft cloth, and its object is to hold back the body and upper part of the thigh against the force drawing the limb downward. Raise the hips from the table by means of a broad bandage passing beneath them and tied to the bar above. Cover the whole limb with soft flannel or a piece of woolen blanket, and fit it as neatly as possible. Then give the patient ether to relax the muscles and apply the force to the rope attached to the lower part of the leg until the leg is as long as the sound one.

Having soaked the bandages (already filled with dry plaster before rolling them) two or three minutes in water, wind them on the limb smoothly but not tightly, in small successive thicknesses, sprinkling dry plaster on the surface frequently and smoothing it with the hand.

"When the limb is well encased, allow the patient to remain in the same position for twenty or thirty minutes, until the plaster sets, then put him in bed and keep him there three or four days After that he can move about on crutches.

"*This dressing must be carefully watched, lest it be too tight.* If there is much pain, and if the toes become dark and lose their feeling, it must be cut off. If it becomes too loose a fresh one must be put on."

The fact that there is such a variety of dressings employed for the treatment of fractures of the thigh, indicates the difficulty which surgeons experience in securing a healing of the bone without shortening of the limb. Indeed, it must be repeated here that *some shortening of the limb must be expected.* No apparatus has been devised which can be relied upon to secure a perfect result, and no experienced surgeon will ever promise to treat the fracture so as to make the broken limb as long as it was before.

Fractures of the Neck of the Thigh-bone.

Fractures occur at this part of the thigh-bone chiefly in elderly people. There are several reasons for this. In the first place the bones generally are more brittle in advanced life than in youth and middle age. The mineral matter in the bone is present in larger proportion, while the animal matter—the part which gives the bone its elasticity—is decreased in quantity. For these reasons all the bones become more brittle and are more readily broken in advanced life.

There is another reason why fractures occur at the neck of the thigh-bone more frequently in elderly people than in younger persons. This reason is that the neck of the bone changes its position with regard to the shaft. In young persons the neck forms an oblique angle with the shaft, while in old age the neck is lowered so that it makes almost a right angle with the body of the bone.

Fracture of the neck of the thigh-bone occurs almost always as the result of a fall upon the hip or upon the knees. Yet in some cases the bone is fractured by force applied to the feet; thus it may result from simply stepping somewhat heavily down a stair. Indeed it is surprising to observe what slight causes have been known to produce this fracture in elderly people. Tripping upon the carpet or getting the foot entangled in the bed-clothes have been observed to occasion such a fracture.

Whenever an elderly person experiences a sharp pain, accompanied with lameness or inability to walk, after such a trifling accident, we should suspect the existence of this fracture and examine the hip.

This fracture is very often *impacted*; that is the lower fragment is driven firmly into the upper. It is important to distinguish whether or not impaction has occurred, since the treatment will vary somewhat in different cases.

Several signs are present in both impacted and non-impacted fractures. These are pain and swelling around the hip joint; turning out of the foot, the toes being directed away from the opposite leg; shortening of the limb, flattening of the hip, the bony prominence being less distinct than on the opposite side; loss of power to use the leg.

In addition, we may remember that the fracture usually occurs from a blow upon the hip, or from some sudden wrenching of the limb.

There are two signs whereby we can distinguish a non-impacted from an impacted fracture of the neck of the thigh-bone. These are:

First— An unnatural mobility of the thigh. This, of course, results from the fact that the two fragments are entirely separate, so that the movements of the limb are not restricted by the barriers natural to the hip-joint.

Second— A grating sensation can often be felt when the thigh is moved around somewhat forcibly.

If the fracture be impacted, on the other hand, the movements of the limb will be less and not more than natural, and no grating sensation can be felt.

Fractures of the neck of the thigh-bone are sometimes confounded with dislocation of the hip. It is important that we recognize the difference at once, since a dislocation of the hip can be reduced and the patient be about again in a few days, while a fracture at the neck of the bone rarely heals completely in an elderly person.

The following points of distinction will enable any one to recognize the difference between a dislocation of the hip and a non-impacted fracture of the neck of the bone.

First—In dislocation of the hip there is no grating sensation; in fracture there is.

Second—In dislocation the bone cannot be replaced except with difficulty; in fracture the limb can be readily straightened, but does not retain its natural position.

Third—In dislocations the foot is usually turned inward, the toes toward the opposite leg; in fractures the toes are usually turned outward.

Fourth—In dislocations the limb remains fixed in one position, no motion being obtainable at the hip-joint; in fractures, on the other hand, the thigh can be moved by a second person.

Treatment.—The treatment of fractures of the neck of the thigh-bone in elderly persons is usually unsatisfactory, and sometimes quite useless. The result depends rather upon the condition of the individual than upon the particular dressing used.

Perfect recovery never takes place; in some cases, union occurs by means of a membrane or ligament, and not of true bone. In a considerable number of cases the fragments do not unite at all.

The limb is always perceptibly shortened, and the individual is often permanently lame. Sometimes the shock caused by the injury results in prostration of the patient, and causes death in a few months.

The treatment varies according as the fracture is or is not impacted. This point should, therefore, be decided before the leg has been roughly moved or examined.

If the fracture be impacted, nothing further is necessary than perfect repose for the limb; the patient should be kept upon his back in bed.

If the fracture be not impacted, the treatment should aim at the accomplishment of three objects:

First, the ends of the bone should be replaced; the lower fragment should be drawn downward, to prevent shortening; the limb must be kept perfectly quiet.

The bone can usually be set without much difficulty. One person grasps the hip and pulls strongly toward the head, while an assistant seizes the leg and draws it forcibly toward the foot of the bed. It will sometimes happen that the parts remain almost in position even after the force is relaxed; in most cases, however, the displacement of the broken ends takes place again so soon as the pulling is discontinued. It is therefore necessary to apply the dressing while the extension of the limb is still maintained.

The simplest dressing consists in a strip of board, three or four inches wide, and long enough to extend from the lower ribs to a point several inches beyond the sole of the foot. A cross piece should be fastened to the lower end, in order to keep the splint upright.

This splint is to be well padded and applied to the limb while the patient lies upon his back in bed and the assistants hold the limb in position. The splint is firmly bound to the limb by a bandage which passes around the waist and hips, and by a second bandage, narrower than the first, which extends from the foot to the thigh.

If the limb be very muscular, it will be necessary to use one of the splints described in the previous chapter for fractures of the shaft of the thigh-bone. In most cases, however, it will not be advisable to torture the patient with dressings which compel him to remain upon his back in one position for a month, for the most that we can hope for is a serviceable and not a perfect union of the fragments; there will probably be shortening and permanent lameness; moreover, the patient is usually old and feeble, and his health will be seriously impaired by the confinement and the rigorous dressing necessary to the most perfect result. It will therefore be better, in treating fractures of the neck of the thigh-bone in aged and infirm persons, to apply the splint already indicated for a couple of weeks, and then to remove it and trust to simple repose to effect the healing. Indeed in many instances it becomes absolutely necessary to relieve the patient from the burden of a dressing, and to give him some air and recreation, in order to save his life. The exact dressing, the time during which it is to be applied, must be in every case determined by the circumstances and by the general condition of the individual.

Fractures Just Above the Knee.

The shaft of the thigh-bone may be broken across just above the knee; in this case the treatment and the dressings required are the same as those needed for the treatment of fractures in the middle portion of the bone.

The bone may, however, be broken lengthwise just above the knee; that is, one of the bony prominences which enter into the

formation of the knee-joint may be split off. Sometimes, indeed, the end of the bone is fractured into several pieces.

Signs.— Fractures of the thigh-bone near the knee can usually be recognized without difficulty, since the bone is in this part covered with but little flesh. It is usually easy to feel the ridges made by the edges of the fragments, and by moving these pieces we can readily detect a grating sensation. If the fracture be transverse and just above the joint, there may be great similarity to a dislocation of the knee; but in the latter case motion is very much impaired, while if the injury be a fracture there is even more than the natural amount of movement.

The severity of the injury depends largely upon wnether the fracture extends into the knee-joint. If this occur, there will probably be permanent stiffness of the joint; in fact the bone may be so extensively damaged that amputation of the leg may be necessary. If the knee-joint escape injury, the fracture usually heals in two months, with possibly a slight degree of shortening. We can usually recognize an extension of the fracture into the joint by the fact that the knee becomes enormously swollen and that movement of it causes great pain in the joint.

Treatment.—If one of the bony prominences on the side of the knee be broken off, the bone can be set by simply straightening the limb. The dressing should consist of two splints, one on either side, made of siding, and long enough to extend from the ankle to the hip. These should be carefully padded and applied by means of a firm bandage. This bandage should not cover the knee-joint, for this joint will probably become much swollen and very painful, and will require the application of hot, moist cloths to allay the inflammation which will arise.

If there be any laceration of the limb, it will be advisable not to employ the splints mentioned, but to place the leg in a box made for the purpose long enough to reach from the foot to the thigh and well padded. In this way the wounded surface and the inflamed knee-joint are readily accessible to the eye and hand of the attendant.

So soon as the bones seem to have united, the knee should be gently bent a little every day, so as to avoid the stiffness of the joint which is very apt to ensue in these cases. Care must, however, be

taken not to break the bone again during the efforts at bending the knee.

If the part of the bone which enters into the joint be seriously damaged, permanent stiffness of the joint is inevitable. In this case the leg should be dressed at a slight angle, since the limb will be more useful if the stiffened knee be slightly bent than if it be perfectly straight. The dressing should consist of a "double inclined plane" already described, the angle situated under the knee being raised two or three inches above the ends of the splint.

In nearly all cases of injury to the bones in the vicinity of the knee joint, there occurs considerable swelling and inflammation in the joint itself. This must be treated by the application of hot, moist cloths.

Fractures of the Knee-pan.

The knee-pan is a somewhat elliptical-shaped bone which lies on the front of the knee. It is not bound directly to any other bone; indeed it is really a part of the large muscle constituting the front of the thigh. This muscle runs over the front of the knee and is attached to a point of the leg-bone just beneath the knee. When the muscle contracts the leg is straightened. The knee-pan is located at just that part of the muscle which is stretched over the end of the thigh-bone, when the leg is bent; the object of this little bone is, therefore, to endure the friction which is inevitable when the leg is bent. The muscle is attached to the upper edge of this bone, the lower edge being firmly bound by a ligament to the front of the leg-bone.

It is necessary to understand the anatomy of this part in order to appreciate the ways in which it can be fractured as well as the difficulty in securing a union of the fragments.

The bone is most frequently broken by direct violence such as occurs when a person falls forcibly upon the knee. In some cases, however, muscular contraction alone is sufficient to break the bone; such instances occur usually during violent efforts, such as are made in jumping or in kicking.

The usual fracture is a transverse one, running from side to side of the knee-pan. Sometimes the bone is broken vertically,

and in some cases a blow upon it shatters the knee-pan into several pieces.

Signs.—This fracture is usually recognized without difficulty; one can almost always feel the fragments, unless the limb be much swollen. If the fracture be transverse, there can be felt a distinct crack or fissure, which may be half an inch wide, running across the front of the knee. In this case there will probably be no grating sensation. If the fracture be vertically, or if the bone be broken into several pieces, we can often detect a grating sensation when the leg is straightened and bent.

A characteristic symptom of this fracture is the inability of the patient to straighten the leg; if the leg be straightened for him by another person, he can easily bend it, but when it is bent he is unable to straighten it. The reason for this is evident when we remember what has been said about the anatomy of the parts. The leg is straightened by the contraction of the muscle which is attached to the upper edge of the knee-pan. If this bone be broken, the upper fragment is drawn away by the muscle of the thigh, without moving the lower fragment or the leg to which it is attached.

Treatment.—The treatment of a fractured knee-pan is extremely troublesome, and the results are usually unsatisfactory. The difficulty lies in the fact that the two fragments are rarely united by bone, but are simply joined together by a band or ligament; the result is that the length of the limb is increased, and hence the leg can not be managed with the same accuracy and facility.

The most favorable of these fractures for treatment is the vertical one. To treat this fracture, it is only necessary to keep the leg quiet and straight. During the first few days there will probably be some swelling of the knee-joint, which should be treated by the application of hot cloths. After this swelling has subsided, the limb should be placed upon a straight splint of wood which runs from the ankle to the middle of the thigh. After this is well padded it is attached to the under surface of the leg by means of bandages placed above and below the knee. The healing process requires six to eight weeks.

If it be necessary that the patient be on his feet, the leg may be enveloped in a plaster of Paris dressing, which shall extend from the ankle to the middle of the thigh. This will serve to keep the

knee at rest. The patient should not place the foot to the ground, but should use crutches.

Transverse fracture of the knee-pan is an extremely troublesome one, because the fragments are separated and can be maintained in contact only with difficulty. Many dressings have been devised for the treatment of this fracture; the simplest and one of the most effective is that of Dr. Hamilton.

The difficulty in keeping the fragments together arises, as has been said, from the contraction of the large muscles at the front of the thigh Now, if we can relax these muscles, we can prevent, in a great measure, their effect in drawing the upper fragment of the knee-pan away from the lower. When the thigh is bent at an angle with the trunk, these muscles are relaxed. Dr Hamilton, therefore, advises that the patient's body be supported in bed by pillows placed behind the back, while the limb is rested upon an inclined plane, so that the foot is raised ten or twelve inches above the bed. He makes a splint composed of three pieces of board. The first of these pieces supports the leg, and is long enough to reach from the hip to the sole of the foot. This piece is ten inches wide at the knee.

The upper end of this piece is connected by a hinge to a second piece of board, which rests upon the bed; this piece is as broad as the first and several inches longer. A third piece is joined by hinges with the second, and folds upward, so as to meet the first piece and extend above the toes of the foot. This third piece is provided with pegs, which project from the edges; by means of these pegs and of hooks attached to the first piece, just under the foot, the limb can be rested at any desired height.

The splint, therefore, when complete, makes a triangle, the base of which is prolonged so as to form a support for the foot.

A deep notch is cut in either side of the first splint at a point four or five inches below the knee. This splint is then thickly padded with cotton, especially under the knee. The limb is then placed upon the inclined plane, and the foot is fastened to the splint by means of a bandage carried around the ankle. Another bandage is then applied in the notch, and is carried from this point above the upper fragment of the knee-pan; it is then brought through the notch on the opposite side, under the splint, and through the first notch on the other side. The bandage is carried around the leg and through the notches five or six times, being brought lower upon

the knee at each successive turn. After the entire knee is covered this bandage is pinned, and a second one is applied around the entire limb from the ankle up to the hip.

Another dressing is made on essentially the same principle; instead of the bandage, which encircles the limb through the notches, strong elastic bands are used. These are attached to pegs driven in the side of the splint. One of these bands is brought above the upper fragment, and the other below the lower fragment, the two bands crossing each other at the knee like a pair of suspenders on a man's back. The advantage of this dressing is that the fragments are constantly pressed together by the elasticity of the rubber, while the knee is exposed so that we may readily examine the injured knee-pan without removing the dressing or disturbing the limb. In Hamilton's dressing, on the other hand, the bandage which is passed through the notches does not bring the fragments together with the same certainty, and is apt to become loose in a few days; moreover the condition of the knee-pan cannot be examined without removing the bandage. The disadvantage of the rubber consists in the liability to chafing of the skin under the bands; this can be avoided by placing cotton between the skin and the rubber.

The fragments usually unite by the formation of a ligament between them. The result may be considered very good if the fragments are not separated more than a quarter or even half an inch. If this be the case, the patient will be able to walk without limping, though he will experience at first some awkwardness in advancing the foot in walking.

After a fracture of the knee-pan the patient cannot be too careful in avoiding any strain upon the knee for months. It will be well for him to wear a firm elastic band, which shall encircle the leg for three inches above and below the knee, leaving a slit large enough for the knee-pan to project through it.

There will be, of course, some stiffness of the knee, resulting from the enforced inactivity of the joint for six or eight weeks. This may be overcome by gently bending tbe leg, beginning with a little exercise for fifteen minutes every day and gradually increasing both the extent and duration of the motion.

A star-shaped fracture of the knee-pan — usually the result of a blow or a fall upon the knee — requires special treatment in different cases. In general, it becomes necessary to place the leg

upon a splint in the shape of the inclined plane already described. In fact, Dr. Hamilton's dressing for a transverse fracture of the knee-pan, which has been already described, answers very well for many cases of star-shaped fracture.

Fracture of the Leg.

In anatomy the word leg designates that part of the lower extremity which is situated between the knee and the ankle, in distinction from the thigh, which extends from the hip to the knee.

The leg contains two bones; the larger is situated on the inner side, and forms the prominent edge which we call the "shin." This bone is called the *tibia*, and constitutes the more important part of the support of the body. It constitutes the greater part of the ankle-joint, the other bone of the leg forming only a small projection at the joint; the tibia is the only one of the two bones which enters into the formation of the knee-joint.

The other bone of the leg, called the *fibula*, is a slender bone lying on the outer side of the limb; it is covered with flesh except at its lower end, where it constitutes the bony prominence on the outer side of the ankle.

Either of these bones may be broken while the other remains uninjured, or both are fractured at the same time.

Fractures of the Fibula.

These are the least serious fractures of the leg; they are often caused by comparatively slight violence, which does no injury to the flesh; and inasmuch as the other bone of the leg, the tibia, constitutes the greater part of its strength, a fracture of the fibula gives but little trouble in treatment, and heals without deformity or loss of power.

One of the most common fractures of the fibula, is that which surgeons call "Pott's fracture;" this consists of a break in the bone about two or three inches above the ankle-joint. In some cases the ligament which binds this bone to the heel is torn away.

Pott's fracture is accompanied, in most cases, by a characteristic deformity; the foot is turned outward. At first sight the

patient seems to have suffered a serious injury which may cripple him for life; but it really constitutes one of the simplest and most easily managed fractures. By running the fingers along the bony prominence at the other side of the ankle, we can readily detect the rough edges of the broken bone, and can usually feel a grating sensation when we press the thumbs upon the two fragments.

In some cases the inner bony prominence of the ankle — the tip of the tibia — is also broken off; in this case the foot is usually turned inward. This constitutes a more serious injury than a simple fracture of the fibula alone.

Treatment. — When the fibula only is fractured, the treatment is quite simple and easily carried out. The tibia supports the leg and maintains its length, so that the only object of treatment is to straighten the limb by pulling the foot inward to its natural position, and to keep the leg quiet in this position.

The setting of the bone is accomplished by simply drawing the foot downward to its proper position, when the fragments fall into place. To hold the leg in this position, several dressings are employed. The simplest is made by rolling up a blanket from either end, so that two rolls joined in the middle are formed. The leg is then placed in the space between these two rolls, a bunch of cotton being put under the ankle so as to keep the foot raised to the proper level. Two strips of cloth or pieces of clothes-line are then tied around the blanket so as to press firmly upon the limb. The injured member, encased in a blanket, is then rested upon a pillow. Care should be taken that the leg preserves its proper position, that is that the foot is not allowed to fall outward; other than this, no precautions are required.

The bone is healed in about four weeks, though the patient should be very careful in using the limb for two or three weeks longer.

The fibula is sometimes broken at its upper part near the knee, but as this rarely happens except in connection with a fracture of the tibia also, directions for treatment will be given in discussing this fracture.

Fractures of the Tibia.

In most cases the violence which fractures the tibia is sufficient also to cause a break of the fibula as well. There are instances, however, in which the tibia is broken by direct violence, such as a

blow on the shin-bone. If the fibula remains unbroken, it acts as a splint in preserving the form and length of the leg. If the fracture of the tibia be oblique, the fragments usually rise one over the other and the foot is frequently turned inward. In such a case the object of treatment must include the restoration of the foot to its proper position. If the fracture be transverse, that is, square across the bone, there is frequently no shortening and no deformity.

Treatment. — For the first few days it is usually necessary to apply hot fomentations, such as cloths saturated with hot water. These may be continued until the swelling has subsided. Meanwhile the limb may be placed in a fracture-box. This box consists of four pieces; one piece, which should be about an inch broader than the thickest part of the calf, lies under the leg. To the lower extremity of this there is fastened an upright piece long enough to project above the toes of the injured foot; on either side of the first piece there is fastened by means of hinges a side piece which extends above the top of the leg.

This box may be thoroughly cushioned with cotton batting, or filled with bran, while the side pieces which are fastened with hinges are laid flat upon the bed. The limb is then placed upon the cotton or upon the bran, and bound to the upright foot piece by means of a bandage. The box and the foot attached to it are then drawn toward the foot of the bed with sufficient force to straighten the limb and to reduce any deformity which may be present. The side pieces are then raised so as to enclose the limb, the bran or cotton being thickly packed above the bony prominences of the ankle so as to prevent the leg from shortening. Two or three bandages are then tied around the entire box so as to exert pressure upon the cotton padding surrounding the limb. The box containing the injured limb is then placed upon a pillow in a position most comfortable to the patient.

If the fracture be oblique and there be consequently a decided tendency to shortening of the broken leg, it will be advisable to attach a weight to the box so as to keep the limb constantly extended. This weight should be fastened to the foot piece by means of a rope running over a pulley. In this case the foot should be fastened to the upright piece at the foot of the box by means of strips of adhesive plaster.

In every case in which a fracture-box is employed, extreme care must be taken to see that the broken ends are kept accurately in position. The movements of the patient's body frequently result in displacement of the broken ends, so that unless the limb is carefully watched, the bone may heal with some deformity. In fact the fracture-box is not the most satisfactory dressing for inexperienced hands to use. It will be better for such to employ a starch or plaster of Paris bandage in the way which has been already described, for if this bandage is once properly applied, it remains in position and prevents subsequent displacements of the fragments such as usually occur under the use of a fracture-box.

If there be merely a transverse fracture of the tibia without displacement of the broken ends or shortening of the leg, the dressing which has already been described in connection with simple fractures of the fibula will be sufficient. A blanket folded from either end so as to make two rolls between which the limb rests is placed under the leg; two bandages are then tied around the blanket near either end so as to hold the limb firmly between the rolls.

Fractures of both Bones of the Leg.

These are the most serious and troublesome of all fractures of the leg, especially when accompanied with wounds of the skin, as is so often the case. Because when both bones are broken there remains nothing to preserve the form and the length of the limb; hence the dressing must be made to supply these requisites.

Fractures of both bones of the leg may be divided for convenience into two classes: simple and compound; that is, those which are not, and those which are accompanied with wounds of the flesh communicating with the break in the bone. This distinction is an item of much consequence in the treatment.

The most frequent variety of fractures involving both bones of the leg, is that in which the tibia is broken in its lower part and the fibula at the upper part near the knee. In every case in which the tibia is found to be fractured near the ankle, a careful examination of the fibula at its upper part should be made; for in many cases the fracture of the fibula in this part is overlooked by inexperienced persons.

Treatment.— The treatment of simple fractures — that is, those in which there is no wound of the skin — consists in restoring the limb to its natural length and contour, and in holding the bones in position by means of a dressing. There is rarely any difficulty in setting the bones; the patient is placed upon his back, and by gently pulling upon the foot, we can usually restore the broken fragments to their natural position.

It is, however, by no means so simple a matter to keep the fragments in position; for the powerful muscles attached to the bones of the leg are constantly tending to displace the broken ends, as well as to shorten the leg. The dressing must, therefore, be applied not only with great care, but also with an accurate knowledge of the requirements of the case.

There are numerous dressings employed in the treatment of fractures of the leg; each of these has certain advantages in certain cases. One frequently applied is the plaster of Paris bandage; leather, starch bandage, and the fracture-box are frequently used.

Probably the most generally useful of all dressings for fractures of the leg is that made of plaster of Paris. This can often be applied immediately after the injury, though it is better to wait until the swelling, which almost invariably occurs, has been reduced by hot-water dressings. If the bandage be applied before the swelling has begun — that is, immediately after the receipt of the injury — the pressure of the dressing will probably cause serious injury and perhaps mortification of the tissues. Indeed, in every case in which a plaster of Paris dressing is applied to the leg, the circulation of the limb should be carefully watched; this can be observed by inspecting the condition of the toes and of the foot; whenever this part of the limb becomes cold, blue and numb, we may know that the circulation is impeded and that the dressing is too tight. In such a case the bandage should be at once removed and re-applied more loosely; the failure to do this may result in mortification (gangrene) of the flesh.

The plaster of Paris dressing may be applied to the leg in the following way:

Some loose cloth, such as an old sheet, should be cut so as to make seven or eight bandages, each about nine feet long and three inches wide. These bandages, unrolled, are thickly dusted over with plaster of Paris, which is rubbed into the meshes of the cloth. The bandages are then rolled up and laid aside for subsequent use.

The limb is then enveloped with cotton batting, from the toes to the lower part of the thigh. This may be held in place by a few coarse stitches.

The bandages containing the dry plaster of Paris are then placed for about three minutes in lukewarm water. One of these is then applied to the limb, beginning with the foot, just above the toes. It is wound smoothly over the cotton batting as far as the knee. A second bandage is then applied over the first, a fresh roll being placed in the water to soak during the application of the second to the limb. This is done so that the bandages shall not lie in the water more than three or four minutes; for if they do remain in a longer time the plaster becomes brittle and "crumbly," so that it will not set firmly enough to make a stiff dressing.

Three or four thicknesses should be applied to the limb. After the last bandage is applied, a little plaster mixed with water, so as to have the consistency of cream, should be laid on with the hand and plastered smoothly over the limb.

Such a dressing becomes hard in half or three-quarters of an hour, though it may not dry entirely for several hours. During the first half-hour or hour — that is, until the plaster becomes sufficiently hard to retain the limb in position — the leg should be held by an assistant. This is a very important part of the process, since if it be carelessly done, the fragments may become displaced before the plaster becomes hard, as a result of which the limb may heal with some deformity. The assistant who holds the limb during the hardening of the plaster should, therefore, be carefully instructed to pull gently upon the foot, so as to preserve the natural length of the limb, while, at the same time, the calf is supported so that the broken ends shall remain on the same level. This is a somewhat tedious task, which should be entrusted only to a conscientious assistant.

After the plaster has become thoroughly hardened — say after ten or twelve hours — the bandage may be cut open by passing a pair of strong shears along the front of the leg. The edges of the plaster may then be turned upward a little, so that they shall not scratch the skin; and some cotton should be tucked under these edges to protect the limb.

After a few days it will usually be found that the limb has shrunken somewhat, so that the bandage seems a little large; in this case it may be tightened by applying an ordinary muslin band-

age around it from the foot upward, or by simply tying two strips, one at the ankle and the other just below the knee.

In every case in which plaster of Paris dressings are applied, it should not be forgotten that damage can be inflicted by impairment of the circulation; the caution already given regarding the condition of the toes must be observed.

Another form of plaster splint is the so-called "Bavarian" dressing, which was used extensively in the Franco-Prussian war. This is made out of some soft thick cloth, such as flannel or cheese cloth; two pieces are cut from this cloth long enough to cover the injured limb, and wide enough to surround the leg entirely; the outer piece being one or two inches broader than the inner one. These two pieces are sewed together along their entire length with two seams about half an inch apart.

The injured leg is then laid upon the cloth, so that the seams lie under the middle of the limb; the inner piece is then brought over the limb so that its edges meet in front, where they are fastened by means of a few coarse stitches. The limb is thus enveloped in a garment which should fit it closely like a stocking. The edges along the seam in front are trimmed off even with the surface.

The plaster of Paris is mixed with water so as to have the consistency of cream; it is then spread upon the outer piece of the bandage, which has not yet been applied to the limb. The plaster should be about half an inch thick, and after it has been evenly spread, the outer piece containing it is brought over the limb and applied firmly and smoothly.

The dressing thus consists of a layer of plaster between two thicknesses of cloth; the plaster does not extend entirely around the limb, since the double seam at the back leaves a space half an inch broad containing no plaster. When the plaster of Paris has become hardened, the stitches along the front of the inner layer are cut and the dressing can be opened, since the space at the back between the two seams permits a hinge-like motion. The dressing, when applied, should be kept in position by an ordinary bandage.

The advantages of this dressing are several; it is easy of application, especially advantageous for an inexperienced person; the hinge at the back not only permits the ready removal of the dressing, but also allows the splint to be loosened or tightened according as the swelling or shrinking of the limb requires.

A plaster of Paris dressing made in the usual way, by the use of bandages saturated with the plaster, sometimes requires trimming as the limb shrinks. By simply cutting off half an inch or an inch from either edge along the front of the leg, we can reduce its size sufficiently to permit it to be tightly applied, even after the limb has shrunken considerably.

Treatment of Compound Fractures. — A compound fracture — that is, one complicated with a wound of the flesh — often presents certain difficulties in treatment, for the dressing must always be so made as to permit free access to the wound, as well as to allow the escape of matter which may be formed. In many cases the wound is of such a nature that no attempt can be made to prevent deformity in the healing of the limb, the object of treatment in such cases being simply to save the leg. In many instances the treatment of a compound fracture of the leg consists for a week or ten days merely in immersing the leg in warm water; no rigid dressing can be applied. It must be borne in mind that compound fractures of the leg frequently give rise to the fatal disease known as blood-poisoning (*pyæmia*), and that this condition is favored by the application of stiff dressings, which retard the free escape of matter. In every case the attempt to avoid deformity must be subordinate to the effort to save the limb as well as the life of the patient.

In cases in which the injury is not very extensive, we may often apply, from the very first, a rigid dressing, which shall maintain the limb in fair position. The dressing which is most generally useful for such fractures is the plaster of Paris splint; it should be applied according to the directions already given, but should be modified by having an opening cut in it which shall expose the wound itself and the flesh around it for a distance of at least one inch. This opening or window may be cut within an hour after the bandage has been applied — that is, before the plaster has become thoroughly hard. The wound should be treated according to the principles already laid down for the treatment of such injuries; extreme care must be taken to prevent the accumulation of matter in the wound, which can be done by thoroughly syringing with the solution of Lambert's listerine previously mentioned (one part of listerine to five of water).

Fractures of the Bones of the Foot.

These fractures are not recognized with great facility, for the bones composing the foot are so small, irregular and tightly bound together that it is extremely difficult for an experienced surgeon to detect an injury to them. The prominence of the heel is formed by the largest bone of the foot; a fracture of this bone often presents many of the ordinary signs of fracture, such as deformity, loss of power in the member, and a grating sensation between the fragments.

Fractures of the toes are, of course, readily detected; the general principles of diagnosis and treatment are essentially the same as already stated in discussing fractures of the fingers.

Fractures of the bones which connect the toes with the rest of the foot—corresponding, therefore, with the bones lying between the knuckles and the wrist in the upper extremity—are also recognized in most cases without much difficulty, since the change of form and the grating sensation between the fragments are usually perceptible.

Fractures of the foot are usually the result of direct violence, such as the passage of a wagon wheel over the member. They are, therefore, accompanied with severe injury to the flesh; now the fleshy part of the foot consists largely of ligaments and tendons (sinews) which are extremely important in maintaining the form of the foot as well as in executing the movements of the same. There results, therefore, in many cases serious injury to the form of the foot, as well as considerable impairment of its movements; permanent stiffness of the joints may also result.

Treatment.—The treatment of fractures of the foot varies in details according to the location and extent of the fracture. Certain general principles apply to all such, and may be stated here.

The foot must be restored, as far as possible, to its natural form. This is often a difficult matter for one who is not acquainted with the anatomy of the part, because the small bones composing the foot proper, fit into one another in such a complicated way that they can be restored to their natural position only by delicate and skillful manipulation.

In all cases the injury will be accompanied by considerable swelling, which increases the difficulty in the recognition and treatment of the fracture. It will be necessary, therefore, after restoring the form of the foot so far as possible, to apply hot fomentations —cloths saturated with hot water and covered with oiled silk or oilcloth—for four or five days, or until the swelling subsides. If the injury be situated below the ankle joint and above the toes, no further dressing is required in most cases; if the injury be situated in the front part of the foot, advantage is often derived from the use of a splint. This splint may consist either of one of the usual bandages—glue, starch or plaster of Paris—or it may be made out of a shingle; the selection of the dressing depends largely upon the circumstances of the case as well as upon the individual preferences of the surgeon. Sometimes especial contrivances are required to hold the bones in position.

A fracture of the toe requires merely a small splint of wood, pasteboard or leather, whereby the toe can be kept perfectly quiet in its natural position.

It sometimes happens that the extremity of the heel bone is broken off from the foot, either by direct violence or by muscular effort. This broken fragment is drawn out of place by the powerful muscles composing the calf of the leg, which are attached to it. We can readily detect the deformity by simply looking at the heel, and by gentle manipulation can discover that the point of the heel is displaced, and that there is a grating sensation between this and the rest of the foot.

In treating this fracture, the first object is to relax the muscles composing the calf; for, until this is done, it will be absolutely impossible to restore and retain the broken fragment in its natural position.

To relax these muscles, the knee is bent and the toes of the foot are brought as far backward as possible, so as to bring the foot in a line with the leg; this raises the heel and relaxes the muscles composing the calf.

In order to keep the limb in this position the leg should be enveloped in cotton batting and then covered with an ordinary bandage, which is made to extend from the thigh around the leg so as to keep the knee bent; it is extremely important that this bandage be continued down the foot as far as the toes, in order to hold the heel well up toward the calf.

This position of the limb can sometimes be maintained by careful attention to a simple bandage; but in most cases it is absolutely necessary to employ some more permanent and more rigid dressing. Numerous mechanical devices have been employed for this purpose; any one can easily invent such a dressing, bearing in mind the fact that the prime object is to keep the foot as nearly as possible in a line with the leg, so that the heel is brought high up on the limb.

A very useful dressing for this purpose is that of plaster of Paris or of starch. This dressing secures perfect repose for the limb. Such a dressing has, however, the disadvantage of unnecessary weight and compression of a large amount of surface.

One of the most convenient and simple forms—one which can be readily employed by even inexperienced hands—consists of a leather strap or band, which is fastened around the thigh just above the knee, and from which a tape, or another strap, extends to a hook in the heel of a shoe or slipper; the leathern band around the thigh should be well-cushioned or padded with cotton. The advantage of this dressing consists in its simplicity and ease of application; the disadvantage is the degree of motion afforded to the fragments.

Non-union of Bones After Fractures.

In some cases the broken ends of the bone do not unite. The causes for this failure are several:

First—A constitutional taint of the individual.

Second—The co-existence of some wasting disease, such as consumption.

Third—Improper dressing, as a result of which the fragments are permitted to move during the healing process instead of being held firmly in contact with each other. This is one of the most frequent causes of failure of the broken fragments to unite.

Fourth—Interference with the circulation of the injured limb, in consequence of the tightness of the bandages.

Fifth—The presence of some substance between the broken ends.

There are certain bones after fractures of which we expect non-union; that is, the fragments become united by ligaments, or

membranes, and not by true bone. The knee-pan and the upper end of the thigh-bone are examples of this sort. In some cases of fractures of other bones also a similar union takes place by means of ligaments instead of bone; but by non-union, in general, we understand an entire failure of the fragments to unite either by ligament or by bone.

This condition is indicated by the persistence of the original signs of fracture, at least by the mobility of the fragments and by the grating sensation. Thus it sometimes happens that after a dressing has been applied five or six weeks, the fracture is found to be just as distinct and complete as at the time of the injury.

Treatment.—The treatment of non-united fractures is often troublesome, and sometimes ineffectual. It requires a careful study of the patient's general condition, as well as close attention to the dressing and to the anatomy of the injured part.

In some cases the fracture can still be healed if the patient be allowed to enjoy air and exercise instead of lying in bed. Thus it has often happened that the fracture of the leg, for example, which has been treated by placing it in a fracture-box, has failed to unite for four or five weeks, while the patient was lying on his back; but when the box was replaced by a plaster of Paris splint, which permitted the patient to walk around with the use of crutches, union has promptly occurred.

At other times the fracture fails to unite apparently from simple lack of vitality on the part of the patient. In such cases, the desired object can be sometimes obtained by the use of an unusually nutritious diet, and of tonic medicines. In such cases, we may prescribe with advantage quinine, iron and the hypophosphites.

In a large number of cases the failure of the fragments to unite is caused by the imperfection of the dressing, as a result of which the fragments are permitted to move during the movements of the limb. It is therefore always important to secure such a dressing as will retain the fragments in perfect repose, and to see that this object is accomplished.

In most cases in which a fracture has failed to unite, it is advisable to adopt some means for improving the circulation of the blood through the part. The simplest measure, one that can be easily employed, consists in removing the dressing, or at least so

much of it as will expose the vicinity of the fracture, and of applying friction to the skin for half an hour every day. The surface should be briskly rubbed with the hands, and afterward some stimulating liniment, such as the compound soap liniment, should be applied and rubbed gently into the skin.

If these measures fail, that is, if at the end of ten days there be no evidence of union between the fragments, more active means must be employed. These should be left to the hands of the surgeon, whenever professional services can be secured, for it is important that no time be lost, since the chances for the healing of the fragments are diminished by the lapse of time. Until the services of a surgeon can be secured, the following plan may be adopted : the dressing should be removed and the broken ends of the bone should be rubbed briskly against each other for two or three minutes, by placing the hands one above and the other below the point of fracture. The splint is then applied, and the limb kept at perfect rest. In some cases this may be sufficient to cause the fragments to unite. In most instances, however, it will be necessary to employ some operative procedure whereby an inflammation may be excited at the point of fracture, sufficient to induce the repair of the bone. Various plans are adopted for this purpose. One consists in driving ivory pegs into the ends of the bone. Another plan consists in joining the broken ends by silver wires. Sometimes the ends are sawed off so as to expose fresh surfaces. These operations can, of course, be performed only by a surgeon. If it be impossible to secure surgical skill, the patient must be content to wear some apparatus which shall serve as a substitute for the bone, and shall give the required stiffness to the limb.

Another accident which sometimes complicates the healing of a fracture is " bad union." By this we mean that although union has occurred between the fragments, yet the limb heals in such a way as to impair materially its usefulness.

Bad union occurs if the bone is not properly set at the beginning, or if the dressing be so loose and ill applied as to permit the fragments to acquire a new and improper position. As a result the limb may be so crooked or deformed that it is of but little service to the patient.

If this be discovered before the bones have firmly united—say in the first two or three weeks after the injury—the position can be

remedied by simply setting the bones over again and applying a dressing which shall hold them firmly in position. If the mistake be not discovered until the fragments are firmly united, there is still a way to correct the deformity. This consists in putting the patient to sleep with ether and then in breaking the bone again by main force. After this the limb is placed in a proper position and dressings firmly applied in such a way as to prevent a repetition of the former misfortune.

It sometimes happens that a limb which is perfectly straight and apparently healed when the splints are removed, bends and becomes deformed within a few days afterward. It is sometimes possible to remedy this by placing the limb in the splints again for another week or two; but in many cases the form of the limb can be restored only by breaking the bone again and treating it as a new fracture. To avoid such an accident the patient should be careful not to subject the newly-united bone to any severe strain for several weeks after the dressing is removed. If the broken member be the thigh or the leg, he should be careful to employ crutches and canes, so as to relieve the bone from the weight of the body. If the injured limb be an arm or a forearm, it should be carried in a sling for a week or two after the union appears to be complete.

Dislocations.

Dislocations of joints are usually recognized without difficulty, but require extreme care and skill in treatment. In order to understand the general principles involved in treating a dislocation, it is necessary to appreciate the structure of a joint.

The bones whose ends come together to form a joint are usually thicker at the ends than in the middle or shaft. This enlargement of the end of the bone serves to increase facility of movement by offering a larger surface, and also to afford attachment for the structures which bind the bones together. If we select for example the shoulder-joint, we find that the end of the arm bone is larger than the shaft, and that it has a large rounded surface which rests against a concave surface in the shoulder-blade. The ends of the bones do not lie in actual contact. Each is covered with a thin layer of cartilage, or "gristle," which is more elastic than the bone

itself. The adjoining ends of the bones are furthermore bound together by strong, firm bands, called *ligaments*. These permit a certain amount of movement between the adjoining surfaces, though they do not allow the ends of the bones to be drawn apart. In order to diminish the friction between the ends of the bones which move over each other, a little bag or sac is inserted between these ends, and its inner surface kept moist by a watery fluid.

In addition to these structures, which belong to the joint itself, there are certain accessory structures which are often of great importance in maintaining the form and strength of the joint. These are the tendons or "sinews," which pass over from one bone to another and serve to keep these bones in their proper position.

Whenever the adjoining surfaces of the bones constituting a joint become separated, the condition is termed a *dislocation*. Dislocation may be partial or complete, according to the amount of the displacement which has occurred between the adjacent ends of the bones.

Dislocations are in most cases caused by violence; and hence they may be complicated with wounds of the flesh and with fractures of the bone.

In some instances dislocations occur without any external violence, but simply from the contraction of muscles.

The injury inflicted by a dislocation depends upon the violence which has been employed to accomplish it. In severe cases there occurs not simply a displacement of the bones, but also a laceration and destruction of the other tissues which enter into the ormation of the joint; the ligaments which bind together the ends of the bones are torn; the sac which lies between the adjacent bones is ruptured, and sometimes the tendons and muscles which surround the joint are lacerated.

If the ends of the bones themselves escape injury, the usefulness of the joint can usually be perfectly restored by proper treatment; the ligaments, tendons and muscles heal perfectly. If the ends of the bones be crushed or injured, the usefulness of the joint is rarely restored completely.

If the dislocated bone is not replaced, but lies in the vicinity of its former position, a new false joint is often formed, very similar to the true one, and permitting a considerable amount of motion.

Symptoms of Dislocations.

There are certain symotoms which are present in most dislocations, whereby they are recognized and distinguished from fractures. These are :

First, Deformity.— The unnatural outline in a dislocation is observed especially in the vicinity of the joint. In case of fracture of the long bones, the deformity is usually apparent at some point between the joints.

In every case it is advisable to compare the injured joint with the corresponding one of the opposite side. To do this the body should be stripped of all clothing at and around the two joints.

Second, Loss of Motion of the Joint.— This serves to distinguish a dislocation from a fracture, which is usually characterized by an unnatural freedom of movement. The loss of motion which accompanies a dislocation is observed not simply when the patient himself attempts to move the injured member, but also when such an attempt is made by another person. In case of fracture there is frequently a loss of power on the part of the patient to move the limb, while a second individual can readily elicit all the natural and some unnatural movements.

Dislocations like other injuries are accompanied by swelling, pain and tenderness at the point of injury. These are usually more pronounced in case of dislocations than in fractures.

There are some cases in which it becomes impossible even for a surgeon to determine precisely whether or not a dislocation has occurred ; this is especially apt to be the case so soon as the swelling has occurred. Dislocations may be mistaken for bruises and sprains. In such instances the application of hot fomentations for a few days reduces the swelling and tenderness, after which the nature of the injury can be ascertained with greater accuracy.

Treatment of Dislocations.

There are certain general principles which must be borne in mind in treating dislocations. The object of treatment is, of course, to restore the displaced bone to its former position. The obstacles to be overcome in this effort are chiefly the contraction of muscles and the presence of ligaments.

It has been said in speaking of fractures, that the muscles are in a state of constant contraction, and that this contraction is increased by injury. Hence whenever a bone is fractured obliquely so that the broken ends can slide over each other, the limb is at once shortened by the action of the muscles which pull one fragment past the other. This same effect is manifested in case of dislocation; the displaced bone is drawn upward toward the bone against which it naturally rests. To reduce the dislocation—that is, to restore the displaced bone to its natural position—we must overcome or avoid the muscular action whereby the bone is held in its natural position. In some cases this becomes an extremely difficult item of treatment; indeed in former years complicated mechanical means were used for overcoming this contraction of the muscles; at present we accomplish the same result in simpler ways.

The means for accomplishing this in the different dislocations will be discussed under the special heads; there is, however, one means for overcoming muscular contraction, which is generally applicable, and to which surgeons often resort in order to restore displaced bones to their proper position; this is the *administration of ether*. Under the influence of this substance all the muscles of the body become relaxed. In this condition dislocated bones can be replaced with much greater ease.

A second feature to be considered in the reduction of a dislocation, is the position of the ligaments and tendons around the joint. When a bone is displaced, it often assumes such a position that it is separated from the cavity in which it should rest by several ligaments. If an attempt be made to restore the bone directly to its former position, its progress is opposed by these ligaments; this opposition cannot be overcome by any reasonable degree of force, and it is furthermore not desirable that it should be overcome, since to do so, would tear and lacerate the ligaments. It is therefore necessary to avoid, so far as possible, any collision between the bones and the ligaments which surround the joint. This is accomplished by placing the bone in the position which it occupied at the moment when it was dislocated; by so doing, the end of the displaced bone is brought opposite to the opening between the ligaments which was made at the time of its escape from its socket.

A clear comprehension of the measures required by this latter

principle, can be attained only by a somewhat intimate knowledge of the anatomy of the parts. While it is impossible in a work of this sort to explain details, the general facts will be mentioned in connection with the individual fractures.

A dislocated bone should be restored to its former position as soon as possible after the dislocation. In the great majority of cases the restoration of the bone can be effected without difficulty.

It will not be safe for an inexperienced person to administer ether; that is although deaths from ether are quite rare in the hands of physicians, yet in ignorant or careless hands the drug is a most dangerous one. We can sometimes accomplish in a somewhat imperfect way the result aimed at in administering ether—that is the relaxation of the muscles—in the following way: At the instant when we are ready to exert whatever force may be necessary to reduce the dislocation, we divert the attention of the patient from the operation by a sudden exclamation or by asking him a question. The muscles are relaxed for a few moments while his mind is thus fixed on the subject of the remark; if the effort be made to reduce the limb during these few moments, it will often be possible to accomplish a reduction which would otherwise baffle all attempts without ether.

It is desirable to know the position of the limb at the time when the bone was displaced; for we can generally best succeed in restoring the bone to its former position by placing it as nearly as possible in the position which it occupied at the moment of its escape from the socket. Thus if the shoulder-joint have been dislocated by violence which raised the arm forcibly upward above the head, we can usually succeed in restoring the bone by placing the patient upon his back and drawing the elbow up above the shoulder, and by exerting a gentle force in pulling the arm in this direction. It is always necessary to have an assistant, who shall steady the joint while the operator manipulates the dislocated limb.

After the dislocation has been reduced, the limb should be kept perfectly quiet for several days at least. This is necessary, not only to avoid the pain which movement would occasion, but also to afford an opportunity for the healing of the lacerated tissues around the joint. If the limb be not kept quiet, a second dislocation with additional injury to the tissues may occur. In most cases rest can be secured sufficiently by the application of bandages. Sometimes it is advisable, also, to apply a splint of leather or wood to accomplish the same purpose.

If there be much pain and swelling in the joint, it is desirable to envelop the part in cloths saturated with hot water.

A joint which has been once dislocated must always be treated with extreme care subsequently. No free use of the part, such as is natural to it, should be allowed in less than a month after the dislocation, and even after that, care should be taken to avoid any violent effort.

Dislocation of the Lower Jaw.

The jaw-bone is attached to the skull by ligaments and muscles, and rests against the bones of the skull at one point on either side, where there is a shallow socket made to receive the rounded head of the bone. In consequence of the extensive range of movement required of this bone, the socket is made quite shallow, and therefore offers but little resistance to the escape of the bone from its position. The jaw is held in place, not by the bony socket, but by the ligaments and powerful muscles which are attached to it.

The lower jaw may be dislocated on one side only or on both sides at the same time; the latter accident is the more common. The dislocation may be caused by direct violence, such as a blow or the extraction of a tooth; indeed, there are numerous ways in which the accident has been brought about. The most common of these is the muscular action which accompanies the act of gaping or yawning. It is a little singular that this accident occurs more frequently in women than in men; it has been known to happen as an incident in a curtain lecture.

Symptoms.—This condition is easily recognized even by the inexperienced; the chin is more prominent than natural and projects downward, the patient being unable to close the mouth; there is an unnatural depression in front of the ear, and sometimes a prominence at the back part of the cheek, which is not observed in the natural condition. If but one side be dislocated, the chin and jaw project toward the opposite side, while if both sides of the bone be displaced, there is simply a forward and downward projection of the jaw.

Treatment.—The simplest and best way for reducing a dislocation of the jaw is as follows:

The operator stands in front of the patient and introduces the

thumbs, wrapped in a soft napkin or protected by a thick glove, into the patient's mouth, until they rest upon the teeth of the lower jaw, as far back as they can be placed. The fingers meanwhile grasp the chin. Pressure is then made upon the teeth by means of the thumbs, so as to force the jaw downward and at the same time press it backward. Meanwhile the chin is pressed toward the upper jaw by means of the fingers which grasp it. The thumbs thus act, to a certain extent, as fulcra, while the jaw becomes a lever. Considerable force must be used to overcome the contraction of the powerful muscles which are attached to the back part of the jaw-bone; but if pressure be steadily made, it is usually possible to effect the reduction in this way. An unpleasant feature of this method is the bruising which the thumbs of the operator are almost certain to receive, either during the operation or at the moment when the jaw glides backward into its place; for at this moment the mouth is firmly closed even without the will of the patient.

In order to avoid this injury to the thumbs of the operator, another method is often employed, which differs from the one just described merely in the substitution of two pieces of cork for the thumbs. The patient sits upon the floor, his head being placed between the knees of the surgeon. Two pieces of cork a quarter of an inch or more thick are placed between the teeth of the two jaws, as far back as possible. The operator then presses the chin upward toward the upper jaw and forces it gently backward at the same time. This method may be tried first, and if it fails, the one first described should be employed.

Extreme care should be taken in the use of the jaw after it has been once dislocated, for it is extremely prone to displacements subsequently, even after slight violence.

Cases have occurred in which the dislocation was not reduced; in such instances a new joint is formed, which answers the purpose reasonably well.

Dislocation of the Collar-Bone.

Either extremity of the collar-bone may become displaced as the result of violence.

Dislocations of the inner end of the bone, where it joins the breast-bone, usually cause a displacement of the collar-bone

upward, so that it makes a prominence under the skin. This condition is, therefore, readily recognized.

Dislocation of this end of the bone backward is said to have occurred from curvature of the spine; it is an uncommon accident.

Dislocations of the outer end of the collar-bone, where it joins the shoulder blade, sometimes occur from violence applied to the shoulder. In this case the end of the collar-bone usually projects above the shoulder-blade, where it makes a decided prominence.

Treatment.—Dislocations of the collar-bone are usually reduced without difficulty, though it is not so easy a matter to keep them in place. The shoulder should be pressed backward, while the fingers at the same time force the dislocated end of the bone downward toward its natural position.

After the bone has been thus restored to its proper place, a dressing should be applied after the manner described in discussing fractures of the collar-bone. The treatment of the two is practically the same. A collar-bone which has been once dislocated is, however. apt to get out of place subsequently upon slight provocation.

Dislocation of the Shoulder-Blade.

The shoulder-blade forms joints with the collar-bone and with the bone of the arm. Either of these joints may suffer displacement; it is customary to describe them as "dislocations of the collar-bone" and "dislocations of the shoulder," respectively.

Dislocations of the Shoulder.

These are the most common of all dislocations; their frequency results from the peculiar anatomical relations of the joint as well as from the exposure of the shoulder itself to mechanical violence.

The shoulder joint is arranged so as to afford a very extensive range of motion; hence, it is impossible that the socket

should be very deep. As a matter of fact, the bony socket of the shoulder joint is quite shallow, and affords but little purchase to hold the head of the arm-bone. The socket is, however, deepened by a rim of cartilage placed around the bony edge. Yet, notwithstanding this arrangement, the head of the arm-bone is easily displaced from its attachment to the shoulder-blade.

This accident may result from direct as well as indirect violence. It is most frequently caused perhaps by blows or falls upon the shoulder; it often results from falls in which the weight of the body strikes upon the hand or forearm. The accident happens though more rarely as the result of violent muscular efforts, such as are made in lifting heavy weights.

Signs.—The head of the arm-bone may be displaced in any one of four ways: that is, it may take any one of four positions, outside of the shoulder joint. In order to understand these, the reader must have a slight knowledge of the anatomy of the joint.

Just above the shallow socket of the shoulder-blade, in which the head of the arm-bone rests, there is a bony projection, which constitutes the point of the shoulder. This is called the *acromion process* of the shoulder-blade. Just in front of this, at the outer end of the collar-bone, is another projection from the shoulder-blade, which is called the *coracoid process*. The acromion process prevents the head of the bone from being forced upward, but it sometimes escapes into the cavity just under the coracoid process. This is not always a complete dislocation; that is, the head of the bone usually rests upon the edge of its proper socket.

This variety of dislocation — in which the head of the bone is located under the coracoid process of the shoulder-blade — is easily recognized by the existence of a lump just under the outer extremity of the collar-bone. By comparing the shoulder with the sound one of the opposite side, it will also be noticed that the injured shoulder is flatter and more pointed than the other.

A second dislocation of the head of the arm-bone is that in which the arm is displaced into the armpit. The head of the bone lies, therefore, just under the socket where it belongs.

In a third form, the head of the arm-bone is thrown forward onto the ribs, usually lying between the second and third rib. This is a very rare dislocation.

In the fourth variety of dislocation, the head of the arm-bone is displaced backward onto the shoulder-blade.

There are also other varieties which occasionally happen, and are recorded in the literature of surgery. Their occurrence is, however, so rare that no discussion of them is necessary.

All dislocations of the arm-bone are accompanied by extreme pain in the arm and shoulder, and almost always by a numbness of the fingers and arm of the injured side. This numbness results from the pressure of the dislocated bone upon the large nerves which pass to the arm directly under the shoulder joint. The extent of these symptoms varies with the amount of damage done to the tissues during the escape of the bone from its socket.

The most frequent dislocation is that in which the head of the one is displaced downward and lies in the armpit. The signs of this dislocation are :

First— The position of the arm. The elbow stands out from the side, while the upper end of the bone is plainly felt in the armpit.

Second— Flattening of the shoulder. This is readily understood when we remember that the natural prominence of the shoulder is due largely to the head of the arm-bone, and to the powerful muscle which covers it. When the bone is dislocated into the armpit, there remains a cavity in the position formerly occupied by the rounded head of the bone. Moreover, the acromion process, that sharp projection from the shoulder-blade, gives to the shoulder a pointed and square appearance which strikes the eye at once, especially if it be compared with the uninjured shoulder of the opposite side.

Third— The immobility of the arm. All attempts to move the arm, either by the patient himself or by another person, are ineffectual in causing any extended movement. Such efforts induce extreme pain.

A characteristic feature can be brought out by the attempt to place the hand of the injured arm upon the opposite shoulder. It is often impossible to accomplish this at all; if it can be done it will be noticed that the elbow of the injured arm is widely separated from the chest when the hand rests upon the opposite shoulder; if the elbow be kept in contact with the body, it will be quite impossible to place the hand on the shoulder.

Fourth—The lengthening of the arm. If a tape measure be stretched from the point of the injured shoulder to the point of the elbow, the forearm meanwhile being bent, it will be found that this distance is perceptibly greater than the corresponding measurement on the sound side.

Dislocation of the head of the arm-bone under the coracoid process of the shoulder-blade, can readily be made out by feeling the head of the bone in this unusual position. By taking hold of the elbow and rotating the arm, we can feel that the head of the bone, which constitutes the lump, moves with every movement of the arm.

In this dislocation the elbow is usually turned away from the body, though not to the same extent as in the dislocation into the armpit.

The dislocation of the head of the bone backward onto the shoulder-blade is readily detected by the presence of a lump in this new position as well as by the unnatural flatness of the shoulder. The loss of motion and unnatural position of the arm are evident as in the former cases. In this dislocation the elbow is usually situated near the side, instead of away from the chest.

Dislocations of the head of the arm-bone are usually recognized without difficulty, provided there be no complications of any sort. There are, however, many cases in which dislocations are accompanied by fractures, and others in which the fractures alone present in many respects the symptoms usually found in dislocations.

The most frequent accidents which are apt to be mistaken for dislocations are :

Fracture of the acromion process of the shoulder-blade; fracture of the outer end of the shoulder-blade ; and fracture of the arm-bone just below the socket. The two first-mentioned fractures can easily be distinguished from dislocations by the fact that the deformity of the shoulder is easily remedied by simply lifting the elbow upward ; so soon as the arm is unsupported, the shoulder drops again. In case of dislocation this restoration of the form of the shoulder is impossible. Furthermore, if one of the fractures named be present, the movements of the arm are not especially impaired ; while if the injury be a dislocation, the arm remains fixed.

In these fractures as well as others, a grating sensation can be

felt when the fragments are rubbed against each other; in cases of dislocation there is no grating sensation to be perceived.

Fractures of the arm-bone near the socket of the shoulder joint are easily detected by the usual mobility of the arm and by the grating sensation which can be detected when the arm is moved.

There are, however, cases in which the dislocation of the bone is complicated with one of the fractures already mentioned. In these cases it often puzzles even an experienced surgeon to detect the exact nature of the difficulty. For the symptoms of both fracture and dislocation are present and counteract to a certain extent one another's significance.

Treatment.—There are several methods for reducing dislocations, any one of which can usually be made to succeed in skillful hands.

To reduce a dislocation of the arm-bone into the armpit—commonly called a *downward* dislocation—it is necessary to draw the arm downward in order to enable the head of the bone to ride over the edge of the cavity in which it should rest; at the same time the upper part of the arm must be pressed outward, so as to give the head of the bone a chance to regain its socket.

It will be remembered that the chief obstacle in the reduction of dislocation is the muscular contraction whereby the bone is firmly fixed in its unnatural position. It is therefore necessary to use considerable force in restoring the bone to its place.

The most common method was until recently the plan commonly known as "placing the heel in the armpit." To perform this operation the patient, stripped to the waist, is laid upon a hard bed or upon blankets placed upon the floor.

The operator removes the boot from the left foot if the patient's left shoulder be dislocated, and from the right foot in dislocation of the right shoulder. He then seats himself upon the bed, opposite the patient's hips, and places the foot in the armpit. He then grasps the arm at the elbow, preferably by means of a towel or soft cloth wound tightly around the limb. The operator then pulls firmly upon the arm, so that it shall move downward and outward, bracing himself meanwhile with the foot against the shoulder. After the pulling has been continued for half a minute, the arm should be gently carried inward toward the patient's body,

so that the upper end of the bone shall be forced outward and shall reach the socket.

Another method consists in placing the patient upon a chair, in a sitting posture; the operator puts his foot upon the seat of the chair, so that the knee shall rest in the patient's armpit; the arm is then pulled outward and downward, while the shoulder is forced against the supporting knee. After this effort has been continued for twenty or thirty seconds, the elbow is pressed inward under the operator's thigh, so that the head of the bone is brought outward to its socket.

This method, it will be seen, involves just the same principles as the one in which the operator's heel is placed in the patient's armpit.

These methods are usually successful, though they are not by any means scientific; the success is attained by main force and not by skill. At the present time surgeons employ a method which secures a reduction of the dislocated bone without the exercise of force. The principle upon which this method is based consists simply in placing the arm in the position which it occupied at the moment of dislocation. The method is known as that of "manipulation.

It is practically impossible to describe in detail the manipulations by which dislocations of the shoulder can be readily reduced, but it may be said that an approximation to this method can be performed in essentially the following way:

The patient is laid upon a hard bed, or upon the floor; the operator grasps the arm at the elbow, while an assistant holds the shoulders firmly. The arm is then drawn downward and is made to describe a semicircle, the elbow being carried from the side and brought upward above the head; after it has reached this position, the arm is drawn upward away from the body. In most cases the bone slips back into place during this movement.

In the dislocation forward onto the chest or backward onto the shoulder-blade, the bone can usually be replaced by placing the heel in the armpit, or by the method last described, in which the arm is swept around from the body to a position in which the elbow lies above the head. Some difficulty may however be experienced, difficulty which can be overcome only by a knowledge of the anatomy of the structures concerned.

In almost every case the successful reduction of the bone is

indicated by a " click " at the moment when the head of the arm bone falls into the socket. Even if this do not occur, the restoration of the displaced bone is indicated at once by the freedom of movement exhibited by the arm as well as by the restoration of the natural form to the shoulder.

If these methods fail to secure the replacement of the bone, and if the services of a surgeon cannot be procured, ether should be administered to the patient. The object of this is to relax the muscles of the body ; after this has been accomplished, the bone can often be reduced with ease, even though it has resisted violent efforts while the patient was conscious. It is important that every dislocation be reduced within a few days at the latest ; for if it be permitted to remain, the reduction becomes a matter of great difficulty and even danger. After a bone has remained out of place for several weeks, it becomes bound in its new position by bands or ligaments, while its former socket is often filled up by similar tissue. Under these circumstances the effort to reduce the dislocation is opposed not only by the muscular contraction, but also by these new tissues. It is, indeed, often possible for an experienced surgeon to reduce a dislocation which has existed for some months, but such an attempt should never be made by an inexperienced person.

After the dislocation has been reduced, the arm should be suspended in a sling and firmly bound to the side of the chest by means of a broad bandage which passes around the body. Two or three turns of a bandage should also be passed under the elbow and over the shoulder, so as to support the arm and prevent it from slipping out of place. This bandage should be worn for a week or ten days at least, after which the arm should be supported in a sling. For several months, great care should be observed not to subject the shoulder to any severe strain, since the bone can be very easily dislocated a second time.

Dislocations of the Elbow.

The structure of the elbow joint is far more complicated than that of the shoulder joint, and dislocations in this place are correspondingly difficult of recognition and of treatment. While it is often possible for an inexperienced person to reduce a dislocation

of the shoulder, injuries to the elbow should always be submitted to the surgeon.

The elbow joint is formed by three bones; above, the lower end of the arm-bone, and below, the two bones of the forearm. The bone which lies on the same side of the forearm as the little finger — called the *ulna* — is chiefly concerned in the formation of the hinge which constitutes the elbow. The other bone of the forearm, lying on the same side as the thumb and called the *radius*, enters chiefly into the formation of the wrist joint and forms but a comparatively small part of the elbow joint. At the elbow, the radius merely rests against the lower end of the arm-bone, while the ulna is hollowed out so as to make a deep socket which receives the lower end of the arm-bone.

Either one of these bones of the forearm may be dislocated; or both bones may be displaced at the same time. The ulna alone is sometimes forced out of place by being driven backward; at other times it is displaced sideways. The most common form is, however, the dislocation of both bones backward.

Dislocations at the elbow joint are frequently accompanied with fracture. The socket in the ulna, which receives the lower end of the arm-bone, is so deep that the edge of it is often chipped off when the displacement occurs; in some cases the end of the humerus fitting into this socket also suffers fracture at the same time. In other cases the arm-bone is broken transversely at a point just above the joint, the lower fragment being pulled backward with the bones of the forearm.

The sinews and ligaments which bind together the bones at the elbow are so firm that displacement of the bones can be accomplished only by the exercise of considerable violence. It is usually occasioned by a blow upon the elbow or by a fall in which the weight of the body is transmitted through the elbow.

Signs.— The signs of dislocation vary somewhat according to the exact nature of the injury. In most cases the swelling is so great by the time the surgeon arrives, that some doubt as to the exact condition may exist for several days, until the swelling can be reduced by the application of hot cloths. In every case it is important to compare the injured with the sound side; hence the other arm should be bared for comparison.

There are three points — three bony prominences — which serve

as landmarks or guides in determining the nature of the injury. These are the two projections from the lower end of the arm-bone, one on either side, and the prominence known as the crazy-bone.

When the forearm is bent so that the elbow makes a right angle, the upper end of the ulna constituting the point of the elbow should be situated about half way between the outer and inner projections of the arm-bone. In most dislocations of the elbow, the relation and distance between these three points is markedly different from the natural arrangement.

When both bones are displaced backward, the forearm is bent and the palm of the hand turned somewhat downward, the point of the elbow projecting behind the arm.

It will be found that the arm can be straightened to a considerable extent without causing extreme pain, but any attempt to bend it beyond a right angle causes acute pain. We can generally feel an unnatural prominence behind the arm, unless the swelling is already very great.

Sometimes both bones are displaced outward. In this case the point of the elbow is no longer situated midway between the two bony prominences of the arm; the inner one of these projects extremely, and the skin is drawn over it very tightly.

If the ulna alone be dislocated backward, the palm of the hand is turned downward; the point of the elbow projects very perceptibly behind the arm.

If the radius alone be dislocated, the accident is recognized usually by an impairment in the rotation of the hand. It is sometimes possible to see and feel the extremity of the bone at the front of the elbow-joint.

Treatment.— The reduction of dislocation of the elbow is often a difficult task, especially if much swelling has occurred.

The arm should be bent over the knee, while the foot of the operator is placed upon the chair in which the patient sits. By bending the forearm around the knee and pulling it at the same time away from the arm, it is sometimes possible to reduce the dislocation.

Another way consists in grasping the elbow-joint with the right hand so that the palm shall cover the point of the elbow which projects backward; the forearm meanwhile is held with the left hand of the operator. By exerting pressure so that the point

of the elbow is forced forward and the arm backward with the right hand, the displacement is sometimes relieved.

If these efforts be unsuccessful, an assistant should hold the arm and exert pressure downward and outward for a few seconds, while the operator disposes of his hands about the joint in a way so as to exert pressure upon the point of the elbow and upon the lower part of the arm. The forearm should then be bent by the assistant while the operator forces the point of the elbow forward.

In many cases it is impossible to reduce a dislocation of the elbow-joint without the use of ether; under the influence of this drug, the muscles become so relaxed that the manipulations of the displaced bones are much facilitated.

Some stiffness of the joint often follows a dislocation; this can be best avoided by passive motion of the forearm, exerted by a second individual. It will usually be necessary to keep the joint enveloped in hot fomentations for a week or two after the dislocation is reduced. The arm should be carried in a sling.

Dislocations of the Wrist.

This is an unusual accident; violence applied to the hand and wrist frequently occasions a fracture of the radius, but rarely a separation of this bone from the wrist.

Signs.—The deformity is so characteristic that no detailed description is necessary; the ends of the bones of the forearm can be felt and seen above the back of the hand or below the palm. The motion of the joint is lost.

Treatment.—This dislocation can usually be reduced without difficulty in the following way:

An assistant holds the forearm of the patient and pulls gently toward the body, the operator meanwhile grasps the hand and pulls away from the arm, manipulating the dislocated bones at the same time so as to force them into place.

A splint should be applied to the hand and forearm for a week or two after the accident, in order to afford time for the healing of the ruptured ligaments. It is sometimes necessary to apply hot fomentations for some days after the injury.

Dislocations of the Thumb.

This is a frequent accident. The thumb may be displaced either forward or backward, usually in the latter direction. The displacement often results from a fall upon the hand while the fingers are spread apart; among the youth of the country it is also often caused by the blow of a base ball.

Signs. — The deformity is easily recognized; the end of the bone to which the thumb is joined projects either in front or behind, while the upper end of the thumb proper makes a corresponding prominence in the opposite direction.

Treatment. — The dislocation can be reduced by simply pulling upon the thumb while an assistant holds the hand. It is usually necessary to apply a bandage around the thumb in order to secure sufficient purchase. This can be best secured by an instrument devised by Dr. Levis. It consists simply of a thin strip of wood ten or twelve inches long and about an inch wide. Six or eight holes are cut through one end of this near the edges; the other end is shaped so that a shoulder projects on either side. Two pieces of tape about three feet long are then passed through two pairs of holes in the strip of wood, leaving loops through which the finger or thumb can be passed. The displaced thumb is then inserted under these loops, and then laid upon the piece of wood, where it is firmly held by drawing the tapes tightly over it, and winding their ends around the projecting shoulder. By this contrivance the operator secures a much firmer hold upon the thumb than he could otherwise obtain.

Another method consists in manipulating the joints so as to put the displaced thumb in the position it occupied at the moment of dislocation. "Trial should be made of the excellent method of Prof. Crosby, of New Hampshire, originated by him in 1826, and since recommended by Gerdy, of Paris. It simply consists in pushing the phalanx back until it stands perpendicularly on the metacarpal bone, when by strong pressure against its base from behind forward, and by flexion it is readily carried now into its natural position."—*Gross.* This method consists, therefore, simply in raising the thumb to a right angle with the hand, and pushing its base—that is, the part which joins onto the hand—forward so that it shall slip into position.

Dislocation of the Fingers.

The fingers may be displaced either forward or backward. The dislocation is easily recognized by the unnatural projection of the bones.

The treatment consists essentially in the methods already described in discussing dislocations of the thumb.

Dislocation of the Vertebræ.

The spinal column is composed of rings of bone which lie one upon another, gradually decreasing in size from the lower to the upper portion. These rings of bone are provided with several projections and prominences by means of which they fit tightly into one another; they are furthermore bound together very firmly by numerous ligaments and sinews.

The object of this security in the construction of the spinal column is to afford the greatest possible protection to the delicate nervous tissue which passes through the spinal column — the *spinal cord*. So perfect is this structure that dislocations of the vertebræ occur with comparative rarity; indeed it often happens that a man executed by hanging suffers no displacement of the vertebræ of the neck, notwithstanding the sudden and violent strain upon the spinal column occasioned by his sudden fall from the trap.

It does sometimes happen, however, that one or more of the rings — the vertebræ — suffer displacement; this can only occur from the application of great force.

The results vary according to the location of the displacement. If some of the lower vertebræ are displaced, there results usually paralysis of the lower extremities. If the vertebræ in the middle of the back are dislocated, the paralysis affects the lower part of the trunk also. If one of these rings in the neck is dislocated, the result is often immediate death from suffocation.

Signs.—In some cases it is possible to feel, by careful examination of the bony prominences in the back, that one or more of the rings are displaced. The question is, usually, whether the ver-

tebræ are dislocated or fractured. The question is not usually of much importance from a practical point of view, since the effect upon the patient is about the same in both cases.

Treatment.—A few cases are on record in which dislocations of the vertebræ have been reduced, and the patient has recovered completely. Dr. Hodgen says that he "was once successful, by pulling the head gently upward, in the case of a man whose head was drawn backward and turned to one side. The accident in this case was caused by falling from the top of a load of furniture, and the patient had been totally unconscious for four hours, breathing irregularly and noisily. The bones came into place with an audible snap and the man was restored at once, swearing at the horse he supposed he was still driving."

The attempt may be made to reduce such a dislocation by pulling the head and shoulders upward, while an assistant pulls the legs and hips downward. Sometimes the effort can be assisted by gentle manipulation of the dislocated vertebræ by a third individual. These movements should be made very carefully and gently, since instances are recorded in which fatal injury has been done by the attempt to reduce the dislocation.

In most cases all efforts to relieve the displacement will be unsuccessful; and even if the bones are replaced, the injury done to the spinal cord cannot be repaired. It becomes necessary to provide means for securing regular evacuations from the bowels and bladder, since the patient loses all control over these organs.

The urine should be drawn three or four times a day with a soft catheter. The bowels must be kept open, either with injections of warm water or with the daily use of *cascara cordial*. This remedy answers admirably in securing evacuations under such circumstances; yet, in some instances, it becomes necessary to supplement its use with injections.

One of the most troublesome complications of this condition is the formation of bed sores. These form earliest over the bony prominences of the hips and pelvis. To prevent their occurrence, extreme care must be taken to wash the skin thoroughly, and to harden it by means of frequent bathing with alcohol or brandy and water in equal parts.

The skin can be protected also by the use of cushions. These are best made in the shape of rings, upon which the patient's hips

rest while the bony prominences fall within the ring. The best form is made of rubber and filled with air, and known as "air cushions."

These can be imitated by making a tube of cloth or muslin, stuffing it with cotton, wool or horsehair, and then sewing the ends of the tube together, so that it takes the form of a ring.

The ultimate result is usually death; the utmost care and attention succeed only in prolonging the patient's life a few months and rendering him more comfortable during this time. In a few rare instances recovery has occurred.

Dislocation of the Hip.

This accident occurs only from the application of great violence, for the hip-bone is so snugly fitted into its socket, and is so firmly bound in place by strong ligaments and powerful muscles that a great deal of force is necessary in order to dislodge it from its socket.

There is, therefore, in most cases, considerable injury to the tissues of the leg and hip, as well as a dislocation of the bone. The latter is by itself a comparatively slight accident, but occurring, as it usually does, in connection with serious injury to other tissues, a dislocation of the hip must be regarded as a dangerous accident.

These misplacements usually occur in males, and most commonly during adult life — a fact which is doubtless due to the exposure of such individuals to mechanical violence of all kinds. In some few cases it has been known to result from the application of slight force, such as the twisting of the limb when the foot is caught in the carpet; in such instances, there is usually some disease of the bones, or of the tissues surrounding them.

The head of the thigh-bone may be displaced in any one of four ways:

First—It may be displaced upward and backward from its socket, so that the head of the bone rests upon the pelvic bone. This is the more common variety of dislocation of the hip.

Second—The head of the bone may be displaced downward and inward, so that it rests on the front surface of the pelvic bone, just below and outside of the groin. This dislocation occurs second in frequency to the one just described.

Third—The head of the bone is sometimes displaced backward and slightly downward.

Fourth—The dislocation results in the displacement of the head of the bone upward and forward, so that it rests in the groin. This is the rarest of all forms of dislocation of the hip.

Displacement upon the Back of the Hip-bone.

This dislocation, the most frequent of all, is usually caused by falling while the leg is drawn inward toward the other one. It may also result from a severe blow upon the thigh.

Signs.— If the patient stand upon the sound limb, it will be noticed :

First — The limb is rotated inward, so that the great toe rests upon the instep of the other foot.

Second — The knee is bent and is held in front of that of the other leg.

Third — The bony prominence at the upper end of the thigh-bone, outside of the joint, projects more than that on the uninjured side. The distance between this prominence and the front of the hip-bone is less on the injured than on the uninjured side.

Fourth — The limb is fixed and rigid ; the hip-joint cannot be moved by the patient nor by a second person.

Fifth — The injured member is shorter than the other limb.

If the patient be very fleshy, some of these signs may be scarcely perceptible. If, on the other hand, the subject of the injury be thin, it will often be possible to see and feel the displaced bone, or at least to perceive distinctly the unnatural swelling on the back of the hip of the uninjured side.

This dislocation is recognized at once by an experienced surgeon. To non-professional persons it may at first seem that the patient has suffered a fracture of the neck of the thigh-bone, rather than a dislocation. In order to enable one to detect at once the difference between these two conditions, Dr. Hamilton arranges the points of distinction in the following tables :

DISLOCATION UPON THE BACK OF THE HIP-BONE.

1. Very rare in aged persons.
2. Never caused by a fall upon the prominence on the outer side of the upper end of the thigh-bone, called the " great trochanter."

3. Absence of grating.
4. Unnatural stiffness, or loss of motion.
5. Limb always shortened.
6. Limb almost always turned inward, drawn toward sound limb, and bent.

FRACTURES OF THE NECK OF THE THIGH-BONE.

1. Very frequent in old age.
2. Often caused by a fall upon the "great trochanter."
3. Grating sensation present.
4. Limb can be moved freely, except when motion causes pain.
5. Limb not always shortened.
6. Limb never turned inward, but is almost always slightly turned outward, and generally lies in the same direction with the other limb.

Dislocation of the head of the thigh-bone forward toward the groin is often caused by some force which draws the knee or foot outward and downward.

Signs. — If the patient stand on the sound limb it will be noticed:

1. The foot of the injured limb is advanced and the toes turned somewhat outward.
2. The body is bent forward and toward the injured side.
3. There is an unusual flattening at the point where the other side of the body exhibits the prominence of the upper part of the bone.
4. There is an unusual prominence in the groin.
5. The limb is shorter than the sound one.

In many cases it is possible to feel a movement at the prominent point in the groin when the thigh is rotated.

In the other varieties of dislocation of the hip, the symptoms are very similar to those presented by the two forms just described. The symptoms vary somewhat under different circumstances, but in every case the deformity, the loss of motion and the shortening of the limb are sufficient to indicate the nature of the complaint.

The non-professional observer can in almost every case, by the exercise of care and attention, recognize a dislocation of the hip;

in most cases this knowledge must suffice, since the detection of the individual and separate dislocations requires an intimate knowledge of the anatomy of the parts concerned, and a practical acquaintance with the signs of these affections. A simple means for recognizing a dislocation — a means applicable to all varieties of displacement — is said to be the following:

A line is drawn with ink or lead pencil along the skin of the limb from the bony prominence at the front of the hip to the bony projection at the back of the haunch. If the limb be uninjured, that is, if no dislocation has occurred, the upper end of the thigh-bone should touch the lower border of this line; if, on the other hand, the hip has been dislocated, the upper end of the thigh-bone lies above this line.

Dislocations of the hip are often complicated with fractures of the neck of the thigh-bone; and some of these fractures — those in which the fragments are driven into each other or impacted — frequently simulate a dislocation of the hip to a considerable degree. The latter can, however, usually be distinguished from dislocations by the fact that the limb can be moved, while in displacements of the bone the limb is fixed and immovable.

Dislocations of the hip-bone in children are sometimes accompanied by a separation of the head of the bone from the neck. This occurs in children only, because during early life the head of the bone is not firmly attached to the narrow part which connects it with the shaft.

Treatment.— The treatment of dislocations of the hip has undergone a radical modification in the last few years. In former times it was supposed that the chief obstacle to the restoration of the bone to its proper place consisted in the contraction of the powerful muscles constituting the hip and the thigh. Hence mechanical appliances were employed whereby the limb could be pulled away from the body with extreme force. Systems of pulleys were attached to rings in the wall or to the bed, and several men exerted their utmost strength in pulling the thigh away from the body. In one unfortunate instance, this feat was literally accomplished, the thigh being torn from the body.

A more careful study of the anatomy of the parts showed however that the chief obstruction in the reduction of these dislocations was not muscular contraction, but a certain ligament which formed part of the capsule or sac surrounding the joint. This fact was

brought to the notice of the profession largely by two distinguished surgeons, Dr. Gunn, of Chicago, and Dr. Bigelow, of Boston. It was demonstrated that there is a ligament which extends from the hip-bone to the head of the thigh-bone, having a shape much resembling that of the letter Y. It is hence called the "Y" ligament. It was found that the head of the bone often escaped from the sac of the joint through this ligament, and that the presence of the ligament constituted the obstacle to the restoration of the head of the thigh-bone to its socket.

The recognition of this fact is followed by a change in the methods of treatment, for it became evident that the object was no longer to overcome the contraction of the muscles, but merely to manipulate the bone so that the head should be slipped through the opening, and should at the same time avoid the obstacle caused by the twisting of the Y ligament. The present methods consist, therefore, merely in such movements of the thigh as shall secure the passage of the head of the bone through the the capsule of the joint.

These methods will be described, although their successful execution requires a certain amount of experience and acquaintance with anatomy. There is, however, a method which can be readily employed, even by non-professional persons, and which often succeeds in reducing dislocations.

This method, which was first described by Dr. Allen, of Vermont, is essentially as follows:

The patient is placed upon his back upon the floor; the operator stands over him, holding the injured limb between his legs. The patient's leg is bent at the knee, so that the ankle comes between the thighs of the operator; the latter then clasps his hands below the knee of the patient and lifts gently until the latter's body is raised from the floor. In this way the weight of the body is made to pull away from the thigh.

After the patient has been held in this position for a few seconds there often occurs a movement of the head of the thigh-bone into its socket, accompanied by an audible click.

If this method fail, another attempt may be made by lifting both legs of the patient instead of one; after the limbs are thus held for a few seconds, the head of the bone often slides back into its socket.

If both of these measures fail, it will be necessary to resort

to the methods by manipulation. These vary according to the particular dislocation which it is desired to reduce.

In most of these cases it becomes necessary to administer ether; first, in order to prevent the unconscious resistance of the patient; and, second, to relax the muscles. If no ether be administered, an extra amount of force must be employed, which may occasion injury to the tissues or to the bone itself.

The patient is placed upon some blankets spread upon the floor or upon a hard bed. If the dislocated limb be the right one, the operator grasps the ankle with his right hand and places the left under the knee.

The leg is bent to a right angle at the knee, and the thigh to something more than a right angle with the body. Care should be taken not to bend the limb at the hip so much as to bring the thigh in contact with the body, since the tissues about the joint may be lacerated by manipulations of the limb in this position.

The thigh is then turned outward away from the body, while at the same time it is rotated upon itself by pulling the ankle away from the other limb.

At this point of the manipulation the direction of the leg is therefore obliquely outward, while the thigh itself is inclined inward.

The limb is then slowly extended, that is straightened at both the knee and the hip-joint. It will often be found even at the first attempt that the head of the bone drops into its socket during the manipulation. Sometimes, indeed, the reduction occurs quite unexpectedly before the maneuver has been completed.

Backward dislocation of the hip — the variety in which the head of the bone lies behind its socket — is recognized by the symptoms and signs already mentioned.

The treatment consists essentially in the measures already described, though the attempt to reduce a dislocation by a manipulation requires some modification.

The leg is bent at the knee at a right angle, and at the thigh so that this forms about a right angle with the body.

The thigh is then turned outward from the body, while at the same time the entire limb is rotated outward by means of the hand, which is applied to the ankle of the patient.

The limb is then slowly straightened at the knee and at the hip.

During this movement the head of the bone usually slips into place.

Dislocation of the thigh-bone forward and inward under the groin often results from violence applied to the foot while the limb is placed obliquely to the body. It has repeatedly happened to individuals walking upon icy pavements, and is an occasional unpleasant incident in skating.

The body is bent forward; the foot of the injured limb is turned somewhat outward, the heel being raised and placed against the ankle of the other limb; the knee is slightly bent, and cannot be straightened without extreme pain; the leg is shortened to a greater degree than usually happens in the other dislocations.

If the individual be not supplied with much fat, the head of the thigh-bone can usually be felt in its new position.

Treatment.—One of the best methods for reducing this dislocation is that practiced by Dr. Hamilton.

The patient lies upon the floor or on a hard bed. A folded sheet is passed under the hips, the ends being crossed in front of the body and held by two assistants on either side of the bed. A third assistant stands by the uninjured side of the patient, passes his hand under the sound leg and seizes the ankle of the other limb.

The operator stands by the injured side of the patient, a folded sheet is passed over his shoulders and carried between the patient's thigh as high as possible under the injured limb.

The assistants who hold the ends of the sheet draw upon these and thus hold the hips firm. The third assistant, standing by the uninjured side of the patient, pulls the injured thigh toward him. The operator raises his shoulders, and thus lifts the head of the thigh-bone toward the head of the patient.

The method by manipulation is somewhat simpler, in that fewer assistants are required. It is performed as follows:

The patient lies upon his back on the floor. The operator, standing upon the side of the dislocation, grasps the ankle with one hand and places the other under the knee. The limb is bent so that the thigh stands perpendicularly to the body.

The leg is then turned outward by carrying the foot away from the opposite limb. The leg is then rotated toward the other leg, while at the same time the limb is carried across the front of the body so that the knee is brought to the floor.

In this way the head of the bone is lifted upward and forced somewhat outward.

In the hands of an experienced and skillful surgeon, dislocations of the thigh-bone, when not complicated with fractures or extensive injuries to the flesh, are reduced without much difficulty. Any other individual will probably find much trouble in effecting the reduction.

In every case a non-professional person should first try the method introduced by Dr. Allen, described above. If this fail, he may attempt to use the appropriate method by manipulation; in all his efforts, however, he should be careful not to employ much force, for the proper manipulation can be executed with but a gentle amount of muscular effort on the part of the operator; any greater force usually causes harm and not good.

If these efforts be unsuccessful, it will be better to await the arrival of a surgeon, even though a day or two must elapse, than to experiment with the injured limb. If a much longer delay be unavoidable—and this may sometimes happen in a thinly-settled country—another attempt may be made while the patient is under the influence of ether.

After the reduction has been accomplished, the thighs should be tied together for a week, and the patient should not rest the weight of the body upon the limb for two weeks at least, for after the hip has been once dislocated, a repetition of the accident may occur even after slight violence.

In most cases it will be necessary to envelop the hip in hot fomentations for several days, in order to reduce the swelling and palliate the pain.

It occasionally happens that dislocation of the hip is followed by more or less complete paralysis of the limb. This results from pressure upon a large nerve which passes out from the body just behind the hip-joint; the displaced head of the bone is pressed against this nerve and drawn firmly upon it by the contraction of the powerful muscles composing the hip.

The ultimate result is doubtful, dependent upon the amount of injury which has been sustained by the nerve. The treatment of this complication must consist in frictions of the limb with the hands and with stimulating liniments (such as the soap or ammonia liniments), and in the use of electricity.

After the hip has been dislocated for several weeks, it can be

reduced only with great difficulty and with some danger, for the violence necessary to break up the bands and adhesions which have been formed since the displacement of the bone, often causes a severe and dangerous inflammation. These old dislocations should, therefore, never be meddled with by non-professional persons.

Dislocation of the Knee-pan.

In discussing fractures of the knee-pan, it was remarked that this bone is not attached directly to any of the bones of the leg, but is simply located in the sinew or tendon of the large muscle which forms the front part of the thigh. Its object is simply to diminish friction where the muscle passes over the end of the thigh-bone.

Yet, notwithstanding this fact—that the knee-pan is not bound directly to the thigh-bone—it is not very frequently dislocated.

It may, however, be displaced by direct violence, such as a fall upon the knee; it sometimes is dislocated also by the sudden contraction of the muscles which are attached to its upper border.

The knee-pan may be dislocated either outward or inward or upward; or it may be turned upon its edge, so that one border of it rests upon the end of the thigh-bone, while the other projects under the skin. The most common displacement is toward the outer side of the leg.

Signs.—This outward dislocation can be recognized by the change in the form of the knee; the front of the knee seems flattened, while the knee-pan itself can usually be seen on the outer side of the limb.

This dislocation is accompanied by a loss of motion in the leg, the patient being unable to bend the knee.

The outward dislocation of the knee-pan is met with more frequently in women than in men. This results from the peculiar obliquity of the thighs in females; for, in consequence of the greater breadth of the hips in women, the thighs are directed somewhat obliquely inward, and a violent contraction of the muscles has a natural tendency, therefore, to displace the knee-pan toward the outer side of the limb.

A dislocation of the knee-pan toward the inner side of the limb is accompanied by essentially the same symptoms; the form of the knee is somewhat different, since the prominence of the knee-pan is now observed on the inner side of the limb.

That form of dislocation of the knee-pan in which the bone rests edgewise, is extremely rare. It can be readily recognized by the peculiar shape of the knee, which now presents a sharp edge instead of its usual flat surface. In a few exceptional cases the knee-pan has been turned completely over, so that the surface which ordinarily rests upon the thigh-bone lies directly under the skin.

Treatment.—In treating an outward dislocation of the knee-pan, the patient rests upon his back upon the floor; the leg is straightened and the foot raised.

The operator stands facing the patient and places the heel of the injured limb upon his shoulder; he then pushes strongly upon the displaced bone, so as to force it back into its former position. An inward dislocation is treated in essentially the same manner.

A dislocation of the knee-pan upward results from a rupture of the ligament or sinew which binds the little bone to the large bone of the leg, called the *tibia*. The knee-pan can be readily pulled back into its place, but slips up again as soon as the pressure is removed, because the muscle which is attached to its upper border pulls it upward onto the thigh.

The treatment of this dislocation consists, therefore, in measures which shall overcome the contraction of this muscle and hold the knee-pan in place until the tendon which unites it to the leg has healed again. This requires the application of a dressing similar to that which is employed in fractures of the knee-pan. For a discussion of these the reader is referred to the chapter on this latter subject.

The ligament heals after the lapse of seven or eight weeks, and the patient regains the use of the limb. He should, however, be careful not to subject the leg to any strain for several months subsequently; it is advisable for him to wear a strong elastic band over the knee which shall assist in holding the knee-pan in position. In many cases the ligament which joins the knee-pan to the tibia is longer than natural and the movement of the limb is consequently somewhat though not seriously impaired.

In treating a dislocation of the knee-pan in which the bone lies edgewise on the front of the leg, the patient should be placed upon his back, as before, the heel of his injured limb resting upon the shoulder of the operator.

The surgeon then presses in one direction with one hand upon the upper border of the bone, while pressure is made in the opposite direction against the lower border by means of a large door-key or some similar instrument.

In most cases several efforts must be made before the bone is restored to its proper position; the reduction may be assisted by bending and straightening the leg several times while the pressure upon the edges of the knee-pan is continued.

The difficulty lies, of course, in the contraction of the large muscle to which the knee-pan is attached. In order to overcome this an assistant may make firm pressure downward — that is, toward the knee — by spreading both hands over the front of the thigh a few inches above the knee-joint.

In all dislocations of the knee-pan, the joint becomes much swollen. In the more favorable cases this swelling subsides in a few days under the use of hot fomentations; but in some instances a serious inflammation, which may materially injure the structures composing the knee-joint, occurs. In every case the manipulations should be conducted as gently as possible, and hot fomentations should be assiduously applied to the knee. The limb should be laid upon a splint of wood extending from the hip to the ankle, and fastened by means of a bandage applied to the leg and to the thigh.

Dislocations of the knee-pan are apt to recur upon slight provocation. It is therefore advisable for the patient to wear a rubber or leather bandage around the knee for some months subsequent to the injury, and to take every precaution in avoiding severe strains upon the limb.

Dislocation of the Cartilages of the Knee-joint.

It has been said, in describing the structure of joints in general, that the surfaces of the bone which lie in contact are usually covered by a thin layer of "cartilage" or "gristle." In most cases these pieces of cartilage are so firmly connected to the bone upon which

they rest that they are not separated from it even by the violence which may cause a dislocation.

The cartilages in the knee-joint, however, are sometimes torn away from the bone. This is particularly true of the two disks of cartilage which rest upon the upper end of the large bone in the leg — the *tibia*. It sometimes happens that violence applied to the knee or to the foot causes a tearing off of one or both of these pieces of cartilage from the tibia. The piece escapes into the cavity of the knee-joint, and not only interferes seriously with the movements of the joint, but occasions such pain as to render the limb practically useless.

Signs.—This is an accident which is rarely recognized by non-professional persons, because it may not be accompanied by any change in the form of the limb.

It is indicated by the occurrence of a sudden agonizing pain in the joint, aggravated by any attempt at motion. The leg cannot be straightened, but remains in a slightly bent position. After the acute symptoms have subsided, there remain pain and tenderness in the knee; by feeling the joint we can usually detect an especially painful spot.

In many cases this condition is not regarded as very serious by the patient, and the limb is not submitted to the inspection of a surgeon. In such cases there usually remains a permanent disability of the limb. It is important that the case be treated at once, since by reducing the dislocation of the cartilage the usefulness of the leg can be entirely restored.

Treatment.—The patient is placed upon his back, the thigh being bent at the hip and the leg at the knee. The operator places one hand upon the ankle and supports the knee with the other hand. He then bends the knee suddenly and forcibly, and immediately straightens the leg, making at the same time a twisting movement of the joint.

It sometimes happens that the first attempt at reduction is successful, as is indicated by the perfect restoration of the movements of the limb. In most cases several efforts are required before the reduction is accomplished. Indeed it often happens that all attempts to reduce the dislocation are unsuccessful until ether is administered, when the cartilage is replaced with ease.

It has also happened that after several attempts have been

made unsuccessfully, and the undertaking is abandoned, the patient has unconsciously succeeded in restoring the cartilage to its position by movements of the limb.

After the dislocation has been reduced, it becomes necessary to envelop the knee in hot fomentations, and to place it on a long splint, which shall secure perfect rest for the joint, for two weeks. After the splint is removed, a knee-cap made of leather or strong elastic should be worn, since the dislocation is very apt to recur.

Dislocation of the Knee-joint.

The knee-joint is formed by the thigh-bone above, and the large bone on the inner side of the leg called the tibia, below; there is, in addition, at the front of the joint, the small bone called the patella or knee-pan.

By dislocation of the knee-joint we understand a displacement of the tibia, which is dragged away from its natural position against the lower end of the thigh-bone. Although this joint is a very shallow one — that is, the sockets at the upper end of the tibia are very shallow, in order to permit the extensive motion of the limb — yet dislocations are quite rare. This freedom from displacement is due to the firm ligaments by which the bones are bound together, as well as to the protection afforded by the tendons or sinews of the large muscles. The displacement can, therefore, be caused only by extreme violence; hence, a dislocation of the knee is usually accompanied by extensive injury to the tissues of the leg.

Dislocations of the knee are occasioned by direct or indirect violence; among the common causes are blows upon the leg and twisting of the limb by false steps during rapid walking. It is sometimes occasioned also by falling down stairs.

Signs. — A simple dislocation of the tibia can be easily recognized by the evident deformity of the limb. If the tibia be displaced forward, there is a swelling at the back of the knee and a disappearance of the knee-pan, which falls into the depression at the upper end of the tibia.

The large blood vessels and nerves which run to the leg and foot lie just behind the end of the thigh-bone, at the knee-joint. By

a displacement of the bones, these vessels and nerves are sometimes injured, as a result of which there may be numbness and paralysis of the foot.

If the upper end of the tibia be dislocated backward, it forms a prominence at the back of the knee, which is readily recognized as the end of the bone. The front of the knee, meanwhile, consists of the two large projections which belong to the thigh-bone. The knee-pan is very prominent, and is bounded by a deep depression on either side. In a complete dislocation of the knee the limb is shortened.

Treatment. —If there be no laceration of the flesh, a dislocation of the knee can usually be reduced without much difficulty.

If the upper end of the tibia be dislocated forward, the leg should be straightened as far as possible; an assistant then pulls the leg away from the thigh, while the operator presses the displaced end of the bone back into its proper position.

If the head of the bone be displaced backward, the knee is bent forcibly over the thigh of the operator, while an assistant pulls as before.

In some cases the dislocation can be reduced after previous failures by using a rocking motion from side to side while the limb is being pulled upon.

The injury is followed by great pain and swelling of the knee. It is necessary to place the leg upon a splint, to which it is fastened by means of bandages so as to secure perfect repose. The knee is then covered with hot fomentations and surrounded with oiled silk or rubber cloth.

After the swelling has subsided and the injury seems to have been repaired, extreme care must be taken to protect the knee from violent straining of all kinds. The patient should not stand or walk upon the limb until he has been provided with a strong knee-cap of leather or with a bandage.

Dislocation of the Ankle.

This is a frequent accident, often caused by alighting from cars or carriages in motion and from falling down stairs. It is always a serious injury and often results in the loss of the foot, since amputation is frequently necessary.

The ankle-joint is formed by the two bones of the leg above and by the uppermost bone of the foot — called the *astragalus* — below. The astragalus fits into a groove or mortise which is formed by the bones of the leg. The weight of the body is transmitted from the thigh to the foot by means of the large bone of the leg called the tibia; the lower end of this rests directly upon the broad, curved surface of the astragalus. In order to prevent a displacement sideways, the joint is provided with a bony shoulder on either side of the astragalus: the inner shoulder is a projection of the tibia, while the outer shoulder is the end of the fibula. The astragalus is therefore covered above and on either side by the bones of the leg. The result of this arrangement is, first, that the ankle is protected from dislocations to a great extent; and second, that when a dislocation is effected, there occurs almost invariably a fracture of one or both of the bones of the leg.

There are, however, dislocations in which the foot slips directly forward or directly backward without breaking either of the bones of the leg.

Signs.—Dislocation of the foot forward is an infrequent occurrence. It can be readily recognized by the deformity of the foot and ankle. The heel disappears, since the heel-bone is pushed forward under the ends of the bone of the leg; an unusual protuberance is felt at the upper surface of the foot just in front of the leg.

Dislocation of the foot backward can be recognized by extreme length of the heel, the leg seeming to be planted at about the middle of the foot; the toes are pointed downward, the heel upward.

Dislocation of the foot outward is accompanied by a fracture of the lower end of the fibula, which is generally broken two or three inches above the joint. This accident is therefore classed among the fractures rather than the dislocations, and has been already described under the head of "Pott's fracture." It is usually caused by a "turning over" of the ankle. The sole of the foot is turned outward or even upward, while the inner side rests upon the ground.

In some cases there is a fracture not only of the outer bone of the leg—the fibula—but also of the projection from the tibia which protects the inner side of the joint.

Dislocation of the foot inward is accompanied by a fracture of

the lower end of the tibia, and sometimes with a fracture of the fibula as well. In this case the sole of the foot is turned inward, so that the outer edge rests upon the ground.

There sometimes occurs also an injury which is not necessarily a dislocation, though the astragalus may be actually forced out of place. This consists in a separation of the tibia from the fibula. In the natural condition these bones are bound tightly together by means of ligaments; but in consequence of violence, such as a fall upon the feet, the bones are sometimes sprung apart. If they be widely separated the astragalus is forced up between them, causing a stiffness of the ankle and a shortening of the limb; there may also be a fracture of one or both bones. This accident usually results in permanent loss of movement in the ankle.

Treatment. — Dislocations of the ankle which are not accompanied by laceration of the flesh are usually reduced without difficulty, and do not cause permanent impairment of the movements of the joint.

The general plan is to make extension, that is, pull the foot forcibly away from the leg, while at the same time the ends of the displaced bones are forced backward into position.

In the backward dislocation of the foot, the leg should be bent upon the thigh so as to relax the muscles which are attached to the heel; in fact this measure is to be recommended in most of the dislocations at the ankle.

Those displacements which are accompanied by fracture of the bones must be treated according to the principles already laid down in discussing fractures.

If there be extensive injury to the flesh, the condition is always a serious one; for in many instances amputation of the foot becomes necessary In every case, it is true, in which there is a chance of saving the member, the surgeon should postpone an operation, but it frequently happens that after weeks have elapsed it becomes evident that the bones are so injured as to be incapable of supporting the weight of the body; and it is better to relieve the patient from the annoyance of the diseased bone.

All such injuries to the ankle as are complicated with wounds of the flesh should be submitted to the care of the surgeon at once; a neglect to do so may cost the patient a limb or even his life.

Dislocation of the Bones of the Foot.

The foot contains twenty-six bones; seven of these constitute the back part of the foot and lie under the bones of the leg. Only two of these bones are of such size and prominence as to warrant any especial reference to their dislocation. The others are, it is true, occasionally dislocated, but only by violence which lacerates and mangles the foot badly, so that the injury comes under the head of wounds rather than of dislocations.

The upper bone of the foot, the astragalus, lies in contact with the two bones of the leg, from which it receives the weight of the body. This bone is sometimes separated from the other bones of the foot, as from the tibia and fibula, by violence, usually applied in jumping or falling.

If the astragalus be displaced forward, it can be felt at the front and upper part of the foot, while the rest of the foot is twisted toward the opposite side.

If the astragalus be displaced backward, the foot is bent and the heel projects to an unusual extent.

Treatment.—The bone can sometimes be brought into its proper position by bending the leg upon the thigh and by pulling the foot back into position, while at the same time pressure is made directly upon the displaced bone. These efforts often fail, and it becomes necessary to cut the large sinew which extends from the calf to the heel. This operation should be performed only by a surgeon.

If it becomes impossible to reduce the dislocation, the patient may nevertheless have a very useful foot. To secure the best result he must apply hot fomentations every two or three hours until the swelling and inflammation have subsided; for months, consequently, he should be careful not to place the weight of the body upon the foot.

The five bones which connect the back part of the foot with the toes—the *metatarsal* bones—are sometimes displaced by great violence. This is a rare accident, and one which can rarely be successfully treated except by an experienced surgeon.

Dislocation of the Toes.

This is a rare accident, and one usually associated with fracture.

The great toe is the one displaced in almost all cases. The treatment is essentially the same as that which has been described in discussing dislocation of the thumb.

Rupture—(Hernia).

This term signifies a protrusion of any organ of the body from the cavity where it naturally belongs; thus we may have a hernia of the brain or lung as well as of the bowels. Under the term "rupture," however, people generally understand a protrusion of the bowel from the cavity of the abdomen into one of the channels found in the groin or around the genitals, and in this sense the word is used in this chapter.

The chief forms of rupture are those in which the bowel escapes into the upper part of the thigh, or through an opening called the inguinal canal, or at the navel. We may, therefore, speak of rupture as follows:

1. Inguinal hernia.
2. Femoral hernia.
3. Umbilical hernia.

The inguinal canal is an opening or channel which passes obliquely through the abdominal wall just above the bone at the lower part of the front of the body. Before birth, this canal remains open in order to permit the passage of certain organs from the abdomen through the abdominal wall—a process quite natural to the development of the child. After this has been accomplished the canal diminishes in size, and is so firmly closed that in most individuals the contents of the abdomen never escape. The opening of this canal is, however, a weak point in the abdominal wall, and when a person violently compresses the contents of the abdomen, as is done during the evacuation of the bowels and during childbirth, the intestines are sometimes forced into and through this canal, and appear under the skin outside of the abdominal cavity.

In other cases the inguinal canal is not closed as usually happens; it remains open to such an extent that a fold of intes-

tine is found in it, even at the birth of the child. This condition is called *congenital* hernia.

There is also another canal which leads from the abdomen a short distance downward into the thigh, alongside of the large artery and vein which passes from the body into the lower limb. This canal is sometimes forced open by pressure of the abdominal contents, a loop of intestine escaping into it and forming a slight prominence under the skin at the upper part of the thigh. In consequence of the greater breadth of the hips and pelvis in women, this variety — the femoral hernia — is more common in women than in men.

Umbilical hernia occurs usually soon after birth, though it may also begin in more advanced life. It results from weakness of the abdominal wall at the point where the umbilical cord is attached in the fœtus.

Surgeons divide all ruptures according to the condition of their contents into three classes:

1. *Reducible* hernias, those whose contents can be pushed back into the abdomen.

2. *Irreducible* hernias, whose contents cannot be returned into the abdominal cavity.

3. *Strangulated* hernias, that is, those which are constricted at some point so that the passage of their contents and the circulation of blood in them are obstructed.

The most frequent form of rupture is the inguinal hernia, which occurs in males much oftener than females. It usually begins immediately after some violent strain or exercise. This strain may consist in lifting, jumping, etc.

In some cases the patient feels a sharp pain and soon afterward notices a lump in the groin; at other times there will be no especial symptoms to call attention to this part of the body; the patient observes simply a gradual swelling in the groin or of the scrotum.

When the rupture is fully developed there is a swelling in this part which may vary in size, being sometimes as large as a man's head; it is usually somewhat tender and elastic, though easily compressible. There is no redness of the skin nor other sign of inflammation, the patient suffering no pain.

If the hernia consists of one or more loops of intestine which have escaped through the inguinal canal, there may be some

interference with the functions of the bowels; the patient is often troubled with constipation and sometimes with attacks of colic and vomiting. In other cases the hernia does not contain the intestine itself, but consists merely of some of the layers of fat — technically called omentum — which cover the intestines. In this case the tumor is not so tense or elastic, and the rupture may cause the patient no other trouble than the mechanical annoyance caused by the swelling.

There are certain signs whereby we can distinguish a rupture from other tumors which are present in the same part of the body. Thus a hernia varies in size with the position of the individual; it is smaller when he lies down and larger when he stands erect. In many individuals the swelling disappears entirely during the night.

By directing the patient to cough, and holding the hands upon the base of the tumor where it joins the body, we can feel a decided impulse transmitted to the fingers during the act of coughing. Many persons can reduce the hernia, that is push it back into the abdomen at will, though it usually reappears so soon as the fingers are removed. *Irreducible hernia* occasions several inconveniences. After taking a full meal the patient is often troubled with dragging pains in the abdomen and attacks of vomiting. It is in these cases, too, that colic and constipation so frequently occur.

Treatment. — In treating a reducible hernia the usual plan and one which should be always tried, is the use of a *truss*. It is very important that the hernia should be attended to, since it is liable to cause serious trouble at any moment. In ordering a truss it is customary to take the circumference of the body at the hips, about midway between the bony prominence at the front of the hip and the large bony projection at the upper end of the thigh-bone. It is much better, however, to have the truss adjusted to the person by one accustomed to the work; for a badly-fitting truss not only gives a great deal of annoyance, but is also somewhat dangerous, since it deludes the patient with a sense of security, and may induce him to make efforts and execute movements which will result in injury to the rupture.

Several operations are practiced by surgeons for the radical cure of rupture. These are more or less successful, but cannot be relied upon always; nor are they entirely devoid of danger.

If a truss be applied while the patient is still a child or youth, a permanent cure is often effected, since the canal becomes gradually closed and strong enough to prevent the escape of the bowel from the abdominal cavity.

It is highly important that the truss should be worn constantly; it would be much better if the patient would wear it even in bed. By removing it for a few moments he frequently undoes the good that it has taken weeks to accomplish, since the intestine may be forced into the canal while the abdominal wall is unsupported by the truss.

If some time must elapse before the patient can provide himself with a truss, a bandage should be applied which shall support the abdominal wall until the truss can be obtained. A small pad, made by folding soft flannel or cotton cloth, is placed over the opening through which the rupture appears. A bandage is then applied around the waist, and a second one is pinned to this in front, and is passed between the thighs and fastened to the bandage again behind. This second strip covers the pad, and holds it firmly in position. Several layers of bandage may be applied until sufficient protection is afforded.

The truss must usually be worn for several years, and perhaps even during the entire life. The patient cannot be too careful in the matter, since he is constantly liable to an accident which may cost him his life.

When the truss is obtained, the rupture should be returned to the abdominal cavity. To do this, the patient is placed upon his back on the bed, the foot of the bed being slightly elevated. The operator then exerts a gentle pressure upon the swelling from below upward, kneading the tumor meanwhile so as to facilitate the passage of the intestine into the abdominal cavity. No violence should ever be used in this manipulation.

Strangulated Hernia.—A hernia is said to be strangulated when the intestine is grasped or constricted so tightly at some point as to prevent the passage of its contents along the bowel.

Strangulation may occur in an old as well as in a recent hernia. Sometimes the patient is not aware that he has ever had a rupture until the symptoms to be presently described occur; in other instances the individual has suffered for a long while from hernia, and has perhaps become so accustomed to it that he neglects to take proper precautions in the use of a truss and in the avoidance of violent effort.

Symptoms. — The first symptoms of which the patient complains are due to the obstruction of the bowels. This will be understood when it is remembered that a loop of the intestine is forced into the canal and doubled upon itself so as to make a knuckle-like protrusion. The result of this is that the contents of the intestine cannot pass through the constricted part.

The first symptoms are, therefore, colicky pains, often accompanied by an accumulation of gas which distends the abdomen. The patient experiences a sense of tightness in the abdomen; he has a constant desire to evacuate the bowel, but his efforts are unavailing. After a few hours, vomiting occurs; the vomited matters are at first merely the contents of the stomach, but subsequently contain bile and even matters which can be recognized by their odor as the contents of the bowels. The patient becomes much prostrated; the pulse is rapid and feeble, the skin pale, the countenance exhibits anxiety and distress. There soon ensues an inflammation at the seat of the constriction. The abdomen becomes very tender and swollen. If no relief be obtained, the parts begin to mortify and the patient sinks into a condition of collapse which soon terminates fatally.

Treatment. — If these symptoms occur, no time should be lost in securing the services of a surgeon; for the patient's life depends upon speedy and skillful relief. Until his arrival, the following measures may be tried for the relief of the patient. The object of treatment is, of course, to restore the intestine to its proper position in the abdominal cavity. This can sometimes be accomplished by manipulation alone.

The patient should lie upon a bed the foot of which is elevated. The knees are to be drawn up so as to relax the muscles. The bladder and rectum should be emptied by the patient himself if he is in a condition to accomplish it, otherwise by the use of a catheter and by injections of warm water into the rectum.

If there be anybody present who is competent to administer ether, the patient should be put under the influence of this drug; otherwise he should be engaged in conversation, so as to divert his attention from the manipulations which are to be performed. The operator then grasps the tumor with both hands and very gently compresses it. He should then attempt to pass the intestine up through the ring, which can be plainly felt with the finger, at the

base of the tumor. Great care and gentleness must be exercised in this effort since unnecessary violence may cause serious injury.

The manipulation should be continued for twenty or thirty minutes, unless the patient complain of extreme pain before the expiration of that time. The return of the bowel to the abdominal cavity will be indicated by a gurgling sound and sensation, the tumor at the same time disappearing.

If this effort does not succeed, the patient should be placed in a hot bath (100 degrees F). By this means the tissues are often relaxed so that the loop of intestine can be returned to the abdomen with considerable ease.

If all these measures fail, the patient should take twenty or thirty drops of laudanum, and cold applications should be made to the swelling. A piece of ice, wrapped in flannel, may be bound over the skin. It is important to inspect the skin every twenty or thirty minutes, to see that it does not become too cold, a condition indicated by a ghastly whiteness; for if the temperature be lowered too much, mortification of the part will ensue.

It sometimes happens that, after the patient awakens from the sleep which is induced by the laudanum, another effort may be successful in reducing the hernia.

Care should be taken to avoid the use of purgatives or cathartics; these merely aggravate the patient's sufferings and render his condition more precarious.

If all these measures fail, an operation must be performed. The friends should reconcile themselves to this idea at once, and not insist upon delay in the hope that the difficulty may be remedied spontaneously. For this is one of the conditions in which delay is not only dangerous but fatal; in fact, an operation should be performed just so soon as a faithful effort at reduction has proved unsuccessful.

Strangulated hernia may occur either in the inguinal canal or at the upper part of the thigh in the femoral canal. In the latter case the symptoms are essentially the same as those just described, and the remedies needed are identical. A femoral hernia rarely attains a large size, and the chances for reducing it without operation are not so good as in the case of inguinal hernia.

The symptoms of strangulated hernia should be borne in mind, and the possibility of this condition remembered whenever obstinate

vomiting without any apparent cause occurs. For it sometimes happens that the loop of intestine which becomes strangulated is so small that it does not produce any appreciable tumor; it is only by close inspection that even the experienced eye and finger can detect a minute tumor. Cases have occurred in which patients have died of strangulated hernia without any suspicion existing in the minds of the friends or the physician as to the real nature of the difficulty, which was discovered only by a *post-mortem* examination.

Sprains.

A sprain is a wrenching of a joint, whereby some of the ligaments — the bands which unite the bones — are torn or severely stretched. In many cases there occurs also an injury to the bones.

The severity of the injury varies extremely. A severe sprain, while containing no element of danger to the life of the patient, is nevertheless a serious injury, which may result in the permanent impairment of the functions of the joint.

Treatment.—The first item in the treatment of a sprain is *perfect rest* of the limb. In many cases it is advisable to apply a splint in order to prevent any unconscious movement of the part. The splints are essentially the same as those which have been described in treating of fractures.

A most valuable feature for reducing the swelling and pain consists in wrapping the joints with cloths saturated with water as hot as can be comfortably endured. These fomentations should be continued for three or four hours. So soon as the pain and swelling have somewhat subsided an elastic bandage or cap should be placed around the joint.

Care should be taken in avoiding any violent movements of the affected joint for some weeks after the injury. Some stiffness may occur, which can be overcome by having the joint moved regularly every day by an assistant. The restoration of the motions can also be furthered by the use of some stimulating liniment, such as the ammonia liniment.

In some cases serious disease of the bone follows a sprain. This is the result of the original accident and cannot be averted by treatment.

Bruises.

A Bruise consists in the rupture of blood vessels by application of violence, and the escape of blood into the surrounding tissues.

If no further injury be inflicted than the simple damage to the flesh, perfect recovery may be expected with no other detriment than the annoyance and pain occasioned by the violence.

Treatment.—The object of treatment is to prevent, so far as possible, the escape of blood into the tissues, and to promote the absorption of the blood which has already escaped.

To check the flow of blood some cold application should be made to the part. Ice or ice-water is the most convenient, and can readily be obtained. It is not wise to apply leeches or to use other measures for removing the blood which has accumulated in the tissues; for this blood is already clotted, and can best be removed by the natural process of absorption.

The only danger to be apprehended occurs in case of extensive lacerations of the tissues, by which a large blood vessel has been injured. In such cases there is some danger of mortification of the skin, and even of the flesh underneath.

In such instances it is absolutely necessary to keep the part constantly moist and warm. This can be done by applying hot fomentations over the entire surface, and renewing them as often as the temperature is decreased.

In rare instances the blood accumulated in the tissues putrefies, giving rise to the formation of matter. In this case the skin should be freely opened and the blood removed, after which the wound should be thoroughly and repeatedly cleansed with the following solution:

Listerine, - - - - - -	Two ounces.
Water, - - - - - -	Ten ounces.

Burns and Scalds.

The effects of burns or scalds vary with the degree of the injury. If the damage to the tissues be not severe, nothing but local treatment is required; if, on the other hand, the surface be

extensively burned, the patient exhibits the signs of *shock* or collapse.

The pain consequent upon a burn or scald can be most quickly relieved by immersing the patient in a bath with a temperature of about 70 or 75 degrees F. If this be not obtainable, cloths saturated with warm water may be laid upon the part.

After the burn has been thus treated for an hour, the limb should be enveloped in cotton which has been saturated in carbolic acid solution, two ounces of the acid being thoroughly mixed with two quarts of water. If this be not at hand, the burned surface should be thickly sprinkled with flour.

If the burn be superficial it will be necessary only to cover the part with a piece of thin cloth smeared with vaseline, which may be allowed to remain for a day and then removed. If, however, the burn be a deep one, there will be mortification of the surface and pieces of skin and flesh will be separated by the formation of matter. It is very important that the dressing which is applied be not allowed to adhere to the surface, since it will stick to the skin, and its removal will occasion the patient much pain.

In cases of deep burns, the most satisfactory dressing consists in placing the limb, or the entire patient, as the case requires, in a permanent warm bath. The pain is thereby relieved, and the separation of the mortified flesh proceeds most rapidly and satisfactorily. This method is employed almost exclusively in the renowned hospital in Vienna, Austria.

If this cannot be accomplished the limb should be enveloped in soft cloths spread with vaseline; this dressing should be changed every day. So soon as matter begins to form the parts should be thoroughly washed with warm water containing a little carbolic acid or listerine (two ounces of listerine to eight ounces of water) at every dressing.

If there be much pain in the burned surface, it can be relieved by dissolving a tablespoonful of baking soda in a pint of water and applying this by means of soft cloths to the surface. These cloths must be wet every hour, in order to prevent them from drying and sticking to the surface beneath.

When the pieces of mortified flesh become of a dark color there will usually be a fetid discharge. These pieces of flesh must be removed with the scissors; before doing this the limb should be bathed for half an hour in warm water.

If the burn be extensive the patient is collapsed; the skin is pale and cold, the pulse rapid and feeble, the patient sometimes unconscious. Stimulants must be applied at once; hot bottles or flat-irons wrapped in flannel should be applied to the feet and to the sides of the body; ammonia should be held near the nostrils, and a tablespoonful of whisky or brandy may be given in milk. If there be much pain ten drops of laudanum may be added to the whisky.

After the patient rallies from the shock, care should be taken to supply him with liquid diet only for several days. Indeed, no indigestible articles should be allowed for a week or two after the injury, since such cases are frequently complicated with ulceration of the small intestine, a complication which would be aggravated by the use of solid or indigestible food.

Diseases of the Teeth.

Nowhere else in the world are the teeth so poor and so liable to decay as in America; and as a result American dentists have acquired that perfection which comes from extensive practice, and are world-renowned.

It would be out of place to discuss in this work the particular influences which seem to hasten the decay and irregularities in development of the teeth which are so familiar in this country. It may be said in general, that the artificial habits consequent upon civilization are responsible for the deterioration of the teeth. It seems reasonable to suppose, that in the natural condition of mankind the teeth would be as well preserved as they are in wild animals; in fact, observation of some of the lower races shows that this supposition is well founded.

The consumption of artificially prepared food, which is the universal custom among civilized peoples, seems to favor the decay of the teeth by introducing several substances, especially acids, which destroy the enamel of the teeth. Furthermore, the retention of particles of matter between the teeth results in the decomposition of such matter and the formation of acid substances.

Mechanical violence also favors the decay of the teeth. For so long as the enamel is perfect the teeth are safe from decay, while

the removal of a portion of this shell exposes the softer and more destructible parts of the tooth to the action of corrosive substances which may be contained in the mouth.

If the teeth could be kept perfectly clean there would probably be no decay; though it must be admitted there is a great difference in the natural preservative power of the teeth. Some individuals, even though employing all possible means for keeping the teeth clean, are unable to prevent decay.

The care of the teeth should be begun with their appearance in the mouth. It is a mistake to suppose that the first set of teeth require no attention since they will subsequently be removed. The fact is that the foundation for many irregularities and difficulties with the permanent teeth arises in a neglect to properly care for the milk teeth.

The child should be taught habits of cleanliness with regard to the teeth as well as elsewhere; a small soft brush should be used for the first set.

It is further advisable that the child's teeth should be inspected occasionally by a dentist; this is especially necessary if there be any irregularities manifested in the growth of the teeth. For if carefully attended to the teeth can be straightened and arranged so as to be almost perfect no matter how irregular they may seem to be at the beginning.

Irregularities of the teeth have been the subject of much study and attention on the part of educated dentists. A valuable paper called "An inquiry into the causes of irregularities in the development of the teeth" has been recently published by Dr. Kingsley, of New York, from which the following extracts are taken:

"The peculiarities of the permanent teeth it is unnecessary to describe in detail. In the departure from symmetry they assume almost every variety of position, so that it would be almost impossible for the human mind to conceive of an irregular arrangement which would not find its counterpart in nature.

"These variations are recognizable by every one of extended observation, and are *deformities*, because they are a greater or less departure from a normal standard. Such a standard cannot in the very nature of things be one shape to which all must conform or be classed as deformed.

"Symmetry and harmony do not imply uniformity; and the dental art may developed up to the highest type of perfection, and

yet there exist as great a variety of forms as there would be in the faces of the aggregated beauties of the world.

"In 1864 Messrs. Cartright and Coleman, of London, made an examination of some 200 ancient skulls in the crypt of Hythe Church, Kent. These skulls, of which there is no authentic history further than that they have been there for centuries, were apparently of both sexes and all ages.

"The jaws presented in all instances unusually well developed dental arches. The teeth were remarkable for regularity of position, only two deviations being noticed; one upper canine shut within the lower jaw, and one bicuspid was turned upon its axis and there might have been other slight irregularities which were unnoticed, but in no single instance was there anything seen approaching to that which under the term 'contracted arch' so commonly exists in the present day.

"The average width of the dental arch in these skulls, from the outside of the first molar to the corresponding point, was two and a half inches.

"In 1869 Mr. John R. Mummery, of London, contributed to the Odontological Society of Great Britain the most valuable paper on this subject which I have ever read. I accord more importance to his personal examinations than I do to the observations of any man not a practical dentist. The statements of all others, even those of ethnologists, being less precise and more general in their character, must be accepted with some allowance.

"He examined all the available skulls of ancient races and of modern uncivilized races to the number of about three thousand, and tabulated more than one-half of them, which were classified as follows: Ancient British, 203; Roman British, 143; Anglo-Saxon, 76; and Ancient Egyptian, 36. Of modern uncivilized races: North American, 145; Polynesian, 204; East Indian, 223; African, 438; and Australian, 165.

"From a careful analysis of the measurements given in his tables I find that the average width of the dental arch, from first molar across to first molar, in the skulls of ancient races, was a trifle less than two and three-eighths inches; the same measurement of the uncivilized moderns showed an average width of a trifle above two and a half inches.

"The narrowest measurement given by him of any skull of any race is two and one-eighth inches.

"The highest average of any race is nearly two and three-quarter inches, and these belong to the New Zealander, the Fiji Islander and the Ashantees.

"The narrowest average was found among the Hottentots and Bushmen of South Africa.

"In these tables there is abundant evidence that the full measure and type of both dental and maxillary arches has been sustained among all races of simple habits, of all ages.

"Dr. Nichols, a dentist who spent twelve years in the Rocky Mountains on the Pacific coast, during which period he examined the mouths of thousands of Indians and Chinese, informed me that he never saw an instance of irregularity of the teeth in either of these races, with but one exception, and that a displaced canine in the mouth of a Chinese woman. The jaws of both races are universally well formed and amply developed; and this is also true of all semi-barbarous and savage races of good physical organization.

"The standard of normality of the dental arch is a curved line expanding as it approaches the ends, and the teeth all standing on that line.

"Abnormality will include such a shape of the arch as is not in harmony with the surrounding features—all crowding and twisting and all departures from a regular line in the positions of the teeth.

"Almost the only answer received by the dental student as to the cause of these irregularities has been 'premature extraction of the milk teeth,' and consequent contraction of the jaw; and this answer has been almost universally accepted without a question as to its philosophy.

"It is only within a few years that any one has been bold enough to doubt the universally accepted theory which so glibly accounted for every presentation of abnormality.

"No one of extended observation will hesitate in believing that there is a faculty or power at work, modifying materially the physique of the present generation, altogether inexplicable by the too commonly asserted influencing power of climate, hygiene or diet.

"One of the most alarming characteristics of the present age and the present civilization is found in the rapidity of its movements and the activity of its mind, in the larger aggregate of highly

organized and excessively developed nervous systems and in the increasing tendency to nervous and brain diseases.

" As the peculiarities of progenitors in mind, temperament and physique are by nature stamped upon their offspring, we see a generation of children inheriting a tendency to a nervous exaltation which every slight favoring circumstance encourages and stimulates. This is unquestionably more noticeable in the centers of luxury in this country than in any other portion of the civilized globe.

" Fathers who are under a mental strain to the verge of insanity transmit that exaltation to their offspring. Children are no longer children except in their immature physical development; their emotions are under constant stimulus and excitement, and if there is not in all instances an absolute intellectual precocity, we have relatively a mental and nervous development far in advance of the physical. Hence if the mental is only up to the average of its years, we find it associated with anything but a robust physique; and the contrast remains the same. One of the manifestations of this precocious emotional and exquisitely developed nervous system is its influence upon the development of the teeth, while the physical system is following in tardy but vain efforts to keep pace with it.

" My argument from this universally recognized condition is this: During the formative and eruptive periods of the permanent teeth, they are under the influence of an independent and peculiar vital force; this innervation pushes on their development and eruption regardless of the more tardy growth of the bony system; being implanted in a crowded position, in undeveloped jaws, they never have an opportunity to recover from it, and emerge in the same disordered arrangements in which the crowns were formed.

" The grounds for such an opinion are not merely theoretical but are the results of observations in private practice for more than a quarter of a century.

" In a personal investigation of the mouths of congenital idiots found in the asylums of this country, in Great Britain and France, together with the Cretins of Switzerland, are found with hardly an exception broad jaws and well-developed teeth, showing that when the mind was inactive and the brain sluggish the teeth grew normally and in regular order.

" A perfect dental development is the result of well-balanced physical and nervous systems, without hereditary taint.

"There can be no question that the Creator intended there should be perfect harmony in the development of physical and nervous systems, and that where such harmony exists we come nearest to the standard of a perfect organization. This harmony of organization, or true balance of the two systems, demands that in the earlier years of life the brain and the nervous system be held in abeyance to the physical.

"The healthier mental organization is of slower growth. If, therefore, we find that a certain mode of life destroys this harmony — breaks up this balance — there will follow necessarily deterioration and destruction of the race; and this is based on well-recognized physiological law. If the brain and the nervous system are in an undue state of activity, the drain upon the sources of nutrition will be at the expense of the physical system.

"No force operating on the brain can interrupt or alter the type or inherited model of the dental arch, after the first ten years of life.

"I do not hesitate to place it upon record that the next generation will see more of abnormality in dental development, and an increase of nervous and cerebral diseases, and that the two are related and spring from the same cause.

"It is too late to stop it in those who have passed infancy, but it is not too late to modify and partially remedy the evil in those now being born, and those who may be begotten hereafter.

"To fathers and mothers surrounded by luxury and flattered with the precocity of their infants, which they are stimulating to the last degree, I say you are the enemies of your race; you are sowing the seed of nervous, mental and physical disorders from which the harvest will be fearful, and the end death to your family and to your name. Do not, under peril, encourage this brilliancy of your child, which is now so charming rather let the mind stagnate.

"For the first seven years of life give concern *only* o his morals and to his physique; nourish him as you would nourish an animal from which you desired the finest development, stimulating only his moral nature, and his intellect will take care of itself. Thus, if he have no hereditary taint, you will have laid the foundation of a splendid specimen of his race."

Toothache.

The most frequent causes of toothache are:

First—Decay of the tooth extending to the nerve contained in the pulp of the tooth.

Second—Inflammation of the membrane surrounding the root of the tooth. This usually causes a swelling of the gum, and the formation of an abscess or a "gum boil."

Third—The general condition of the body, which predisposes to neuralgia.

Treatment.—The treatment depends upon the source of the pain. There is no one remedy which can be relied upon to cure toothache in general.

If the tooth be decayed, a dentist should be consulted and his opinion sought as to the advisability of removing the tooth.

In many cases it is possible for him to devitalize the pulp of the tooth, fill the cavity, and retain a useful member.

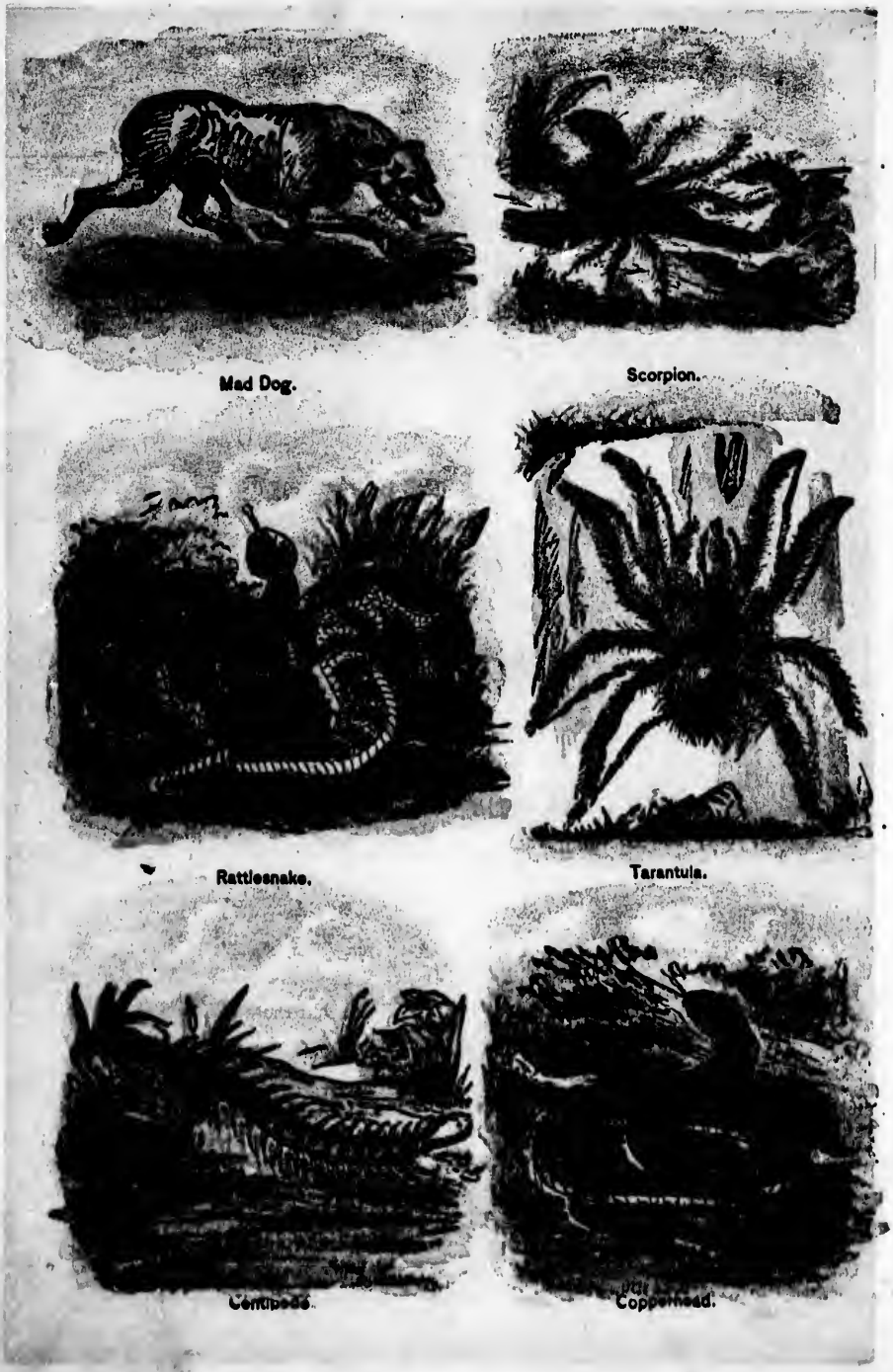
Until the services of a dentist can be procured the pain can be alleviated by the application of oil of cloves, creosote, chloroform, laudanum, or Jamaica ginger. The cavity of the tooth should be cleaned with a little cotton; a few drops of one of the substances named is then placed upon a small wad of cotton, which is then gently inserted into the cavity of the tooth.

If the toothache be caused by inflammation at the root of the tooth, it can sometimes be quieted by painting the gum with a mixture of tincture of aconite and tincture of iodine in equal parts. Sooner or later, however, matter will form at the root of the tooth; the abscess should be opened at once. Such teeth are usually of no service, and may be extracted.

Toothache which originates not in any local difficulty around the tooth, but in a constitutional condition, must be treated by internal remedies. In many cases advantage will be derived from the internal use of quinine, two grains of which may be taken three times a day.

Toothache is sometimes of malarial origin; it may come on every second day, just like the chills and fever of ague. In such cases it must be treated by quinine.

2.8
2.5
3.2
2.2
3.6
2.0
1.8
1.1
1.0



Mad Dog.

Scorpion.

Rattlesnake.

Tarantula.

Centipede.

Copperhead.

POISONS AND THEIR ANTIDOTES.

There are certain substances which all recognize as poisons—substances which are always poisonous to all persons. There are, however, many other materials which are poisonous only under certain conditions or in certain quantities; such substances furnish a large percentage of the cases which come under the care of the physician.

Poisons exert their injurious effect upon the body in various ways. Some, such as prussic acid, arrest the action of the heart at once, while others cause a gradual change in the functions of other organs. Poisons are often introduced into the system by being taken into the mouth and swallowed; yet they can be introduced by any of the avenues of approach—by being breathed into the lungs, by being rubbed upon the skin, or by simple contact with a scratch or abrasion.

Poisons taken into the stomach when this organ is empty are absorbed into the blood in an incredibly short time. It has been repeatedly demonstrated that poisonous liquids appear in the blood within a few seconds after they have been taken into the stomach. If the stomach be full of food, absorption is less rapid and the probabilities for the removal of the poison are much greater.

When taken into the body by being inhaled, poisons usually manifest their effect at once, since no appreciable time is required for their passage through the membrane of the lungs.

Numerous cases of poisoning from the use of injurious substances in food and in articles of clothing are brought to the notice of the physician. The most common of these will be mentioned in the following pages.

Poisons which Occur in Food.

Probably the most common form of poisoning by food is *lead*-poisoning. The symptoms of this affection have been already described on a previous page.

The most frequent source of lead which is taken into the stomach is drinking water. Some springs and wells contain lead in such quantity as to render them unfit for use; but the lead is not usually obtained from the ground, but from the service pipes. Dr. Chandler, of New York, found one-tenth of a grain of lead in a gallon of Croton water, after it had stood for six hours in a lead pipe.

Many drinking vessels also contain lead; even those which are made of Britannia metal or other material that is itself free from lead, contain a good deal of this metal in the solder with which the parts are cemented together. It was found in one experiment that water which had stood twenty-four hours in such a vessel contained lead in the proportion of over eleven grains to the gallon. The occasional use of such water probably causes no injury, but the long-continued employment of it may result in the symptoms of lead-poisoning, even if there be no more than one-tenth of a grain of the metal in a gallon of water.

Cans and other vessels used to preserve fruits, lobsters, etc., are frequently soldered in such a way that the lead contained in the solder becomes mixed with the contents of the can; if these contents contain free acids there may result also chemical combination with the solder, so that the lead is dissolved in the liquid contained in the vessel.

Some years ago, an extensive series of cases of lead-poisoning in New Orleans was traced to the drinking of soda water from a particular and popular fountain. It was discovered that the reservoirs were so constructed as to permit the solution of lead combinations in the soda water. A Scotch chemist recently found half a grain of lead in a gallon of soda water.

Vinegar often contains lead as an impurity, resulting from the manufacture.

All vessels, pipes, spigots, and the like, which contain lead, and are exposed to the action of acid liquids, are liable to furnish a poisonous element in the liquids which pass through them.

Many cooking vessels are lined with materials containing lead; this is said to be true of some of the so-called porcelain-lined vessels.

Instances are known in which lead-poisoning has followed the use of flour from a certain mill. Investigation showed that the mill-stones, having been worn so as to become uneven, had been

repaired by filling up the cavities with melted lead; particles of this had been worn away and mixed with the flour.

Copper Poisoning from Food.

There are various compounds of copper, which are occasionally found in different articles of food, and which cause injurious effects when taken into the body. The most commonly met with of these is the sulphate of copper or "blue vitriol."

Compounds of copper are frequently used in coloring pickles, and for preserving the color of vegetables, such as green peas, which have been canned and preserved. Prof. Redwood found that cans containing from eight to ten ounces of peas, furnished one or two grains of blue vitriol.

Copper is sometimes mixed with the food from cooking utensils made of copper or brass. The copper is separated from these vessels by acid liquors, by oils and fats, and by salt water. Several cases are on record in which serious, and even fatal, poisoning has occurred from the use of food cooked in copper and brass vessels.

Poisons in Sugars.

There has been a great deal of popular discussion upon the possibility of poisoning from sugar. The fact is, that while sugar is largely adulterated, yet but little matter of a poisonous sort finds its way into the ordinary varieties of sugar.

It has been asserted that sulphuric acid may be present in sufficient quantity to cause injury. The fact is, that although sulphuric acid is used in the manufacture of the cheaper sugars, yet it is so effectually removed that it causes no perceptible effects.

Numerous analyses have been made by chemists in different parts of the world, as a result of which it seems to be well established that there need be no fear of using sugar because of the presence of sulphuric acid. Prof. Chandler, of New York, examined for the Board of Health of that city, a large number of specimens of sugar obtained from the stores, without finding any injurious articles.

Some time ago it was asserted that a serious illness was caused by a specimen of syrup obtained in a town in Michigan. Prof. Kedzie, President of the State Board of Health of Michigan, made an analysis of seventeen specimens of syrup, one of which was the article in question. He found that sulphuric acid was present in three of the samples, though not in quantity sufficient to cause injury.

It has been asserted that white sugars sometimes contained compound of lead, since sugar of lead is known to be used in decolorizing sugars. A number of examinations of sugar have failed to reveal the presence of lead in quantity sufficient to arouse suspicion of an injurious influence.

Many syrups contain compounds of iron, which are introduced from the vessels in which the sugar is melted or the cane is crushed. No injurious effects are, however, to be apprehended from this source.

Poisoning from Colored Fabrics.

A large number of cloths and papers used in the arts are colored with compounds of arsenic; and many articles for personal wear are colored with aniline dyes which, in most cases, contain arsenic as an impurity.

Wall papers, window shades and carpets are frequently colored green with what is popularly known as Paris green, a compound of arsenic and copper. In course of time the wear on the carpets, wall papers, etc., liberates a number of particles of arsenic which float in the air and are inhaled by the occupants of the room. Chemical examination of the dust in rooms containing these articles has repeatedly shown the presence of a perceptible quantity of arsenic. That this quantity may sometimes become a dangerous element can be comprehended when it is known that a square foot of wall paper has been found by analysis to contain thirty-five grains of arsenious acid (white arsenic). Dr. Kedzie, of Michigan, examined the paper in five cases in which poisoning had occurred; he found from one to five grains of arsenic in every square foot of the paper.

Aside from these articles—wall paper, etc.—there are numerous articles in every-day use which are colored with arsenic and are

often the cause of injurious effects. Children's toys, for instance, are very frequently the source of injury from the arsenic which they contain; wafers, table mats, confectionery papers, artificial flowers, etc., have all been known to cause poisonous effects.

The aniline colors themselves are quite incapable of causing injury; but since arsenic is used in the preparation of the dyes, these latter often contain a sufficient quantity of the poison to exert an injurious effect when long applied to the skin. The most common ways in which the aniline colors cause poisoning is by the use of stockings and under garments.

The first effect is simply an irritation of the skin manifested by the formation of pimples; if the cause be not recognized and avoided, a serious skin disease and even constitutional effects may follow.

Poisoning from Cosmetics.

The most common sources of poisoning of this kind are powders for the face and dyes for the hair.

The most frequent poison in these articles is lead. Hair-dyes sometimes contain other poisonous substances as well.

While articles can be obtained from the market free from these injurious substances, yet there is some difficulty in assuring one's self of their purity, since all claim to be free from injurious effects. Those who insist upon being certain of the harmlessness of their toilet articles can use the following mixtures, which can be put up at any drug store.

A white powder for the face can be made as follows:

Wheat starch,	220 parts.
Oxide of zinc,	30 parts.
Oil of rose,	Four drops.

A red powder can be made as follows:

Carmine,	One part.
Carbonate of magnesium,	Four parts.

It has been stated in discussing hair-dyes that an imitation of the Persian method can be employed without danger of injury. Instead of this the following hair-dye, proposed by Hagar, will be found useful and harmless:

Ten parts of the subnitrate of bismuth are heated in a glass vessel with 150 parts of glycerine; caustic potash solution is then gradually added while the mixture is stirred; after a time the liquid becomes perfectly clear. A solution of citric acid is then added so as to make the liquid about neutral in reaction—that is, so that it will not change the color of either red or blue litmus paper. Add orange flower water until the liquid measures 300 parts.

Poisoning from Insect Powders.

The powders used to destroy insects and vermin of other kinds usually contain either phosphorus, arsenic, strychnine or corrosive sublimate. The effects and the proper treatment for these various poisons will be hereafter described.

Poisoning from Meats, Fish and Cheese.

In most cases meats, such as sausage and ham, derive whatever poisonous properties they may possess from certain decompositions which take place in the flesh. These changes result from defects in the mode of preparation of the meat, such as imperfect smoking and curing. In such cases the inner portion of the mass of flesh is not acted upon by the preservative agent; it becomes softened and putrid.

In other cases the flesh contains some of the living parasites which infest cattle and hogs, and the sickness caused in the consumer is due to the activity of these parasites in his body. The most frequent of these are the trichina spiralis, and the minute plant which causes the disease known as "malignant pustule."

Cow's milk sometimes conveys a poisonous principle; a case was recently reported in Philadelphia in which a family sickened from the use of the milk of a cow which died on the following morning. It was found that the animal was suffering from malignant pustle, and that the human victims had been infected with this disease.

Cases occur now and then in which several members of a family suffer from symptoms of poisoning which can be traced

pretty conclusively to the use of cheese. The most careful chemical and microscopical examinations of such specimens have repeatedly failed to reveal the injurious substance. It seems probable that the injurious properties of the cheese are due to some unusual form of fermentation.

Treatment is usually not called for until after the patient has been sick for some hours. The difficulty begins with a feeling of nausea and general indisposition, soon followed by vomiting and diarrhea. The general effects and ultimate result vary in different cases, since they are due to different substances contained in the meat or cheese.

So soon as a suspicion of the actual nature of the complaint is entertained, an emetic should be given; for this purpose a teaspoonful of mustard should be stirred in a glass of warm water and given at once. This may be followed after half an hour by a brisk purgative. In many cases nothing further will be required; if the patient manifest signs of weakness and prostration, it will be necessary to support his strength by alcoholic stimulants. A tablespoonful of whisky may be given in a little milk every hour or two.

Poisoning by Medicines and Chemicals.

By Acids. — The mineral acids — nitric, sulphuric and muriatic — are sometimes used for suicidal purposes, and are sometimes taken by mistake.

Symptoms. — If one of the strong acids be taken into the mouth, the patient becomes instantly aware of the mistake by the intense pain. If the liquid be swallowed, the pain is felt along the throat and gullet into the stomach.

Upon examining such a patient, we find the lining membrane of the mouth dry and hard, and sometimes presenting a yellowish or blackish appearance as if charred. The patient vomits violently, the matter ejected being sometimes red from admixture with blood, and sometimes of a black and tarry appearance; this latter substance is really blood, which has been acted upon by the acid.

If much of the liquid have been swallowed, the patient becomes prostrate; the hands and feet are cold and clammy, the

pulse small and feeble and very rapid. In the course of a few hours there sometimes occur bloody or tarry evacuations from the bowels.

Treatment.—The first object of treatment is to neutralize the acid; that is, to cause it to combine chemically with other substances, so as to deprive it of its corrosive power. For this purpose, we may give any alkaline substance, such as soda or potash. It is, of course, improper to give the strong alkalies, since these are themselves corrosive.

A teaspoonful of washing soda stirred up in water, or if this cannot be promptly procured, as much soap in water should be given at once; or a little plaster may be knocked off the wall, broken into small pieces and administered in water.

After a sufficient quantity of this has been given to neutralize the acid — the exact amount must, of course, depend upon the quantity of acid which has been taken — the patient should take three or four eggs beaten up together, or, if these be not at hand, a glass or two of milk. After a short time he may have some bland tea or barley water.

It is not advisable to give emetics or to use the stomach pump; the acid will be neutralized at once by the alkaline substances, and will exert no further corrosive action. It is necessary to keep the stomach as quiet as possible, since it is already damaged by the acid, and if it be made to contract violently by the act of vomiting further injury may occur.

The patient's mouth and throat are extremely sore; the surface usually mortifies in patches, and pieces of the flesh come away, leaving raw surfaces. Nothing can be done to prevent this; we can simply take care that the parts are kept as quiet as possible, and are not irritated by food. If the injury be not extensive, the patient may take liquid food — milk, broths, and the like, — in small quantities at short intervals. If, on the other hand, a large quantity of acid has been taken, or much time has elapsed before the administration of the antidote, the nourishment should be administered by injections into the rectum.

Poison by Alkalies.—The alkalies which are most frequently taken into the mouth are potash, soda and hartshorn.

Symptoms.—The symptoms are very similar to those caused by the mineral acids. They are manifested more especially in the

throat, however, causing the patient to choke and gag. Hartshorn has not only a local influence upon the lining membrane of the mouth and throat, but also affects the system generally, frequently giving rise to convulsions.

Treatment.—The alkalies are neutralized by acid substances, and are converted into soap by oils. Hence, the treatment consists in the administration of acids and fat.

The patient should take a glassful of weak vinegar, or vinegar and water in equal parts. This should be followed in ten minutes by a tablespoonful of sweet oil.

If neither of these remedies is at hand, an abundance of warm water should be administered, followed in a short time by a glass of milk.

Poisoning by Oxalic Acid.—Oxalic acid is a solid substance, and is usually taken by mistake for some of the other white crystalline substances (such as Epsom salts).

This acid does not cause any serious injury to the lining membrane of the mouth or throat. Its injurious effects result from its absorption into the system, since when in the blood it acts as a deadly poison.

Treatment.—Any alkaline substance, chalk, magnesia, washing soda or lime, should be given at once in quantities dependent upon the amount of oxalic acid which has been swallowed. Immediately after this the patient should take two or three eggs or a glass of milk.

After five minutes, vomiting should be provoked, either by giving a teaspoonful of mustard in a glass of warm water or by tickling the throat with the finger or with a feather.

Poisoning by Carbolic Acid.—Carbolic acid is sometimes taken by mistake, and occasionally used for purposes of suicide.

Symptoms.—The symptoms are in many respects those caused by mineral acids. The surface of the mouth and throat is turned white by the acid. The patient soon becomes prostrated, a condition which is due to the constitutional effects rather than to the local injury.

The urine contains blood, and in a few hours acquires a dense black color so that it resembles ink.

Treatment.—The whites of eggs should be beaten up and administered in abundance. After this, vomiting should be caused by administering mustard and warm water. After the stomach is emptied of its contents, sweet oil, with or without magnesia, must be administered.

Poisoning by Prussic Acid and its Compounds.—Prussic acid is often taken with suicidal intent. The cyanide of potassium is one of its compounds, which is almost as deadly as the acid itself. Bitter almonds also contain a considerable quantity of prussic acid. The oil of bitter almonds, as well as cherry-laurel water, are sometimes taken by mistake.

If the prussic acid be strong, or if much of the cyanide of potassium be taken, no measures offer much promise of recovery; for these drugs cause a rapid arrest of the heart's beating, as well as a cessation of the breathing.

Treatment.—Vomiting should be promoted as soon as possible by tickling the throat or by a teaspoonful of mustard in warm water. Meanwhile ammonia should be held near the nostrils, and cold water should be dashed upon the face and chest.

So soon as the patient seems capable of breathing, he should be stimulated by strong coffee containing a little whisky or brandy. In many cases there is a numbness and a loss of feeling in the limbs; the skin should be vigorously rubbed with a flesh brush or a coarse towel, and the patient frequently spoken to in order to prevent him from lapsing into unconsciousness.

While these measures are being executed the following solution may be prepared: Ten or fifteen grains of green vitriol should be dissolved in two ounces of water; to this half a teaspoonful of subsulphate of iron solution is added, and enough caustic soda to make the liquid somewhat alkaline in reaction. Half of this may be given at once.

Poisoning by Arsenic.—This is indicated by an acrid taste in the mouth and a sense of tightness in the throat; in a short time a burning pain is felt in the pit of the stomach, soon extending into the abdomen; nausea and vomiting occur; there is extreme thirst.

If the quantity taken be large, convulsions may occur, and the patient soon becomes prostrated.

Treatment.— Vomiting should be excited at once; give a teaspoonful of mustard in warm water or tickle the throat with the finger.

Then administer *dialysed iron* in teaspoonful doses, and follow this with milk, whites of eggs and barley water.

Poisoning by Copper and its Compounds.— The most common sources of this poison are blue vitriol and verdigris. The symptoms are very similar to those of poisoning by arsenic.

Treatment.— Whites of eggs are to be administered freely, after which vomiting should be excited with warm water and mustard or by irritating the throat with the finger.

After the contents of the stomach have been evacuated eggs and milk should be given.

Poisoning by Quicksilver Compounds.— The most frequently met with of these is corrosive sublimate; the red precipitate and white precipitate and vermilion are other compounds which are sometimes taken into the stomach.

Treatment.— Whites of eggs and milk are to be freely given, afterwards vomiting should be excited. After the stomach has been emptied, milk or linseed tea should be given.

Poisoning by Zinc Compounds.— The only one of these which is apt to be used as a poison is white vitriol.

The treatment is the same as that for poisoning by compounds of copper or mercury.

Poisoning by Compounds of Lead.— These are sugar of lead, white lead, goulard water and red lead.

Treatment.— Epsom salts should be given freely, one or two ounces being dissolved in water.

After this vomiting should be excited by a teaspoonful of mustard stirred in a glass of warm water, and by tickling the throat.

Poisoning by Lunar Caustic.— A teaspoonful of common salt dissolved in a cupful of water should be swallowed at once, and followed by the whites of a dozen eggs.

If vomiting do not occur at once it should be excited by tickling the throat, or by the usual emetics.

Poisoning by Opium.— A large percentage of the cases of poisoning which the physician is called upon to treat result from the use of opium, laudanum or morphine. It is important that this condition be recognized, since certain principles of treatment must be carried out in order to overcome the effects of the drug upon the system.

Symptoms.—The symptoms caused by the use of opium vary extremely according to the quantity of the drug which has been taken. If a comparatively small quantity has been swallowed the patient becomes gradually drowsy, the pupils of the eyes are contracted, the breathing becomes slower, the pulse is less rapid and full.

If a large quantity be taken these symptoms ensue in a very short time, and are rapidly followed by complete unconsciousness; stupor has been known to ensue within three minutes after a hypodermic injection of morphine.

The patient does not die, however, during this stage. So long as he can be roused by shouting or shaking there is still a possibility of complete recovery.

If the individual be so comatose that he cannot be roused in any way, a condition of extreme prostration ensues. The pupils of the eyes are contracted to the size of pins' points; the breathing becomes so slow that every respiration seems to be the last. The acts of breathing may be diminished from sixteen or eighteen in a minute, which is the usual number, to eight, six, or even four per minute. The pulse is very slow and very full; the face is pale and livid; the skin is cool and clammy.

Even when these symptoms have ensued it is possible for the patient to recover, though death is usually the result.

In some persons who are especially susceptible to the action of opium, many of these symptoms may be brought on by a dose of the drug which is perfectly safe for most persons.

Treatment.—The objects of treatment are: First, to empty the stomach; second, to keep up the breathing; third, to stimulate the heart.

To empty the stomach an emetic should be given at once. A teaspoonful of mustard in a glass of warm water should be administered, and the throat should be irritated by the finger. These means are, however, often insufficient. In the first place it may be im-

possible to induce the patient to swallow, and the lining membrane of the throat and stomach are so benumbed by the drug that they may not respond to these irritants.

If vomiting do not promptly occur after two or three draughts of mustard and water have been given, a stomach pump should be brought into requisition. This can be extemporized by any one who has a piece of rubber tubing four feet in length and half an inch in diameter. One end of this should be passed into the stomach. To do this it is only necessary to push the tube into the back part of the mouth, well up against the back part of the throat, and then to direct it downward. It is important to keep the tube pressed well against the back part of the throat in order to avoid passing it into the wind-pipe, which lies a little further in front. After the tube has been passed into the throat for eighteen or twenty inches, the outer end should be elevated; water is then poured into it from a pitcher, one or two quarts being employed for the purpose. The end of the tube is then lowered so as to make a siphon; the liquid returns from the stomach through the tube into a basin held for the purpose. This process should be repeated once or twice.

To keep up respiration, the patient's skin should be briskly whipped with a wet towel; at intervals of five or ten minutes, his head and chest may be dashed with cold water; the effect will be greater if ice-cold water and warm water (110 degrees Fahr.) be employed in quick succession. In the intervals between the douches, the patient may be made to walk the floor, supported on either side by an assistant. This measure is, of course, impossible if the patient be so profoundly unconscious as to be unable to use his limbs. Yet much more can be done in this direction than would be supposed by one who has had no experience.

As a last resort, artificial respiration may be performed, a process which is described under the head of drowning. It has sometimes been possible to save a life by keeping up artificial respiration for half or three-quarters of an hour after the patient has ceased to breathe.

Strong coffee should be prepared, and may be administered at short intervals by the mouth if the patient can swallow, otherwise by the rectum.

If an electric battery can be procured and managed by some

one acquainted with it, one pole should be applied to the nape of the neck and the other to the pit of the stomach.

The effects of opium can be counteracted in great measure by *atropine*. This is a powerful drug and should be used by a physician if the services of a medical man can be procured. One-fortieth of a grain of atropine may be injected under the skin if the symptoms of opium poisoning be profound; this dose may be repeated in fifteen or twenty minutes if the breathing be very slow and show no signs of improvement.

Ammonia should be held near the nostrils; if the pulse become weak, a tablespoonful of whisky may be administered by the rectum every half hour until four or five doses have been given.

Poisoning by Belladonna, Henbane, Stramonium and Digitalis. — These drugs cause different symptoms, but the differences between them will be recognized only by a medical man. In general there occurs a state of excitement and agitation often culminating in delirium; there is frequently vomiting, diarrhea and extreme pain in the bowels.

Treatment. — If vomiting have not occurred, it should be provoked at once by tickling the throat and giving a teaspoonful of mustard in a glass of warm water. The patient should then take a teaspoonful of powdered charcoal. After this, milk and strong tea may be given.

If the pulse be very weak and feeble and the patient appear much prostrated, ammonia (hartshorn) should be held near the nostrils and a teaspoonful of whisky should be given every twenty or thirty minutes until six or eight doses have been taken.

Poisoning by Strychnine, Nux Vomica, White Hellebore, Oleander and Spigelia. — Finely powdered charcoal, which can be made by pounding in a handkerchief the coal from a wood fire, should be given at once in large quantities.

Vomiting is to be excited by tickling the throat and by the administration of mustard in warm water. After this strong coffee should be given.

SMOTHERING.

Under this term may be included several conditions, caused in various ways, but presenting essentially the one feature — a lack of breath. This result follows drowning, strangling, choking, hanging, etc.

The essential feature in all these conditions is the cessation of breathing. In hanging, it is true, when properly done, the vertebræ in the neck are dislocated. This injury is beyond all relief.

So long, however, as no other feature is present in the case than the stopping of respiration, there is always a chance for recovery within a certain time after the breathing has ceased.

If the respiration has been arrested by constriction of the throat, such as occurs in hanging and strangling, the first thing to be done is, of course, to cut the object which causes the constriction. Even though consciousness be completely lost, an effort should be made to revive the patient.

Treatment.—In case of choking from the presence of food or other matters in the throat, the body should be inverted so that the head is lower than the shoulders. The body may then be violently shaken; if relief be not at once obtained, the finger should be introduced into the throat and an effort be made to extract the foreign body. In case of drowning, the body should be so placed that the head is lower than the chest; this can be arranged by placing the body over the knee of another person, or any object of sufficient height. In this way some of the water will probably escape from the lungs and air passages.

Artificial respiration is then to be performed in one of the following ways:

The patient is placed upon his back, the head hanging over some projection, such as the end of a bench, upon which he may lie. The operator stands above the patient's head, grasps the arms below the elbows and draws them upward above the head, inclining them away from the body at the same time. After holding them in this position for a second, the arms are returned again to the sides of the body so that the elbows rest against the chest and the

forearms on the abdomen. The operator should press the patient's arms firmly against the chest and abdomen so as to force all the air out of the lungs.

By raising the arms in this position the chest is expanded and the air enters the lungs; by pressing the arms upon the body, the air is forced out of the chest again. In this way the respiration is artificially induced.

This series of movements should be executed at first about ten times in the minute; in ten or fifteen minutes the rapidity of the movement may be increased to fifteen or eighteen respirations per minute.

If an assistant be present, he should see that the tongue does not fall back into the throat; the end may be grasped by means of a soft cloth or towel, and should be pulled forward out of the mouth.

This process should be continued ten or fifteen minutes, whether the patient show signs of life or not. At the end of this time, the ear may be applied to the patient's chest to observe whether or not the heart beats. Any movement of the heart, however slight, is an indication that life can be saved by further respiration; even though no movement be felt, the respirations should be continued for at least half an hour.

Howard's Method of Reviving the Drowned.

The following method of Dr. Howard is used in the New York harbor:

RULE 1.—Upon the nearest dry spot expose the patient to a free current of air; rip the clothing away from the waist and give a stinging slap upon the pit of the stomach. If this fails to arouse the patient, proceed to force and drain away the water which has entered the stomach, according to rule 2.

RULE 2.—Turn the patient upon his face, the pit of the stomach being raised, upon a folded garment, above the level of the mouth. For a moment or two make steady pressure upon the back of the stomach and chest, and repeat it once or twice until fluid ceases to flow from the mouth.

RULE 3.—Quickly turn the patient upon his back, with a

bundle of clothing between it so as to raise the lower part of the breast-bone higher than the rest of the body. Kneel beside or astride of the patient, and so place your hands upon either side of the pit of the stomach, upon the front part of the lower ribs, that the fingers fall naturally in the spaces between them and point toward the ground. Now grasping the waist, and using your knees as a pivot, throw your whole weight forward as if you wished to force the contents of the chest and stomach out of the mouth. Steadily increase the pressure while you count 1, 2, 3, then *suddenly* let go, with a final push which springs you into an erect kneeling position. Remain erect upon your knees while you count 1, 2, then throw your weight forward, and proceed again as before. Repeat the process at first about five times a minute, increasing the rate gradually to about fifteen times a minute, and continue it with the regularity of the natural breathing which you are imitating. If another person be present, let him with the left hand hold the tip of the tongue out of the left side of the mouth with the corner of a pocket handkerchief, while with the right hand he grasps both wrists and pins them to the ground above the patient's head.

After-treatment.—When breathing first returns, dash violently a little cold water in the face. As soon as breathing has been perfectly restored, strip and dry the patient rapidly and completely, and wrap him in blankets only. Give hot brandy and water—a teaspoonful every five minutes the first half hour, and a tablespoonful every fifteen minutes for an hour after that. If the limbs are cold, apply friction. Allow abundance of fresh air, and let the patient have perfect rest.

PRACTICAL SUGGESTIONS.

Avoid delay. Promptness is of the first importance. A moment lost may be a life lost. Waste no time in gaining shelter. When gained, it oftener harms than helps the patient.

Prevent crowding around the patient. However difficult this may be, it *must* be enforced. Friends must not be allowed to obstruct the circulation of air, nor to engage the patient in conversation when rallying.

Avoid attempts to give stimulants before the patient is well able to swallow. It helps to obstruct respiration, and may choke the patient.

Avoid hurried, irregular motions. The excitement of the moment is almost sure to cause this in inexperienced hands. Just as a flickering candle moved carelessly, goes out, so the heart when its beatings are imperceptible, needs but little cross motion, or interruption, to stop it. The movements of rule 3 should therefore be performed with deliberation and regularity.

Avoid an over-heated room. The animal heat which is needed cannot be supplied from without, but must be generated in the system. This is best promoted by a free supply of cool air, and internal stimulants. The vital heat resulting is best retained about the patient's body by blankets alone.

Avoid giving up the patient too soon to death. At any time within one or two hours you may be on the very threshold of success, though no sign of it be visible. Several times success has been known to follow half an hour's apparently useless effort. Rest and watchful nursing should be continued for a few days after resuscitation, or various chest troubles may ensue.

DISEASES OF WOMEN AND CHILDREN.

Self-preservation is the first law of nature — in point of time only; for a second law, not less imperious, is race-preservation. Life, it has been said, is a struggle to gratify two instincts — hunger and love. In the preceding pages we have considered the diseases affecting man as an individual; affecting those organs which are concerned in the maintenance of the individual. We shall now proceed to the discussion of the diseases which affect man as a sexual being, as an instrument in the preservation of his race — in other words, to the diseases of the sexual or reproductive organs.

Among the lowest beings, animals and plants, the maintenance of the individual and of the race is provided for by one and the same organism. The minute plant, the fungus familiar to us under the name of yeast, is a microscopic ball, which, placed under favorable conditions, not only maintains its own proper life, but also produces similar independent beings. On the surface of the original ball, minute buds appear, grow, and finally are detached, with the size, shape and powers of the parent organism. As we ascend the scale of life, however, we find special organs set aside in each animal and plant, intended solely for the production of new and similar beings. In the highest animals, this office of reproduction — the most important of all the animal duties — becomes so complicated that the labor is divided between two classes of beings — male and female — which, while similar in all the essentials of individual life, present marked differences in their sexual powers and organs.

In all the higher animals, man included, the development of the sexual organs, and therefore of the sexual instincts, occurs only after the previous development of those organs and instincts essential to the preservation of the individual. The interval which elapses between the birth of the animal and the advent of its sexual life varies according to the term of the animal's natural life. The rabbit

becomes sexually mature within a year after its birth; the elephant only after a score of years; the human animal after ten to fifteen years. The child is a sexless being, possessing only the rudiments of sexual organs, the germs of sexual instincts. There are, therefore, no essential differences—mental or moral—between the boy and the girl. After a certain period—in our climate usually between twelve and eighteen years—the sexless becomes a sexual being, assuming those traits, physical, mental and moral, which change *it* into *him* or *her*. The distinction between brother and sister, heretofore maintained with difficulty by peculiarities of dress and artificial customs, becomes natural and unmistakable. The angular awkwardness and innocent freedom of the girl are replaced by the rounded grace and conscious modesty of the woman; the boy is no longer a companion to be romped with, but an admirer to be enslaved. Both man and woman differ physically from the child,—he more than she—and differ still more markedly from each other. His skin is rough and hairy; hers smooth and hairless. His outline is angular, his shoulders broad, his hips narrow, his muscles strong, his bones large, his skull thick, his voice deep and harsh; her contour is rounded, her shoulders narrow, her hips broad, her skin thickly padded with fat, her voice smooth and child-like. Man's physical development fits him especially to maintain the struggle for existence; woman's whole physique is designed for the preservation of her race. Man is essentially strong and selfish; woman, weak and generous. In man is embodied the individual; in woman, the race.

"Love is of man's life a thing apart,
'Tis woman's whole existence,"

a fact admirably illustrated by two familiar peculiarities of women: In breathing, the child and the man employ largely the muscles of the abdomen; woman, on the contrary, breathes almost entirely with the chest, because the mutual performance of her sexual duties compels the use of her abdomen muscles for other purposes than those of breathing. Although man's shoulders are broader, yet his collar-bone is shorter than woman's. The latter, therefore, though lacking somewhat the strength and freedom of movement in the shoulder-joint, can support a burden, as of a child, on her breast with less fatigue than he. The transition of the girl into the woman implies mental and moral as well as physical growth—a fact not always appreciated by parents. The physical

changes — certainly the most tangible — consist in the development of the sexual organs, lying on either side of the womb; connected with it by tubes about four inches long, are two bodies resembling almonds in size and shape. These bodies are called the ovaries (or egg-producers); each contains even at the birth of the infant thousands of very minute bodies, the eggs. During the earlier years of the child's life these bodies and their contents remain undisturbed; but at an age which varies with climate, race and surrounding, betwee 8 and 16 years, the ovaries enlarge; several of these microscopic eggs swell, until finally one of them bursts its covering as well as the wall of the ovary. Meanwhile the other organs concerned in reproduction are likewise awakening to new life; the womb, in sympathy with the ovaries, is swollen with blood during the ripening of the egg in the ovary. The climax of the process is two-fold: First, in the ovary the escape of the ripened egg by rupture of its coverings; second, in the womb the escape of blood by rupture of the blood vessels. The egg is carried from the ovary along the connecting tube to the womb, and is usually carried with the blood escaping into this organ out of the body; the girl menstruates. This, the local process, is accompanied usually by evidences of general disturbance — lassitude, peevishness, pains in the back and loins. Sometimes even convulsions or fainting fits are experienced.

This condition — lasting usually one or more days — recurs at intervals often of great irregularity. One month, two, three, six months may elapse before a repetition of the process. The breasts also, accessory organs of reproduction, exhibit an increase in size, and frequently become the seat of painful or other unusual sensations. During the period of two years, more or less, this transition stage endures, — the birth of the woman — during which the infant woman demands not less careful and assiduous supervision than the infant child; for during this period the girl is peculiarly susceptible to diseases of the flesh and perversions of the mind. She must be protected not only from the ailments which inevitably arise from neglect to recognize the importance of the change at hand, but also from diseases which affect other parts of the body with especial frequency at just this time of life. For it is a fact that, just as the infant is susceptible to derangements of health from causes which do not affect adults, so the girl, during the infancy of her womanhood, is likewise peculiarly susceptible to

influences which do not affect her younger or her older sisters. The importance of this fact cannot be over-estimated, and is scarcely as yet fully appreciated; though one of the greatest boons which has in recent years been granted to women by the community is the more general recognition of the necessity for special care at this, the dawn of her sexual existence. As we recognize for convenience a physical, mental and moral nature, so we may consider the changes and the perils at this period as physical, mental and moral.

Among the possible physical ills is the manifestation of constitutional tendencies and of hereditary taints which have lain dormant since the birth of the individual. It happens but too often that the delicate child of consumptive parents, which has maintained fair health during its previous years, yields when this increased demand is made upon it and manifests the first pronounced symptoms of the parents' fatal malady; so, too, insanity, epilepsy and a score of other affections, the tendency to which was imparted with the parents' blood or acquired through their ignorance, attack the girl at this her critical period, perhaps to overwhelm her at once, or at least to secure a foot-hold from which they can never be dislodged. Then again there are certain ailments which seem to affect the children of robust and of delicate parents alike. Such is chlorosis, popularly known as the green sickness, because of the greenish tinge sometimes exhibited by the otherwise pale countenance. In this disease the blood is impoverished, whence the extreme pallor; yet the root of the evil lies not in the blood, but in the nervous system. The beginning is insidious: lassitude, even prostration; disinclination for exertion and society; a capricious appetite, often exist for a considerable time without other symptoms, to the perplexity of parents, perhaps even of the physician; then occur impairment of digestion, constipation, palpitation of the heart, pallor, irregularity, perhaps suppression, of the menstrual function. Sometimes most curious and perverted tastes are displayed, such as a passion for nibbling slate pencils, for devouring pickles, drinking vinegar, etc.; mental perversities no less remarkable may be exhibited, so that in a few months the previously healthy, rosy child has become an irritable and irritating invalid; the alarmed friends consider that the girl is in a decline, talk of consumption and heart disease, or having an indistinct idea that a pale individual should always take iron, dose the unfortunate

girl with that article. It should be, however, realized that the green sickness is too serious and complicated to be entrusted to home remedies; that the patient should be at once placed under the care of a competent physician. The disease is caused by a lack of air, sunshine, exercise and amusement; by anxiety, fear, or other emotions; by overwork, physical or mental. To avoid it, therefore, one needs to know only the cause. Its first symptoms can be almost invariably cut short by a change of scene, of occupation and of company.

Yet the most serious physical ills originating at this period are those affecting primarily the organs undergoing development. At this time are laid but too often the foundations of those ailments peculiar to women, and especially to American women, causing painful and irregular menstruation in the girl, sterility in the wife and invalidism in the mother. These ills may be traced usually not to any willful interference with or abuse of these organs, but to an over-zealous use and cultivation of other organs. It is too often forgotten that the chief aim of the girl is to become a woman, and that the time preceding and following the first menstruation should be devoted primarily to this change, to this development of the sexual functions, even to the neglect of other functions. The girl therefore demands and must receive other treatment than her brother; for him, sexual development is a more gradual and less integral process; one which does not materially change the bent of his inclinations, the direction of his pursuits, nor his physical habits, which intrudes itself upon his attention by no imperious calls; a change, indeed, of which he is often long unconscious. For her, it is an introduction into a new world, or rather into the world, on the outskirts of which she has passed the previous years of childish probation; it is the transformation of the caterpillar into the butterfly. For her there is no possibility of ignoring the change at hand; body, mind and soul unite in calling her attention to the duty of the hour; the strange, uneasy, perhaps painful bodily sensations, the mental languor and indisposition for accustomed pursuits, the indefinable longings and emotions, indicate as plainly to others also the dawn of the new existence. The successful initiation of the child into this new life, is evidently the first and most important object of those interested in her welfare; for whatever may be her material and social advantages, she must be nevertheless a woman; and for a woman, the successful pursuit of happiness is impossible without sexual perfection.

The care demanded by the child during the period of puberty includes no active interference with the sexual functions themselves, but simply the regulation of the other functions of body and mind, so that the child's strength, or at least a sufficient portion thereof, may be diverted from other into the new channels; a diversion of strength which would, we may assume, occur in the natural state of the animal without artificial regulation or interference. Indeed, it should be understood that the object of supervision, whether by parents or by the physician, is not to surround the girl with artificial barriers, nor to stimulate in any way her sexual development, but merely to remove those artificial barriers and unnatual stimulants to proper sexual growth which are the necessary and inseparable outgrowths of our social customs; for it is a fact often observed and repeated, that the stimulants to excessive mental effort, inseparable from a high state of civilization, result in a neglect of the bodily functions. It is not asserted that extreme mental and physical culture are incompatible; but to secure their co-existence in the same individual, each — body and mind — must be carefully and conscientiously trained. The tendency of modern life, particularly in the United States, is to high-pressure mental effort, without regard to the physical foundation therefor. Nowhere in the world is the stimulus to mental effort so great and so widely disseminated; nowhere are the rewards for successful effort so sure and so readily attained; nowhere are the opportunities and inducements for individual effort, the natural resources and advantages for collective enterprises, so enticing. As a result, therefore, the burdens of life are most eagerly assumed at an age which was formerly regarded as scarcely that of discretion. As a further result, the preliminary training of our youth of both sexes is crowded into a period utterly insufficient even for the modest attainments of our grandfathers, and doubly so for the acquisition of that knowledge which our modern schools profess to teach. The formal pleasures of society also are no longer monopolized by adults, but are eagerly sought by and granted to children. The demands of society can be met only by a certain devotion to fashion, whose behests must, therefore, be obeyed by the children also. The theater and the novel are amusements as legitimate for the girl as for the mother. In short, precocity is the order of the day. The girl of fifteen is but the copy of her elder sisters indulging in the same pleasures and employments, which oftentimes tax severely their more mature

strength and endurance. The result is plain and inevitable: at thirteen, the woman is born and for four years should have nothing to do which can interfere with her growth into womanhood. To put her upon the same diet of amusement and employments as are suited to a woman of twenty, who has completed her sexual growth, must evidently be disastrous; to subject her immature and tender muscles and bones to the same pressure and strain that may be borne with safety later in life, is irrational in the extreme. An infant fed upon beefsteak and potatoes could hardly escape dyspepsia and other disorders of digestion; the child compelled to carry heavy weights would naturally have a deformed back-bone and legs; the infant woman, placed upon a diet adapted only to vigorous adults, and assuming a share of the physical burdens inseparable from the pleasures of society, can scarcely hope to escape the penalties as surely inflicted by the sexual as by other organs when abused. The average girl of thirteen has, perhaps, vitality enough to develop into a robust woman; but she has not vitality enough to accomplish both this task and the duties which are but too often thrust upon her. One or the other — either the physical development or the social accomplishments, or both — will be but imperfectly attained; and since the imperfect performance of the social duties is the more readily and earlier observed and avoided, the deficit is left but too often on the physical side of the account.

Yet we cannot charge upon social pleasures the whole, nor indeed the greater part, of the abuse to which the budding woman is subjected; for the greatest enemy to the sexual health of our young women has been the popular system of education. The theater and the ball are but occasional and by no means inexorable demands; the school is an unavoidable requirement. Our popular systems of education assume that boys and girls can be properly treated alike, and may be expected to accomplish the same work in the same time and at all times. However true this assumption may be in childhood and in adult life, it is certainly opposed to all observation and experience during the period of sexual development. We need not concern ourselves with the questions which agitate and are agitated by our friends, the advocates of women's rights, so-called. The question of the relative superiority of man and woman is quite foreign to the present subject; the comparison of mental and moral powers of the two sexes is also quite irrelevant. The fact is, that the girl has a much greater physical and a more

intense mental development to acomplish than the boy; and must moreover complete that development in a shorter time than is allowed him; whence it follows that she cannot and should not be expected to devote to other functions, whether of mind or of body, as much energy as may be properly required of him during the same period. This fact, so apparent upon the slightest consideration, has been strangely enough ignored by both parents and educators. Girls and boys, whether sitting side by side in the same school-room or pursuing parallel courses of study in different institutions, have been expected to work not only five days in the week, but also four weeks in the month. The boy can do it; the girl can—sometimes; yet it is expected that she will always; she is spurred to perform her school work at any cost by comparison with her male competitors. Too often the success of her school life is purchased by the sacrifice of her sexual perfection. It has been said that the thousand ills which torment American women may be ascribed largely to the educational methods of our schools and colleges; not that such methods are the only cause of female diseases, but that they are an important factor. Strange as it may seem, this neglect of the peculiarity of the female organization has been nowhere more apparent and more rigidly insisted upon than in institutions founded and devoted to the education of women. The platform of woman's rights has not as yet been made to include as a plank the right to complete the natural sexual development—a right which implies a sufficient opportunity for the growth of the ovaries and the accessory reproductive organs, and for the establishment of their periodical functions. "It is not enough," says Dr. West, "to take precautions till menstruation has for the first time occurred; the period for its return should, even in the healthiest girl, be watched for, and all previous precautions should be once more repeated; and this should be done again and again, until at length the habit of regular, healthy menstruation is established. If this be not accomplished during the first few years of womanhood, it will in all probability never be attained."

There are instances in our large cities, by no means rare, in which this special mechanism of menstruation remains undeveloped or attains at best an incomplete, unsatisfactory, perhaps painful development. It is the unanimous experience of physicians, that such cases of imperfect sexual development are usually found in girls with brilliant school records. The body can rarely discharge two

important duties well at the same time. To secure the best work from the brain, we rest the muscles and the stomach. The best mental effort, the best literary and scientific work is not performed in the first hour after dinner. It has been found by actual observation, that a greyhound started immediately after a full meal, in the pursuit of a fox, does not digest his food so long as he continues the violent muscular effort of running; while the stomach of a second animal, permitted to rest after his dinner, soon completes its task of digestion. The hound has strength and vitality enough either to digest the food or to pursue the fox, but not to perform both duties at the same time. Muscle-work and stomach-work must interfere with each other if attempted together. The digestion of the dinner slows the muscles, the contraction of the muscles slows the digestion. In order that the animal shall run swiftly, the bulk of the blood must circulate in the muscles; in order that the stomach shall digest properly, a large quantity of blood must circulate in the stomach. The animal does not contain blood enough to support great activity of both stomach and muscles at the same time. So, too, the development of the girl's reproductive organs requires the circulation of large quantities of blood in these organs. The mental activity necessary to prepare and recite her lessons demands the circulation of large quantities of blood through the brain. The girl has not blood enough to perform both lines of work at the same time. Menstruation slows her brain; study slows her menstruation. During the menstrual week the first business is menstruation, in favor of which study and other mental effort must be subordinated. This, let it be remembered, should be the rule, not only at the first and second monthly periods, but also at every period for three or four years, until, in other words, sexual development is complete. For if the brain be worked continuously, the ovaries must be slighted; and if slighted, the insult and injury can never be repaired. If the reproductive organs are not developed now, they will not be at any later period. If imperfectly fashioned now, they can be only patched, and not perfected, in after life. Blood must be allowed to flow to these organs in ample quantity, even though the brain have not enough left to study very hard, nor the feet enough to dance very energetically; even though the corset lace be loosened, to permit the increase in size in the ovaries and womb below, and in the breasts above.

"Every physician," says a recent writer, "can point to students

whose splendid cerebral development has been paid for by emaciated limbs, enfeebled digestion and disordered lungs. Every biography of the intellectually great records the dangers they have encountered, often those to which they have succumbed in overstepping the ordinary bounds of human capacity, and while beckoning onward to the glories of their almost preternatural achievements, register, by way of warning, the fearful penalty of disease, suffering, and bodily infirmity, which nature exacts as the price for this partial and inharmonious grandeur. It cannot be otherwise. The brain cannot take more than its share, without injury to other organs. It cannot do more than its share, without depriving other organs of that exercise and nourishment which are essential to their health and vigor. It is in the power of the individual to throw, as it were, the whole vigor of the constitution into any one part, and by giving to this part exclusive or excessive attention, to develop it at the expense and to the neglect of the others." In the training of our girls the tendency has certainly been to defraud the sexual organs of their just due, during the earlier years of their development; to train the mind, without regard to the suffering which may be inflicted upon the body; to train the girl's mind, indeed, as the boy's is trained. Already we are perceiving the result: the American woman is both physically and mentally a unique type of humanity, remarkable alike for vivacity, mental attainments, intellectual beauty of face and feature on the one hand, and for the appalling absence of physique on the other. A young American, landing in England, exclaimed: "Now for the first time I see women." An English lady, visiting the Boston schools, said: "I never saw before so many pretty girls together." These remarks indicate fairly well the impressions made upon natives of the one hemisphere by women of the other. The transient, delicate beauty of feature is accorded to the American girl; the permanent, tangible beauty of health belongs to her European cousin.

It is a painfully significant fact, that the one department of medicine in which the American physician confessedly excels his European brethren, is the diseases of women; in medicine, as in other things, practice makes perfect; the skill of the American medical man is, then, an unenviable commentary on the physique of the American woman.

The ailments which affect the organs immediately concerned in reproduction are not, of course, thrust upon the attention of the

general public; yet the generally imperfect development of the accessory sexual organs is a secret the knowledge of which is by no means confined to milliners and dressmakers, who are said to be in the habit of adapting not the dress to the figure, but the figure to the dress. If the only evil resulting from this imperfection of development were the loss of beauty, it would not call for attention on the part of the medical adviser; but it must be remembered that imperfect development of the breast modifies not only the contour of the woman, but also impairs the health of her offspring, and usually implies, moreover, an unsatisfactory condition of the organs directly instrumental in the production of the new being. A recent writer calls attention to this fact in these words: "There is another marked change going on in the female organization at the present day, which is very significant of something wrong. In the normal state nature has made ample provision in the structure of the female for the nursing of her offspring. In order to furnish this nourishment, pure in quality and abundant in quantity, she must possess vigorous and healthy digestive organs and a well-developed sexual system. Formerly such an organization was very generally possessed by American women, and they found but little difficulty in nursing their infants. It was only occasionally, in case of some defect of the organization, or where sickness of some kind had overtaken the mother, that it became necessary to resort to the wet-nurse or to feeding by hand; and the English, the Scotch, the German, the Canadian-French and the Irish women now living in this country, generally nurse their children. The exceptions are rare. But how is it with our American women who become mothers? To those who have never considered this subject, and even to medical men who have never carefully looked into it, the facts, when correctly and fully presented, will be surprising. It has been supposed by some that all, or nearly all, our American women could nurse their offspring just as well as not; that the disposition only was wanting, and that they did not care about the trouble or confinement necessarily attending it. But this is a great mistake. This very indifference or aversion shows something wrong in the organization as well as the disposition. If the physical system were all right, the mind and natural instincts would generally be right also. While there may be here and there cases of this kind, such an indisposition is not always found. It is a fact, that a large number of our women are anxious to nurse their offspring, and make the

attempt; they persevere for a while, perhaps for weeks or months, and then fail. There is still another class that cannot nurse at all, having neither the organs nor nourishment requisite even to make a beginning. Why should there be such a difference between our American women and those of foreign origin residing in the same locality and surrounded by the same external influences? The explanation is simple: there is a want of proper physical development." The girl's energies have been devoted to study and mental accomplishment. Her blood has been devoted to her brain; the development of other organs and of other powers has been sadly neglected.

Dr. Weir Mitchell, of Philadelphia, says: "Worst of all, to my mind, most destructive in every way, is the American view of female education, the time taken for the more serious instructions of girls extends to the age of 18, and rarely over this. During these years they are undergoing such organic development as renders them remarkably sensitive. To-day the American woman is, to speak plainly, physically unfit for her duties as woman, and is, perhaps, of all civilized females, the least qualified to undertake those weightier tasks which tax so heavily the nervous system of man. She is not fairly up to what nature asks from her as wife and mother. How will she sustain herself under the pressure of those yet more exacting duties which nowadays she is eager to share with the man?" Dr. Clarke, of Boston, remarks: "In our schools it is the ambitious and conscientious girls, those who have in them the stuff of which the noblest women are made, that suffer; not the romping or lazy sort; and thus our modern ways of education provide for the non-survival of the fittest. Girls of bloodless skins and intellectual faces may be seen any day by those who desire the spectacle, among the scholars of our high and normal schools—faces that crown and skins that cover curving spines which should be straight, and neuralgic nerves that should know no pain. Later on, when marriage and maternity overtake these girls, they bend and break beneath the labor like loaded grain before a storm, and bear little fruit again. A training that yields this result is neither fair to the girls nor to the race."

It must be remembered, also, that the reproductive organs are the key to a large part of the mental and moral nature—to all that makes a woman womanly. At 45 years, or thereabouts, the sexual organs of woman wither and cease to perform their accustomed

duties; and it is a fact familiar to us all, that at that age a woman loses the chief, indescribable charm which she has previously possessed. Her physical vigor and intellectual accomplishments are retained undiminished, but she is no longer a woman. So, too, it has been observed that those unfortunate females who are condemned by disease to the loss of the ovaries, become, like the women who have had the change in life, sexless creatures. Woman's entire being, therefore, mental and moral, as well as physical, is fashioned and directed by her reproductive powers. It is easy to understand, therefore, that if these powers be never completely developed, there will and must be an arrest of development of her mental and moral nature. It is, then, not alone for the welfare of her body that the dawn of the girl's sexual life should be carefully supervised. In the changes accompanying the development of the sexual system at puberty there is exhibited a most remarkable example of the intimate and extreme sympathy between the brain and the ovaries, between the mind and the reproductive powers. The change in the disposition and character of the girl at this time is by no means limited to the birth of the sexual feelings and the ideas associated with these feelings; for there arises at the same time a new nature, comprising the highest sentiments of humanity, social, moral, and even religious.

Hygiene of Puberty.

The care demanded by the girl relates directly, of course, to her bodily functions, but just as certainly to her mental state. Certain rules should be observed throughout the entire period of puberty, and certain additional precautions are necessary during the menstrual flow. It may seem unnecessary to remark that the first requisite is food; yet it is nevertheless true that attention should be paid to both quantity and quality of the food during this period of development. For the girl's appetite is often very capricious; she is sometimes, though rarely, inclined to excessive indulgence at table. A more common and more serious error is either positive disinclination for nourishing food, or the rejection of all except particular articles of diet—and these frequently cakes, pastry and sweatmeats. It is not necessary to prescribe nor insist upon any special regimen nor line of diet, but simply to remember that the girl should have

an abundance of nourishing food at regular hours; that she should, and probably will, display a marked increase of appetite, for which she should not be teased; to which, indeed, she should be encouraged; for during these few years the demands on her system for nourishment are unusually great. And it is a most unfortunate and mistaken delicacy which would restrict the gratification of nature's demands at this time.

Meat, especially fat meat, the usual garden vegetables, fruits, and especially milk, may constitute the bulk of her diet. Tea, coffee, wines and condiments — which are at no period of life especially advantageous as a regular diet — may be positively injurious during this stage.

The next most important factor in the building of body and brain alike is sleep. Early to bed and late to rise may be a judicious modification of the old saw at this time. The hours that the girl may apparently lose by lying in bed at this period of her life will be redeemed a hundred-fold in her more mature and valuable years.

Exercise, too, is an indispensable aid in the development of the girl during puberty. Nor can any rules be laid down for the execution of this condition. That activity of body only may be regarded as exercise which gives the child pleasure. The line at which exercise ends and work begins must be determined by the individual tastes, strength and surroundings in each case. Yet this is, of course, a matter which can be judiciously regulated by the parents in every instance. One fact only should be borne in mind — that exercise, to be beneficial, must be taken in fresh air, whether indoors or out; and that the human animal, like other creatures, plants and animals, attains its best development when bathed in the life-giving rays of the sun. The girl has no need of a complexion as yet: she should have have her sun-bath daily without a parasol, even though she become as brown as the traditional Indian. Not the least of the advantages of physical exercise, undertaken, as it naturally is, with companions of the same age, is that it diverts the girl's attention from the changes going on in her own nature, prevents her from brooding upon mysteries of which she has, and as yet can have, no comprehension — in short, assists her in remaining a child until childhood has passed. In this way, too, exercise constitutes one of the best safeguards against the vicious habits to which girls, as well as boys, frequently become

addicted during these years of life. It is a matter of general observation that such habits acquire particularly strong hold upon those who, from lack either of opportunity or inclination, have not enjoyed the outdoor exercise so natural to children of both sexes at this time of life.

Clothing, too, is a matter of extreme importance, and one which cannot be passed over in silence, in discussing the hygiene of puberty. So long as the girl remains but a child, so long will she suffer only immediate and direct effects from the present curious fashion of dressing girls. It has doubtless puzzled every one who has stopped to consider the question, to conjecture by what law of nature or art the clothing of a girl previous to 12 years of age should be bunched around her waist, while her neck, arms and legs are nearly or quite unprotected. Her brother — certainly as vigorous and able to withstand the weather as she — is clothed from the neck to the wrists and to the ankles. The girl's costume is adopted, with slight variations, by the ballet-dancer with a purpose — that of exhibiting her physical charms; yet that cannot be the object in thus clothing the girl of ten years, since she has no charms to exhibit, other than could be displayed to the same advantage by her youthful brother. Yet we will not stop to remonstrate upon this prevalent fashion of clothing children before puberty, since the ill effects — the imperfect protection against the weather — are perfectly apparent. With the commencement of puberty the girl's dress is changed; yet oftentimes not to the same extent as the interests of her body demand, for it cannot be too earnestly insisted upon that her entire body should be at all times, but especially during the menstrual week, thoroughly and warmly clothed. Thick shoes and woolen stockings may not be so esthetic, but are certainly, in the long run, more profitable. Neck, shoulders, and the figure generally, will be more attractive in after years if carefully and completely and warmly clothed now.

At this time, too, the girl is ordinarily inducted into that peculiarly feminine garment, the corset. Now, it is not our purpose to indulge in a tirade of abuse of this most useful article of feminine apparel. Every medical man, as well as every woman, can understand the advantages resulting from the use of the corset; indeed it is not the use but the abuse of the article which has been the subject of so many attacks upon it. A corset suspended by shoulder-straps so that the weight of the skirts attached to it should

be borne by the shoulders and not by the hips and abdomen; a corset which permitted a perfectly free expansion of the chest in breathing would certainly be devoid of all objections as well as eminently useful. Just so far, however, as the weight of clothing suspended from the corset is borne at the waist, just so far as the expansion of the chest is restricted by the corset, in just so far is the garment objectionable and injurious. At present the corset suspended from the shoulders is the rare exception, and within the last few years it has had to sustain not only the weight of the manifold skirts, but has been continuously dragged downward by two elastic bands fastened to the stocking. Then again, though no woman was ever known to admit that the corset impeded her breathing in the least; though every woman can prove most conclusively, by inserting her hand within the corset, that her person has ample room in the garment, yet it is equally true that no dress habitually worn over the corset can be made to meet if that garment be removed—except, indeed, by especial effort and adaptation of form on the part of the wearer. It is not maintained that no pressure can be borne without injury by the mature woman; but it is certain that the position of the womb and ovaries in the body may be modified by unnatural pressure of clothing during the period of sexual development; for these organs rapidly acquire additional size and weight at this time, and if in addition they be forced downward by the intestines and other organs contained in the abdomen—as they certainly will be by a tight corset and heavy clothing—they will be found, at the end of puberty, not in the postion and in the condition natural to them, but much lower in the pelvis, and often unnaturally crowded with blood.

This is the condition commonly known as falling of the womb, so often accompanied by derangement of the menstrual function and by discharges—a condition which may be detected not infre quently before marriage, but which is naturally more apt to be observed in the wife and mother.

When properly used, therefore, the corset is perfectly unobjectionable, and is indeed at times a most valuable article in supporting the person; yet it must be admitted, that during at least the first years of puberty, the girl has no need for such support, and that her appearance is not improved by the article whose chief use appears to be to hold in position certain artificial substitutes for natural organs not yet developed. To the use of these pads there

is, from the physical standpoint, only one objection—that ... but too often defeat their own object; that by pressure they prevent the breast from acquiring the size, shape and firmness natural to it.

It would be perfectly proper and yet entirely useless to insist that the girl during the period of puberty has no need for a corset; that if she be allowed to wear one, custom and her own mistaken idea as to what constitutes a beautiful figure will almost certainly induce her to abuse the corset and still more fatally abuse her own body For so long as women believe that physical beauty increases as the size of the waist diminishes; or so long as they labor under the mistaken impression that men admire small waists; just so long will the corset be employed as a straight-jacket—health, hygiene, advice, remonstrance and doctors to the contrary notwithstanding. The doctor has, it is true, a certain though not very noble satisfaction in this matter—he knows that the woman who persistently, perhaps even contemptuously, disregards his advice in the matter, will be in future years a valuable patient, needing long, expensive, often futile treatment at his hands. If the feminine portion of the community could be convinced not only that the compression of the body by a tight corset is as barbaric as the compression of the China woman's toes by a tight shoe; not only that the fashionable figure of the modern woman is a wide departure from the ideal of nature and art alike—for these facts are known to all; but also that the figure of the average fashionable woman is not the ideal form desired and admired by the average man, there might be hopes that the corset would be loosened; that the growing girl would have an opportunity for unrestricted physical expansion.

Another important consideration in the care of the girl during puberty is the regular evacuation of the bowels and bladder. If either the rectum or the bladder be habitually distended, there is apt to occur a change either in the shape or position of the womb. In treating diseases of the womb, the physician is called upon in almost every case to secure proper action of the bowels; and in the majority of instances it is found that torpidity of the bowels has endured since puberty—that the habit of constipation was formed at that period of life. We have used the word habit intentionally; for it may be safely affirmed that, except in those exceptional cases in which there is disease of the part, habitual constipation cannot

exist if proper care and attention be exercised. There should be no false delicacy in the matter; these functions may not be regarded, as they sometimes are, as relics of the primitive and barbarous state of man, to be slighted and neglected, and performed only when further neglect becomes impossible. In childhood and youth, but especially in the girl at puberty, it should be impressed upon the mind that the regular evacuation of the bowels and the bladder is a part of the daily duties to one's self. Medicines are rarely necessary if this plan be followed; if at a certain hour of the day — usually best and most convenient in the morning — the attention be fully and conscientiously devoted to that purpose.

Care During the Monthly Changes.

If it be borne in mind that puberty means the rapid development of those most important functions whereby the girl is transformed into the woman, and that the monthly changes are the periodical crises of this epoch, marking the successive steps of her pilgrimage from childhood to womanhood, it becomes evident that during these monthly periods everything should be subordinated to the performance of this function. Other organs, therefore — body and mind, brain and muscle — should be rested. The first law of the menstrual period is, therefore, rest. By this we do not mean that absolute repose is demanded, but merely that nothing should be required or permitted to which the girl's strength is inadequate or her mind indisposed. It is best to say in general terms that she should do less than the usual work, that she should take less than the usual exercise, whether for pleasure or profit, whether in walking, riding, dancing, or domestic employment. Not less important is freedom from mental effort and anxiety. Hence it will be found, as a rule, desirable to keep the girl out of school one or more days during each period, particularly if she be ambitious and studious. In many cases it becomes absolutely necessary, as already indicated in previous pages, to withdraw the child from school during the earlier months or years of puberty.

The warmth of the body should be carefully and evenly maintained. At no period of life may so much damage follow the wetting of the feet, sitting in a draught, etc. Yet, while a moderate

and uniform temperature is so eminently desirable, it must not be assumed that the girl should be kept in a close, hot room. Fresh air is always necessary at this as well as at other times. Nor is it true that the customary baths should be omitted during this period. If care be taken to avoid extremes of temperature, there is no occasion for deviation from the usual custom. The bath should have a temperature of 75° to 85° F. It is scarcely necessary to remark that extreme emotional excitement of whatever kind should be avoided at these times, whether those emotions be awakened by actual occurrences or merely called into action by the pages of a novel. For no part of the human nature is so intimately associated with the sexual organs as the emotions The emotional existence is indeed largely founded upon the sexual power and function, and no part of the animal organism is so easily and seriously deranged by the exercise of the emotions. It is a fact familiar to most women that the menstrual flow, even in the mature woman, can be diminished, arrested or increased by various emotional excitements during the monthly period.

Between the monthly changes no other precautions are necessary than have been already indicated, and these are suggested and directed by the one dominant fact that at this period of life the res of the girl's body should be employed in building up proper sexual organs.

When Puberty is Delayed.

The examination of several thousand cases has shown that in the United States the first menstruation occurs on the average between the ages of 14 and 15 years. This average represents, of course, numerous exceptions; menstruation not infrequently occurs at 12 or 13, on the one hand, or is delayed until 16, 17 or 18, on the other. These and even greater variations from the average are perfectly consistent with health and with the proper development of the sexual organs; neither the early development nor the long delay need cause anxiety nor medical interference. While every girl is to a certain extent a law unto herself in this particular, yet certain influences are known to modify the rapidity of sexual development. Foremost among these is climate; in animal as in vegetable life rapidity of growth and decay is proportional, other

things being equal, to heat. Hence the tropics furnish not only the most profuse and luxurious vegetation, the most brilliantly decorated of the animal creation, but also the most precocious of human beings; and we find it generally true that the average age of sexual maturity in women increases from the equator toward the poles. Another point of considerable interest in this connection is this: Even in a mixed population like that of the United States, where individuals of the same family often represent ancestors from different quarters of the globe, the women of dark complexion, brunettes, retain not only the dark hue common to the people of tropical climates, but also the tendency to mature sexually at an earlier period than their fairer sisters, whose complexion suggests relationship with the less fiery-blooded and more slowly developing races of the North. It is generally true also that girls of large frame, whose general development therefore takes place later in life, experience puberty also at a more advanced age than their smaller sisters.

Race, too, accompanies certain differences in the period of sexual maturity; and while we may suppose that differences in race were originally the results of differences in climate and natural surroundings, yet it is true that even in our own country, exposed to essentially identical conditions of climate and temperature, the dark-eyed Jewess and the dark-skinned negress attain sexual maturity one, two or three years earlier than other females.

While, therefore, inherited tendencies are largely influential in determining the exact period of puberty, yet individual influences may be made to hasten or retard to some extent this development. Idleness, physical and mental; stimulating, highly-seasoned food and beverages; constant stimulation of the emotions by works of fiction, by the theatre, and by the society of the opposite sex; by observation of, and association with, older girls blessed with long dresses and lovers—all these and similar influences, the atmosphere of more mature years, which the child is often injudiciously permitted to breathe, naturally hasten her sexual development. Could any doubt exist upon this question, it would be allayed by the fact that girls born and bred in the country attain their sexual development later than those in the city. Not only does the first menstruation occur six or seven months later in life in the country than in the city girl, but the period of puberty, when once inaugurated, proceeds less rapidly. The comparative freedom of the former

from those peculiarities of city life which stimulate the passions while repressing the physique, explains both the rapidity and the imperfection of the sexual development in the city girl as compared with her country cousin.

Just as the age at which puberty begins varies with the individual, so, too, does the rapidity with which the process is completed differ. In some the first menstruation is followed at the usual period of twenty-six or twenty-eight days by the second and third, and subsequent ones appear at the interval common in mature years. Not so in all cases, however. A considerable interval, sometimes even six months, may elapse after the first before the appearance of the second menstrual flow, and that, too, without the occurrence of pains in the back, or other symptoms common to such occasions. In such cases menstruation seldom becomes regular during the first year or even two years of puberty. Yet it must be understood that this condition demands no interference by either physician or parent. It merely indicates that the process of ripening is proceeding more slowly, though by no means less surely, than in other cases. So long as the menstrual flow is accompanied with no more than the usual symptoms of general disturbance, so long as the girl's general health remains unimpaired, so long will her sexual development progress satisfactorily without artificial means.

The same individual differences are manifested in the intervals elapsing between the menstrual periods; while the average time may be regarded as twenty-six to twenty-eight days, some healthy women menstruate at intervals of twenty-four, twenty-one, eighteen, or even sixteen days; others thirty, thirty-five or even forty. This, too, is a matter which need occasion no anxiety nor demand interference, provided the interval be maintained with reasonable regularity. It sometimes happens, also, that after child-birth, the monthly periods become regularly longer or shorter than they were previous to that occasion.

The length of time during which the flow continues may also vary in different individuals, and, indeed, in the same woman to a less extent, without overstepping the bounds of health. While the general average in our climate may be regarded as about four days, some women flow six, others only two, or even one day. So, too, the quantity of blood lost at each menstrual epoch presents similar variations within the bounds of health — four or five ounces representing a fair average. In these respects also, notwithstanding the

individual peculiarities, the same general laws prevail as are illustrated in the development of the function in general. In the warmer climate the average flow is greater and the interval shorter; in the colder climates menstruation is generally less frequent and less profuse. Social surroundings and personal habits exert marked influence in this regard; the same factors which induce early menstruation are usually productive of more frequent and profuse discharges. The youthful devotee to society, so-called, is not infrequently annoyed by menstrual irregularity, which her rustic sister — a stranger perhaps to household and culinary luxuries — escapes. It may be said in general that the more robust and vigorous the individual the less is the interference with the general health at the menstrual period. It is usually the weak, nervous, delicate women — those accustomed to personal luxury and emotional excitement — who are most subject to profuse and frequent menstrual discharges. There is one point of importance which may be ascertained without difficulty — the menstrual blood never clots when this function is naturally performed; a clotting of the blood indicates something wrong in the organs concerned.

Such, then, are the circumstances usually attendant upon healthy menstruation during the first year of the girl's sexual life. Sometimes, however, cases are observed in which the process even from the beginning presents unnatural features requiring the advice and assistance of the physician. Among these is painful menstruation or

Dysmenorrhœa.

It is doubtless difficult to define the exact line separating painless and painful menstruation, since few females subject to the various unnatural influences of our artificial society escape entirely more or less pain at the menstrual epoch. We may assume that in the natural state of man menstruation, like all other boily functions, is a painless process — an assumption supported by our knowledge of this process and its analogues among the lower animals and the lower races of mankind. We are, however, accustomed to regard a certain amount of pain felt chiefly in the small of the back accompanied with headache, languor, and perhaps painful sensation in the breasts, as natural; and to refrain from all

interference unless the general health of the girl is at the same time obviously impaired In these cases there is usually a certain amount of languor, and even pain in the intervals between the menstrual epochs — a symptom which demands immediate attention. It may be stated in general that painful menstruation is caused by one of three conditions: First, a depreciated condition of the constitution originating either in the blood or in the nervous system, and causing a tendency to neuralgia ; second, an unnatural state of the womb; and third, an unnatural condition of the ovaries. In girls dysmenorrhœa is usually due to the first of these causes, less frequently to the second and third ; we should especially look out for chlorosis, or the green sickness, for physical exhaustion, whether due to over-work or over-indulgence in social pleasures, to mental exhaustion from excessive study and emotional excitement. In some cases, too, the pain appears to be due not to any diseased condition, but rather to a tendency of the individual to rheumatism or gout or to malarial influences. It is important to note for the benefit of the physician who may, perhaps, be consulted, whether the pain occurs chiefly before the beginning of the flow and ceases with its appearance, or whether the pain keeps pace with the amount of blood lost, increasing, therefore, during the first day or two of menstruation. It is further desirable to note whether there be any appearance of clotting. or whether particles of reddish appearance, resembling somewhat pieces of flesh, be contained in the discharge ; also whether the pain be felt chiefly in the back or in front, whether it be continuous or be felt at intervals and accompanied with straining — resembling, therefore, the so-called bearing-down pains ; also whether a whitish or yellowish discharge precedes by one or more days the appearance of the proper menstrual flow.

Since the causes of painful menstruation are so various, it is evident that the treatment must vary in different individuals. Indeed here, as elsewhere, it must be borne in mind that medical treatment is intended not to destroy a disease, but to assist an individual subject to a disease; that it is, therefore, not the disease, but the patient that is treated. To relieve painful menstruation, we must, therefore, know what causes the pain before attempting to remove it. And since the causes, so numerous and various, can be generally definitely and accurately located only by the special knowledge and skill of the medical adviser, it is impossible to lay

down any set of rules for the treatment of painful menstruation. There are certain measures, however, which are decidedly useful in diminishing the pain, and therefore beneficial in nearly all such cases, even though they do not remove the *cause* nor prevent the recurrence of the pain at the next period. Such girls will be benefited by wearing flannel next to the skin not only during but also between the monthly periods; by taking special care to avoid exposure to cold and wet for several days before the monthly is expected; by retaining the recumbent posture during at least the first day or two of the flow; by the application of flannels wrung out of hot water to the small of the back and lower part of the abdomen. Sometimes, indeed, a light mustard plaster may be applied to the abdomen with even greater advantage; care being of course taken not to mix in the plaster enough mustard to blister the skin. A bottle of hot water or a hot flat-iron wrapped in flannel may be applied to the small of the back and to the feet if the moisture of the plaster or hot cloth be disagreeable. If the pain still be excessive, a teaspoonful of paregoric or ten drops of laudanum may be administered. Yet it must be remembered that, as a rule, laudanum and other opiates, alcoholic stimulants, whisky slings and other remedies, should be as far as possible avoided; because, since more or less relief follows their employment, the girl will acquire the habit of resorting to them every month, and thus prolonging and rendering permanent the unnatural condition of the sexual organs on which the pain depends. It is advisable to consult a physician at once, if the employment of the hot flannels and other local remedies mentioned be not followed by relief without any resort to medicines. It is a popular impression that such cases are benefited by marriage and maternity; and such is undoubtedly the case in one class of patients suffering from painful menstruation. But marriage, like other remedies, cannot be advantageously prescribed for all. Indeed, many such cases suffer an aggravation of the menstrual difficulty upon the assumption of the duties of the wife and mothe

Another disorder of menstruation which may occur, though less frequently, in the maiden as well as in the matron, is an excessive loss of blood during the monthly sickness—a condition termed in medicine *menorrhagia*. Another condition, often traceable to the same causes, is the appearance of blood in the interval between the regular menstrual periods; this latter condition is

designated *metrorrhagia*. We may in general divide the causes of profuse menstruation into two classes: first, those associated with the womb itself, and, second, those dependent upon constitutional conditions. Among the former are displacements of the womb, or changes in its shape; inflammation of the inside of this organ, the formation of tumors upon and within it; the retention in the womb of fragments of the after-birth; the increased size of this organ after pregnancy, often resulting from getting up prematurely and indulging in work and exercise after delivery. The causes not referable directly to the uterus, and especially frequent in girls as distinguished from married women, are general debility from improper physical and mental training, emotional excitement, etc. As already indicated in the previous pages, domestic remedies must consist in the avoidance of such impropriety of diet, clothing, exercise and habits, and during the menstrual week of maintaining the recumbent posture. A change of air, society and surroundings will frequently, while influencing the general physical and mental health, restore the natural mode of menstruation.

Another condition — one which causes mothers much anxiety, often needless during the earlier years of the girl's sexual life — is what is popularly termed *suppression* of the menstrual flow — the failure, partial or complete, of the monthly sickness to appear at the expected periods. It should be remembered that during the first years the menstrual flow rarely recurs with the same regularity as to time, duration and quantity, which is often manifested in the woman's more mature years; a girl may skip a period or two without thereby furnishing cause for alarm or interference, unless there be other evidence of deranged functions. The fact that a girl's monthly flow may last but a day or two, may be also quite consistent with perfect health. If, however, the flow be much diminished or entirely disappear in one who has previously menstruated regularly and profusely, and if she at the same time manifest other evidences of imperfect functions — such as headache, nausea, pain in the back, loss of appetite, inability to sleep, and unusual sense of exhaustion — measures may be taken to promote the menstrual discharge. In these cases it will usually be found that the cause is to be sought in the general condition and not in any diseased state of the sexual organs. The treatment will, therefore, naturally be directed to the constitution rather than to the womb. Partial or complete suppression of the monthly flow, technically called

amenorrhœa, is frequently found in patients suffering from consumption, chlorosis, and heart disease; but aside from these unfortunates, this suppression is peculiarly frequent among women who live indolently and luxuriously among the higher classes of society. Therefore, in such cases the menstrual function is but one of the many functions habitually performed but imperfectly; there is no flow of blood from the womb, merely because the woman's body does not produce nor contain blood enough for the purpose. In such cases treatment is directed naturally to the restoration of the general health and to the avoidance of those injurious influences inseparable from persistent devotion to society. If it be possible to restore the color to the cheek and flesh to the body, the menstrual flow will usually appear at once in proper quantity and at proper times, without paying any attention to the sexual organs. At times, however, it may be desirable to encourage the menstrual discharge by promoting the flow of blood to the lower abdominal organs—an object which may be accomplished by the application of hot cloths, by a gentle laxative, and by careful friction and gentle kneading of the abdomen and loins, followed by rest and quiet; or a hot hip-bath of fifteen minutes' duration may be used to accomplish the same result.

Such are the more usual physical disorders associated with the performance of the menstrual function in the earlier years of womanhood. In discussing them, we have assumed that the child is naturally formed in all particulars, and that no other influences than inherited tendencies and errors of training have been at work in interfering with the proper performance of the menstrual function. It should be mentioned, however, that nature exhibits occasionally certain freaks in this, as in other departments of the body —freaks which, because undetected, even unsuspected, may occasion considerable anxiety and difficulty. In some children, who exhibit the other characteristics of fully developed womanhood, menstruation is not observed; indeed, cases are on record in which women have married and borne children without menstruating, the monthly flow having appeared, perhaps, after the birth of one or more children. In other cases there is a mechanical obstruction to the escape of blood from the womb—a membrane which closes completely instead of partially the natural orifice of the parts. In such instances the usual symptoms of the monthly sickness, such as headache, pain in the back and languor, recur at regular inter-

vals, though no blood can of course escape; after a number of months the accumulation of blood in the vagina and womb may be so great as to render each menstrual period extremely painful and even to cause an enlargement of the abdomen, which may give rise to an unjust and cruel suspicion of incontinence. It is scarcely necessary to state that a watchful mother could and would early detect the unnatural formation by simple inspection of the genital organs. This discovery should be made early, not only for the satisfaction of the knowledge acquired, but also because the condition can be at once and very simply relieved without any danger to the girl, if but few menstrual periods have transpired; while on the other hand, after some years, when the accumulation of blood has become excessive, the operation necessary to secure the natural performance of the function may have far more serious consequences for her than could have ensued in the first or second year of menstruation.

It sometimes happens, too, that while a girl is otherwise well and perfectly developed, one or more of her sexual organs fail to undergo the change natural at the period of puberty, and remain in the undeveloped condition natural to the child; indeed it may happen that some of these organs are entirely absent—have been left out of the child's body in the making, just as an individual is sometimes born without the usual number of fingers, or even without arms. It is scarcely necessary to observe that such an individual can never hope to perform the duties of the wife and mother. If indeed the ovaries only be lacking she may become a wife, although she will never exhibit the peculiarities of outline and figure, of heart and mind characteristic of the complete woman; she is, and must remain a sexless being. If the sexual organs be all present the girl may ultimately become a woman even at the advanced age of 24 or 25 years—there being merely a delay, and not an arrest of development. In such cases it may be possible to hasten the change by exposure to those very influences, such as emotional excitement, which are known to concentrate the bodily energies upon sexual organs; possibly something can be done also with medicine and electricity. The most efficient agent is doubtless marriage, which is, under the circumstances, of course scarcely a legitimate and honorable means, and one usually impracticable.

On the other hand, sexual development occurs sometimes at a remarkable early age. Thus instances are on record in which the

peculiar physical changes, including the monthly discharge of blood, began at five, at three and at two years; indeed two cases have been recently reported in which menstruation began with the life of the infant. That the sexual development actually occurs in such precocious children is shown by the fact that girls have become mothers at nine, even at seven, years of age. It might be interesting, but is scarcely necessary to enumerate the various deviations from the usual type of menstruation which have been observed in individual cases; such, for instance, as those in which the loss of blood occurs from the nose instead of from the womb. Yet it is necessary to call attention to the fact that tumors connected with the ovaries or the womb are occasionally developed during puberty, and that such tumors may give rise to excessive and irregular menstruation, or may even cause a complete suppression of the courses. Numerous instances have been observed in which a sudden cessation of menstruation, followed in a few months by enlargement of the abdomen, has been construed, notwithstanding the unfortunate girl's tearful denials, as evidence of pregnancy; and although in the majority of such cases — tearful denials included — the suspicion is well founded, yet the possibility should be borne in mind that suppression of the courses, enlargement of the abdomen, and other symptoms usually produced by pregnancy may be also caused by a tumor of the abdomen; that in any doubtful case the girl should have the benefit of the doubt and be submitted to medical examination before an ineffaceable stain be allowed to deface her fair name.

We have thus sketched the care and attention which may be properly bestowed upon the girl's body during the trying period of puberty. Yet it is understood that a not less important duty of a mother during these same years is a training of the moral nature. This department does not belong, of course, essentially to the medical adviser, nor will it be discussed in these pages. Yet one suggestion should be made by the physician, since he is often called upon to treat cases arising from defects of the moral training. At this time of the girl's life there is an imperative necessity for the most intimate and intelligent sympathy between mother and daughter. At no other time in the life of the human female has she such pressing need for guidance, support, encouragement and affectionate solicitude; at no other time is she so completely dependent for sympathy and tenderness upon members of her own sex. She is entering a

to her, unknown and unexplored realm. She is assuming duties and powers which she would often gladly escape; she is bewildered, perhaps overwhelmed, by new emotions and desires which she is unable, often unwilling, to direct and control. The various circumstances which thus increase her need for sympathy and affection constitute at the same time a barrier between her and her male relatives. In these, her new trials and troubles, she cannot make confidants of father and brothers as has been her previous habit, for however tender their regard, she feels instinctively that they can have no intelligent appreciation of her situation; she must seek solace and counsel from woman, and of all women, most naturally of her mother. Yet the experience of physicians sometimes reveals the fact that the mother's advice and assistance have been very tardily and even grudgingly bestowed; that the entire matter has been ignored so far as possible, perhaps even until the girl has been terrified by the sudden appearance of her first menstrual flow; that she has been taught to regard her sexual functions as an evidence of total depravity, a part of the original curse in the garden; something to be ashamed of, repressed, neglected, and not infrequently in such cases the girl's knowledge of the powers and possibilities of her future sexual life have been derived, in large part at least, from her playmates and school companions. In very brief conversation with the child the physician readily perceives whether her information has been derived from her mother or from other sources, for in the latter case there is apparent a false delicacy, a furtive air, a tacit impression that the whole subject belongs in the realm of forbidden fruit. The child plainly betrays by her manner a consciousness of guilt in knowing anything about the subject at all, indeed often affects an ignorance of matters which she evidently understands. It may be perhaps true in the abstract that the girl should be kept in ignorance of the sexual relation; of the significance of those changes which she is now experiencing; yet it is quite sure, as a matter of fact, that she will *not* remain in this state of ignorance. For it is practically certain that the information will be obtained through either legitimate or illegitimate channels, and it is surely far better that she should hear the truth from her mother; that she should be impressed with a solemn sense of the dignity, responsibility and yet danger to body and soul inseparable from her sexual powers that she should be taught the conscientious discharge of her new duties · that she should be in-

structed to regard these as the crown and glory of her womanhood. This plan is certainly far better physically, mentally and morally than that she should learn from girls as ill-instructed as herself that the prime object and use of her sexual powers is sensual gratification; that marriage is on the same moral plane as licensed prostitution; that maternity is the unwelcome though inevitable result of the sexual instinct; for if the girl entertain such ideas she will certainly not confide in her mother that implicit trust so essential to her own safety. She will brood and dream in private over the great mystery thus revealed. This unfortunate and mistaken impression is but too often strengthened by the mother's neglect to introduce the subject—a neglect prompted either by false delicacy or by the erroneous belief that the girl is as yet but a child and can't comprehend such matters; a silence which may be interpreted by the girl as a tacit confirmation of her suspicion. We would not be understood as insisting that the girl of 14 or 15 should be instructed in all that pertains to the sexual relations. We would merely express our conviction that in order to secure the complete confidence of her daughter, the mother must impart, and that, too, early in puberty, at least some of the elementary truths as to the meaning of sexual development. Let her not beguile herself into the belief that the matter may be better postponed until the child has acquired more experience and discretion; let her remember that the question is merely whether the information shall be conveyed in the delicate spirit and pure motive of the mother or clothed with the degrading influences of doubtful jest and innuendo. The details of the communication must be of course left to the mother's tact and discretion.

Were mothers generally in the habit of early instructing their daughters as to the significance of puberty, it would be scarcely necessary for us to allude to a topic which, under present circumstances, cannot be conscientiously ignored—indulgence in secret bad habits. Probably every mother who reads this line recoils in disgust at the idea of associating her own daughter's name with such a possibility; for every mother believes, naturally, that *her* child is too pure in soul and body ever to conceive or practice a habit so loathsome; but be not too sure. A part of this fond belief is doubtless justified—probably very few children have ever conceived the idea or the possibility of such practices; and were the habit limited to the few precocious enough to discover them inde

pendently, and to practice them voluntarily, it would scarcely be necessary for us to mention this repulsive subject. But the fact is, that the child rarely escapes a knowledge of this subject, communicated by the precept and example of older playmates, servants and even nurses. In many cases the girl or boy is instructed to perform such unnatural acts at a time when she or he is mentally incapable of comprehending their significance, and even physically incapable of experiencing any pleasurable emotion in connection therewith; the child is, therefore, not only ignorant of the physical wrong, but is also quite innocent of any intention, or even consciousness of moral impurity. Although Miss Catherine Beecher long ago sounded the note of warning to parents, and although this warning has been often repeated, and confirmed in popular publications by medical men, yet parents are not yet fully awakened to the wide-spread prevalence of this habit among the youth of both sexes. It may be safely said that wherever children between twelve and sixteen years of age habitually congregate, there the habit is more or less rife; in every school, especially in the boarding-schools, where the children are withdrawn to a large extent from the ennobling influences of personal contact with their parents; in every crowd of boys, or even girls, there will be found one or more individuals who are not content to be themselves addicted to this habit, but are sure to impart a knowledge of it to their companions, many of whom, unconscious of any wrong, are easily induced to imitate. Indeed, almost every physician could mention cases in which the innocent child has been instructed in this vice by the servants in her father's house, perhaps even by her own governess.

The effects, physical and moral, of indulgence in this habit, though greatly exaggerated and distorted in the circulars and books with which the country is flooded by patent medicine venders and other quacks, are nevertheless dire enough. Among them we may enumerate loss of appetite and of flesh, bodily and mental weakness, nervousness, and disorders of the sexual and urinary organs. Yet, perhaps, the most disastrous is the moral effect, for this unnatural and premature excitement of the sexual desire must necessarily direct the child's thoughts and inclinations into improper channels, and may well dispose the girl to become an unreluctant victim to profligate arts in subsequent years. In one of the saddest cases in the writer's experience, the possibilities just expressed have been realized. A girl had, at the very beginning of puberty,

been taught the habit by a companion, and became a slave to the passions thus nurtured, and finally a victim to one who knew how to arouse these passions to which she was herself enslaved; and when, at nineteen, she became an outcast from society, she vainly lamented that no one had ever warned her at that early age of innocence and ignorance against the disastrous moral tendencies of her secret habit.

Nowhere have we better illustration of the value of prevention as compared with cure; for this habit, once acquired, it seems at times impossible to break. In some cases it has been found necessary to resort even to mechanical restraints, such as tying the hands. Yet if it be discovered that the child is addicted to this unfortunate habit, a cure would best be effected, in most cases, certainly not by severe censure and harsh reproof, but by kind sympathy and affectionate encouragement. Oftentimes, doubtless, these measures, directed by a mother's tact, will suffice. It should also be observed that there be no local physical causes which can keep up an irritation of the sexual organs; for it is a fact that, in exceptional cases, the habit is maintained, perhaps even generated by local disease of the womb or of the skin of these parts; by worms in the lower bowel, and by imperfect attention to cleanliness. So, too, the inclination thereto may be diminished by hard beds, light covering at night, regular evacuation of the bowels and bladder, especially late in the evening; sometimes, also, ablutions with cold water, shortly before retiring, may be beneficial. If these simple measures, combined with the judicious advice and restraint of the parents, fail to abolish the habit, a physician should be at once consulted; for this a matter too serious to be neglected or to be hidden. Far better than the attempt to cure the habit, however, is the prevention thereof, which can be accomplished very readily if the mother possess the entire confidence of her daughter. If the girl be taught to converse with her mother as freely upon her sexual functions as about the action of the bowels, it is rarely possible the child could acquire or attempt to conceal such habits. It is not, of course, necessary under such circumstances, to warn the child particularly against these habits in such terms as may excite an unnatural curiosity for further knowledge, but merely to instruct her in a general way that any handling of these parts is injurious and degrading.

In this connection it should be observed that while such habits are usually acquired during or after puberty, yet cases have been

observed — in boys more frequently, it is true, than in girls — in which children, at an age usually incapable of sexual excitement, yes, even infants in arms, have habitually performed such acts, accomplished by movements of the thighs and contortions of the body; and the acquisition of the habit is not infrequent among children who present as yet no sign of sexual development.

A condition often found in girls, though not by any means confined to them, is a discharge commonly known as "the whites," and technically called *leucorrhœa*. In married women, this discharge is usually a symptom of disease of the womb, and it will be referred to in considering the diseases of that organ. In girls, on the other hand, leucorrhœa often occurs without any disease of the womb, the discharge proceeding entirely from the vagina. Although most common after puberty, yet it is not rare to find this same condition in girls from eight to fifteen years of age. Inasmuch as this same symptom accompanies also a certain contagious disease, there sometimes arises a suspicion that the girl has, whether voluntarily or not, been brought in contact with some one suffering from this disease, and physicians are sometimes consulted by anxious mothers as to the possibility that their children have been tampered with by others. If such be really the case, there will usually be other and unmistakable evidence; the fact of the discharge alone does not warrant any suspicion of contact with others. In girls from eight to eighteen, the discharge, though usually white, has sometimes a tinge of yellow, or even green; is sometimes so slight as merely to attract notice by stains upon the linen, at other times so profuse as to occasion great annoyance. There is usually no pain, though sometimes a slight burning sensation is felt, particularly just before and after the menstrual period; the monthly flow is itself often irregular, both as to quantity and time; the general health is usually somewhat impaired; the individual is pale and languid — suffers from constipation, irregular and ill-defined pains in different parts of the body, especially the loins, loss of appetite and sleep.

Causes.—Leucorrhœa, as it occurs in girls, is usually not a symptom of disease of the womb, but indicates merely a relaxed condition of the vagina, dependent most always upon an impairment of the general health. It is especially frequent in those children whom we are accustomed to call scrofulous — those with

pale, waxy skins, prone to enlargements in the neck, the children of delicate parents. Such children often have more or less discharge from various mucous membranes; they have red, watery eyes, and oftentimes excessive secretion from the nose. In such children the discharge from the vagina is to be regarded in the same light and treated largely in the same way; that is, by efforts to improve the general health, by proper attention to diet, air, exercise, etc. In other cases, leucorrhœa is the direct result of improper habits of life, and is especially frequent in the girls of large cities who receive less than the proper quantity of fresh air and sunshine, live in hot and ill-ventilated rooms, and wear clothing which, whatever its design may be, does not protect the person from cold and wet. The general use of woolen underclothing and stockings, and of thick shoes, would go far toward eradicating leucorrhœa from girls. Yet sometimes the cause is to be found, not in the direct violation of ordinary rules of health, but in excessive mental strain, whether of the intellect or of the emotions. Leucorrhœa is especially frequent among the so-called nervous girls. It is not infrequently also a symptom of chlorosis.

Treatment.—The treatment of leucorrhœa must usually begins with an investigation of the girl's habits of body and mind and of her general health; for, in most instances, the discharge ceases without any local treatment, if proper care be exercised to secure nourishing food, warm clothing, appropriate physical and mental exercise. Locally, it rarely becomes necessary in the leucorrhœa of girls—and of them we are now speaking—to do more than secure simple cleanliness, though it must be borne in mind that reliance must not be placed upon local treatment to the neglect of those general rules of health and hygiene already indicated. If the discharge be merely white or glairy, like the white of an egg, it will be usually sufficient to employ, morning and night, a simple injection of lukewarm water, a quart of which may be slowly injected by means of a Davidson syringe; if, after several days, the discharge still continues, two tablespoonfuls of alum may be mixed with the water before injecting. Regular movements of the bowels should also be secured, though only a gentle laxative may be employed. A warm hip bath, followed by vigorous friction of the skin with a coarse towel, will also be found beneficial. After the discharge has ceased, the injection should be continued for two or three weeks, to prevent a return of the difficulty.

Another complaint often manifested by girls during puberty, though by no means monopolized by them, is *hysteria*, popularly known as hysterics. While in many cases there is undoubtedly a physical basis for this disease in some derangement of the sexual organs, yet in a very large number of instances hysteria is a purely mental disorder, the result of a lack of balance between the emotions and the will. The cases occurring during puberty usually fall in this latter category; there is ordinarily no disease of the womb or ovaries, but merely a development of the emotional nature in advance of the judgment and discretion; it is a result of the methods of education, mental and moral training, and peculiar social influences to which the girl has been exposed. It is often noticed that hysterical women have been irritable, capricious and over-indulged children; and a hysterical convulsion or "fit" is oftentimes to be regarded as merely the woman's way of expressing the feelings conveyed by children and men in angry words, boisterous behavior and sulkiness. This is so generally understood that people are not usually inclined to bestow upon hysterical females the same amount of sympathy and solicitude which would seem to be demanded by the violence and dangerous character of the fits; it is considered that the hysterical convulsion is merely an evidence of bad temper, cunningly expressed in a way to demand an attention and sympathy which could not be secured by the temper without the fit. While such is doubtless the true explanation of many hysterical convulsions, yet we may not, in justice to many unfortunate women, class all cases in this same category; for oftentimes it is absolutely certain that there is no intention to deceive or to abuse our confidence by enlisting our sympathies against our judgment. Indeed, instances have been known—though rare ones, it is true—in which a woman has had a hysterical convulsion when alone; and nervous women have often been observed to exhibit the same appearances under the influence of sudden and uncontrollable, but genuine emotions.

The conduct of a woman during a hysterical attack varies so extremely that no comprehensive description can be given. At times there is merely an immoderate indulgence in an emotion which is, under the circumstances, perfectly natural and legitimate, such as an excess of tears or of hilarity. At other times there occurs the sequence of events popularly associated with the idea of hysteria—a rapid and sudden change from laughter to tears, and

conversely. Then again there may be associated convulsive movements of the body and limbs, accompanied with screams. In the fully developed hysterical convulsion there are certain characteristic features; they usually occur during a certain depression of spirits or bodily discomfort, especially at or near the menstrual epoch. The patient often experiences headache, perhaps cramps and numbness in the limbs, sometimes a feeling described like that of a ball rolling around in the abdomen and chest, which often rises into the throat accompanied by a feeling of choking. This latter symptom, a very frequent sensation in genuine epilepsy, may also be simulated in the disease under discussion. The breathing usually becomes hurried and irregular, there is palpitation of the heart and pronounced flushing, often alternating with pallor, of the face. About this time the patient usually falls, screams, pulls her hair, and undergoes a variety of bodily contortions; the arms are thrown aimlessly about, the knees often drawn violently up to the abdomen and as violently extended; occasionally nausea and vomiting ensue The general appearance of the patient, the disheveled hair, staring eyes, bodily writhings, interference with circulation and respiration, constitute a startling picture, one well calculated to distress and alarm the uninitiated, especially those who may have a personal and affectionate interest in the patient's welfare; yet it may be said once for all that there is not the slightest element of danger, that the complete recovery of the patient is merely a question of time—a few minutes or perhaps several hours.

Causes.—The causes of hysteria have been already indicated. In some cases, especially in married women, there will be found a diseased condition either of the womb or of the ovaries, the relief of which will be followed by a disappearance of the hysteria. Yet in the majority of cases, especially of those which occur during puberty, the fault lies, not with the sexual organs, but in the training of the moral and emotional nature; sometimes indeed its development can be traced to extreme emotional excitement—fear, anger, disappointment of the affections, religious fervor; and since maternity is the natural culmination of a woman's life, it is not surprising that hysteria should be especially prevalent among those females whose sexual and maternal feelings find no natural gratification, and who at the same time have no other object in life which may divert their attention. It is an interesting fact, and one which has practical importance in the training of girls, that

hysteria is eminently "catching," that is to say, that the appearance of one case of hysterics is almost invariably followed by the same trouble in females who are intimately associated with the original victim; and this is especially true of girls during the accomplishment of puberty. It is a familiar fact that boarding-schools and colleges for girls are sometimes swept by hysteria as if by an epidemic, so that comparatively few of the pupils between 13 and 18 years escape entirely this affliction. It is in such cases — which are really merely examples of the innate tendency of the human mind to mimicry — that the purely emotional nature of hysteria is manifested; for in these instances the disease can be usually entirely eradicated by simply stimulating the girl's will to combat her emotions. Sometimes a rather harsh stimulus is especially efficient. It is related of a French physician who was called to one of the Parisian convents, where most of the young lady pupils had recently become hysterical, that having assembled the interesting patients he heated a number of irons red-hot before their eyes and with a bland smile informed them that the first girl who had hysterics would be cauterized down the spine. He had no use for his irons.

A case of hysteria, which does not yield readily to social and moral influences which can be brought to bear in the home circle, should be brought to the notice of the physician; for there are no rules to be laid down as to the administration of medicine. If drugs are required — the exception rather than the rule — it will be desirable to know the cause of the hysteria, since this is really a symptom, and not a disease.

Among the numerous eminent medical writers who have publicly urged the considerations set forth in the preceding pages, no one, perhaps, is more worthy of attention than Dr. William Goodell, of Philadelphia, who closed a recent address on the subject in the following pertinent words: "I am old-fashioned enough to believe that the chief end of woman is to be married, to have a home of her own, and to give birth to healthy children; and that woman, as woman, has no moral right to do anything that will unfit her for this end. Whatever does damage to her, does damage to those born to her; and her disabilities are their disabilities — disabilities far-reaching and never-ending. A woman has undoubtedly the right to remain single all her life; but as a late writer forcibly observes, if she considers herself a candidate for love and marriage

she has no moral right to touch any employment that will in any degree unfit her for domestic life and all the responsibilities that go with marriage. Now, while in the abstract this is undoubtedly true, yet I fear that it could be carried out only in the new Atlantis, or in some other equally ideal community. But while a physician cannot undertake to create a fancy republic where hygeia shall reign supreme and where every rule of good health and of good morals shall be observed, he can work efficiently toward the redemption of woman. He can discourage women from taking those industrial employments which tend to impair their health and to unfit them for the duties and functions of woman. Of this class are all those occupations which oblige the worker to be on her feet, and especially during her monthly periods. Should a dire necessity drive them to such work, he can so influence public opinion as to compel their employers to give them the daily or the monthly rest which they may need.

"Nor can women as a class sustain, without injury, the same amount of brain work as men. Where can a robust school-mistress be found? Or how rare is it for a highly intellectual woman to be a healthy one? Then again, compare the health of the boys with that of the girls at our public schools. Women, from their own sensations and feelings, call themselves 'unwell' during the monthly flow. They are, by their own showing, literally unwell, and are, therefore, at that time, as unfit for severe brain-work as for fatiguing body work. The curriculum of studies in our female schools should, therefore, be lengthened out and graded to the physical needs of our girls — our nascent women. Out of school hours there should be very little study; while 'unwell' their brains should not be overtaxed and their bodies overworked. Mothers should be taught how to preside over the physical education of their daughters — how to pilot their frail bodies safely through the shoals and quicksands of girlhood. The clothing should be thick and warm and supported, not from the waist but by the shoulders; their shoes stout and roomy; their chests unconfined by corsets; their brains not overtaxed. Candies, doughnuts and hot biscuits must be struck out from their path; such trash has made our dentists world-renowned. Habits of regularity in sleep, as well as in the evacuations, should be scrupulously enforced. Over-work in a constrained position, especially that at the sewing machine, must be forbidden. Let them daily take sunshine and exercise in the open

air. But on the other hand let them during their monthly sickness, avoid picnics, sleighrides, dancing parties, and other like imprudences.

"The risks from the suppression of the flow should be vividly pointed out, else they could hardly be persuaded to forego pleasures which at such times are fruitful sources of mischief. Mothers should therefore diligently supervise the menstrual week of their daughters, and at that time forbid all over-work of brain and of body. Would that all women could be taught to look upon the law of periodicity in their nature not as an affront to womanhood, not as the mark of a curse, but as a dower of health and of beauty, if respected—as the leaven of life-long invalidism, when abused."

Marriage.

In selecting a partner for life many factors, religious, social, mental and moral, perhaps I should say also pecuniary, enter into consideration, which it is not the province of the medical adviser to discuss; yet there are certain facts bearing upon the physical basis of marriage which it is the physician's duty to impart, and which may therefore be properly presented here.

First—It should be remembered that marriage implies as its natural result the production of offspring; and that a due regard for the welfare of such possible and probable offspring should be taken into consideration as a by no means unimportant element. It is, therefore, evident that marriage can be complete only when the parties to the contract are physically competent to fulfill the sexual relation, and, more than that, when the woman is capable of maternity. Now, while the girl is frequently capable, even in the earlier years of puberty, of becoming a mother, yet it is a fact patent even to the unprofessional mind, and well established by medical observation, that the girl is physically unfit for maternity, and that the disastrous results of premature motherhood are often visited, not alone on the youthful mother as physical injuries, but are also apparent in the puny bodies and limited intellect of her offspring. The girl, in other words, is not made a woman by her first menstruation, for in the years to follow there must occur not only the development of her sexual organs, but also the increase in size and change of form

of her whole frame, particularly the part included between her hips — the *pelvis* — whereby the germ of a new life may be fitly and fully developed within her body, and at the proper time permitted to pass through the pelvis to the outer world. For the too youthful wife marriage often proves a pain, not a pleasure ; a grief, and not a joy. The imperfectly developed womb and ovaries, which might well have attained perfection if permitted to remain unmolested, unable to meet the demands of matrimony, are goaded into a state of irritation and disease. Her nervous system is often thereby enfeebled and she is prone to general prostration, as well as to those diseases peculiar to women. If she become a mother, she experiences more risk of injury during and subsequent to her confinement ; and when called upon to nourish her infant as well as her own still growing body, it is not surprising that she often breaks down entirely.

It has been found that in our latitude and climate women usually continue to grow and develop up to the age of 20 years ; though there are, of course, numerous exceptions in which maturity occurs earlier as well as later than this period. On the other hand, there are certain physical disadvantages accompanying over-maturity in the bride ; for it is a well-established fact that women who experience the first confinement at an age exceeding 28 or 30 years furnish a larger mortality from child-birth than those who become mothers between 20 and 30 years of age. From the physical standpoint alone, therefore, matrimony seems most advisable as a rule between 20 and 25 years — an age too, previous to which the mental development is not usually such as to demand marriage.

In the choice of a husband no adviser can influence the dictates of a woman's heart ; and it is not our purpose either to usurp the duty of the parents in suggesting ordinary discretion and previous acquaintance with the mental and moral, as well as the physical, characteristics of the suitor ; nor to pad our pages with romantic, sentimental, and utterly absurd advice, so interesting to imaginative young ladies, as to just how tall and heavy and graceful and manly he should be ; as to what should be the color of his eyes, etc. It should be, however, remarked that certain physical characteristics ought, in the interest of the girl herself, to constitute insuperable obstacles to matrimony : It cannot be too emphatically insisted upon, that a man and a woman presenting the same hereditary taints, suffering from the same constitutional disease, or tendency to disease, should not, as they value their own happiness and

that of their possible children, marry. In our land this is particularly true in regard to consumption and insanity. Were our laws made with the same rigid regard for physical health as prevailed in ancient times, we would doubtless forbid marriage to all suffering or likely to suffer from consumption; and while we are in these days more humane; while we take into consideration, in the estimation of conjugal happiness, the mental and moral as well as the physical welfare of the participants, yet we must remember that consumption is an eminently hereditary disease, and that the child's chances of becoming a victim to it are greater if both parents be born of tainted stock than if one at least be healthy. The same remark may be applied to insanity, epilepsy and other diseases of the nervous system; for we may be sure that while children may escape if the tainted be mixed with healthy blood, yet the most aggravated and numerous cases of obstinate nervous diseases are found in families where both parents exhibit a tendency to the disease. In this general fact, too, we have a solution of that much-discussed question, whether relatives, particularly cousins, should be allowed to marry. With reference to this, we may say that the simple fact of relationship — when not nearer than that indicated — constitutes no physical impediment to marriage, yet there usually exists in these cases a physical objection; for the physical imperfection, if any exist — hereditary taints and tendencies to disease — will probably be found in both members of the family, and these defects and taints would in all probability be condensed and aggravated in their children; and while we may say that there is no physical objection to the inter-marriage of cousins as such, provided both be healthy, yet there will usually be found upon closer scrutiny a family tendency, the aggravation of which by inter-marriage, would be disastrous to happiness.

It need scarcely be remarked that close and repeated inter-marriage among relatives is, from the physical point of view, undesirable. It is a law, true of man as of other animals, that the most vigorous qualities of a given stock are best maintained by a certain admixture of foreign blood; and it is a fact of observation, that marriages between Americans — those whose ancestors have lived in this country for several generations — are less productive in at least the number of the children than marriages between a native American and a European; though it must be admitted that since the size of the family is influenced by many other circumstances

than the simple fertility of the parents, we are not justified in drawing the same conclusion from the fact just stated as might follow such observation upon animals. It is specially interesting in this connection to note the peculiarity of the Jews: they, as is well known, marry, as a rule, only members of the same race, and yet are remarkable for both physical and mental vigor of their numerous progeny. The peculiar traits, mental and physical, we may indeed say moral, are retained and perpetuated by inter-marriage, and yet a sufficient latitude of choice is allowed to secure a proper admixture of stock. It must, however, be remembered that the religious tenets of Israel provide not only for the health of the soul, but contain also admirable regulations for the health of the body; to which perhaps their fertility and general health are to be in part attributed.

In selecting the time for marriage, certain physical facts should not be lost sight of amid social considerations. The health of the wife and of her possible offspring is furthered by consummation of the marriage rite in the spring or in the fall; for entrance upon this new life is beset with physical and mental trials, which are certainly all the more trying amid the heat of summer or the cool of winter. One important consideration gives spring an advantage over autumn: that if a child be born within a year its chances will be far better for surviving the trying period of teething, since the most critical part of this process will then occur in cool weather, and not in the heat of summer. The wedding should occur about the middle of the interval between two menstrual periods.

Although custom ordains that the newly-married pair shall start at once upon a wedding tour, yet it is generally understood that this tour need not be extended a greater distance than suffices to remove them from the immediate and critical observation of their friends; indeed, it is a hopeful sign to observe that the wedding tour is no longer so imperatively required by society as formerly. From the physical point of view, certainly nothing could be more objectionable than a long journey immediately subsequent to the marriage ceremony. When, in addition to the annoyances inseparable from traveling, the bride is subjected to the trials incident to initiation into her new life, it becomes apparent that the girl is, during the ordinary bridal trip, subjected to a severe and in large part unnecessary physical strain, and that, too, at a time most critical and important for the security of her future happiness, as

well as that of her husband. They are, it is true, withdrawn to a certain extent from the rude realities of life into an atmosphere of affection and sentiment; yet it must be remembered that this affection and sentiment, however sincere and hearty, has a physical basis—a foundation which would be much better and more securely laid if both, especially the bride, were relieved from all unnecessary fatigue and annoyance, for at this time she has supreme need of physical perfection and at the same time of the greatest tact and discretion; sometimes, too, she must be prepared for disappointment, for probably every man, however sensible and rational in other matters, is positively silly during the courtship and engagement; invests his fiancee with perfections of body and mind which are actually never clothed in mortal shape; in fact he marries an ideal creature of his own imagination, and during the first week of married life must learn to substitute the actual for the ideal. Hence it often happens that a certain revulsion of feeling is felt by many men, who nevertheless have sincere affection for their wives—a revulsion of feeling for which the bride is not responsible, and yet which she must anticipate and be prepared to meet. There can be little doubt, though it is a matter of course which scarcely permits of actual demonstration, that the seeds of much unnecessary discord and unhappiness are sown during the honeymoon by ignorance and lack of tact. It is therefore extremely desirable that all useless troubles and fatigues, such as those attendant upon traveling, be postponed until the wedded life be fairly begun. And it is hardly necessary to add that it is desirable to avoid the inquisitive eyes of friends and acquaintances, while on the other hand it is just as undesirable to forget and forsake the world entirely during this time; the boy who eats jam without bread will surely have dyspepsia.

Pregnancy.

The minute bodies contained in the ovaries—the eggs—undergo an enlargement, and one or more of them escape from the ovaries, usually during the monthly period, and are carried along the tube connecting the ovaries with the womb. Arrived in this latter organ they are as a rule cast off with the secretion and leave the body. But if in the course of their progress from the ovary the

egg meet and become penetrated by the male element it is not cast off as in the former case, but becomes lodged in the membrane which lines the womb. Then follows a development of the germ and with it of the containing womb — and this development constitutes the process known as pregnancy. Associated with this process and intimately dependent upon it, are various other conditions manifested sometimes in parts of the body so remote that it is not easy to discover the connection with the organs especially concerned. Indeed almost every part of the body is liable to manifest deviations from its usual state at this time ; yet some of them are of such constant and uniform occurrence as to be regarded as signs of pregnancy. Yet it should never be forgotten that the absolute signs of pregnancy — those which cannot be induced by other causes — are very limited, especially in the early months.

While certain changes early occur in the generative organs themselves which may lead the physician to suspect the existence of pregnancy, yet the first symptom which attracts the attention of the woman herself is usually the suppression of the monthly flow. This, of course, is not an infallible sign of pregnancy, since suppression may be caused also by several other conditions, and indeed not infrequently occurs in early married life without any appreciable cause, unless, indeed, we may attribute it to the influence on the nervous system consequent upon sexual intercourse. And on the other hand the monthly sickness may continue during a part or even the whole of pregnancy. It occasionally happens that the young wife continues to menstruate more or less profusely at the first two or three periods after pregnancy has actually begun. Indeed, cases are on record in which women have menstruated only during pregnancy.

A second symptom upon which women generally lay considerable stress is morning sickness. While this is a very common symptom, and when present may have considerable value, yet its absence is by no means proof of the contrary condition. There is no certainty nor uniformity as to the time at which this symptom may make its appearance. At times it seems to begin almost at the very day of conception, while at other times it may make its appearance only after suspicion is already aroused by the suppression of the monthly sickness. There is also considerable variation in the duration of this condition ; in some cases it may last for a few weeks only, in others may persist until delivery. As a rule,

we may say it begins during the first month and ends at the third or fourth. Occasionally, too, the nausea and vomiting occur in the evening and not in the morning.

Changes in the breast constitute also a usual sign of pregnancy —as will be expected when we consider the duties which these organs are to perform in nourishing the germ now undergoing development. Among the earliest indications are certain vague feelings sometimes described merely as a sense of fullness, but often amounting to uneasiness and even pain. The breast becomes larger and firmer; the nipple is more prominent; the veins under the skin become more conspicuous because larger; the rose-colored circle surrounding the nipple becomes larger, darker, and exhibits numerous small projections. While these changes possess considerable value as signs of pregnancy, yet they usually occur so late—often beginning only with the third month—that the question may be decided without them; this is particularly the case if the woman be already a mother, since the changes in the breasts are usually less marked in subsequent than in the first pregnancy.

Another symptom frequently, though not always present, is irritability of the bladder. In the later months the necessity for frequently voiding the urine is not uncommon; yet this symptom sometimes makes its appearance in the second or third week, and is sometimes followed later by inability of the woman to retain the urine, which frequently escapes by day as well as by night, in spite of all her efforts to control it.

Changes in the abdomen are, in the earlier months, very uncertain signs of pregnancy—reliance upon which has occasioned numerous, often ridiculous blunders. During the early weeks of pregnancy the abdomen actually becomes smaller and it is not until the the thirteenth or fourteenth week that enlargement begins; yet it often happens that there will be an accumulation of gas in the intestines which may simulate quite closely the usual enlargement, and if this happen during the first month or two of pregnancy the great expectations of the young wife are often terribly blighted when a few weeks later she finds her abdomen much smaller than before. Many a childless woman, too, approaching the change of life is led to hope from this deceitful enlargement of the abdomen in connection with the suppression of the menstrual discharge that she is finally pregnant. There are so many causes which may contribute to abdominal enlargement that this symptom has but little value in determining pregnancy, until the later months.

The movements of the child, or rather of the fœtus in the womb, communicate to the mother the sensation known as quickening. The exact time at which the movements are first perceived varies with several conditions—the activity of the fœtus and the condition of the mother. The average time is perhaps the eighteenth or nineteenth week, though it may occur as early as the fifteenth or may be postponed until the eighth or ninth month. Since quickening consists merely in the perception of the fœtal movements by the mother, it is evident that there is considerable room for mistake, especially in the first pregnancy, since similar sensations may be induced by the movement of gas in the bowels, by contractions of the abdominal muscles as well as by other causes. Nor is the absence of this feeling a proof of the non-existence of pregnancy. In the later months, sometimes even in the earlier, the movements of the fœtus become so violent as to occasion perceptible movement of the womb and of the abdominal muscles—movements which may even give the mother pain. Yet all these appearances may be simulated by other conditions than pregnancy; sometimes even intentionally. In more numerous instances, however, the woman is herself deceived, and often persists in her self-deception under circumstances which render the occasion highly absurd. It has repeatedly happened that the enlargement of the abdomen and movements simulating perfectly those of quickening have entirely disappeared so soon as the woman has been allowed to inhale chloroform, but have returned again so soon as she recovered consciousness. While such an occurrence usually suffices to convince the friends of the non-existence of pregnancy, it just as often fails to influence the conviction of the would-be mother. It is related by Hume that Queen Mary of England, whose marriage with Philip of Spain was not blessed with children, at one time deceived herself into the belief that she felt the movement of the fœtus. So confident was the joyful Queen that even her physicians were, or professed to be convinced, notwithstanding the previous years of barrenness. The approaching event became the subject of public and private rejoicings, and of supplications for the continued health and safety of the Queen and of her son. The latter, as is well known, failed to appear—the Queen had deceived herself.

Changes in the skin also often appear as one of the accompaniments of pregnancy; these are usually manifested by a darkening

of the skin, particularly on the forehead, nose and cheeks, sometimes also on the breast. Not infrequently there is more or less change in the general complexion; the skin may exhibit a certain unusual dryness; or, on the other hand, the amount of perspiration may be greater than usual. These changes, however, do not occur with such certainty or uniformity as to give them value among the signs of pregnancy.

Among other less constant and therefore less important signs, are caprices in appetite and personal habits. The pregnant woman is sometimes seized with an unconquerable desire to drink vinegar, devour chalk or slate pencils, indeed behave very much like a girl with chlorosis; the appetite is frequently markedly increased, sometimes even to an astonishing extent. Women in this condition often say that they are always hungry, and actually rise two or three times at night and get something to eat. During the same period that the woman suffers from morning sickness there not infrequently occur also other disorders of digestion—among which heartburn, pain in various parts of the abdomen and diarrhea may be mentioned. Mental characteristics also are sometimes changed remarkably. An unsteady temper, marked by fits of peevishness and irritability, often nervousness and even hysteria are developed in the earlier months.

Diseases of Pregnancy.

Some of the symptoms just mentioned as indicating pregnancy are such as would be regarded under ordinary circumstances as unnatural and requiring treatment. But pregnancy itself is a natural process, and since many of these symptoms are merely evidence of the sympathy which prevails between the sexual organs and other parts of the body, we are not accustomed to regard the slight disorders usual in pregnancy as indications of disease. So long at least as they do not exceed certain moderate limits they are usually treated by mild measures or even ignored altogether. Experience shows that the gravity of the symptoms manifested varies considerably in different women within the limits of perfect health; that is to say, the process is carried to a successful termination and the mother regains her usual condition. It is indeed a matter of surprise often to the physician himself to observe how well the

pregnant woman bears up under physical ailments and annoyances peculiar to her condition, which in the non-pregnant state would certainly be followed by serious impairment of her general health. There is therefore sometimes room for doubt as to just where the line should be drawn; some uncertainty in determining what cases demand treatment, and in which ones no interference is required. This is especially true of those derangements manifested by the digestive organs.

The morning sickness, already referred to, which is exhibited by almost all women to a greater or less extent in the early months of pregnancy, becomes at times the source of serious difficulty, and even apprehension. So long as the general health is not impaired thereby, it is certainly best not to attempt any interference with medicines. There is, indeed, a prevalent impression among the laity that morning sickness conduces to the success of the process; an impression embodied by midwives in the saying that a sick pregnancy is a safe one. Yet at times this symptom becomes so violent that the woman's general health is evidently injured; in such cases the sickness occurs not merely in the morning, but after every attempt to take food, no matter how bland and unirritating. In some of these cases it seems incomprehensible how the body can be sustained by the very slight amount of nourishment retained in the stomach. The most violent of these cases usually occur in first pregnancies Sometimes, too, the simple loss of food is aggravated by the violence of the effort occasioned in emptying the stomach — a violence which often causes anxiety lest the womb also should be excited to expel its contents and abortion be the consequence. At other times the vomiting is very easily accomplished. In but few of these cases is there any notable emaciation or any interference with the development of the fœtus; the usual history is, that after some weeks or months of constant distress, the vomiting ceases as suddenly and inexplicably as it began. At other times, however, there occur emaciation, pain in the stomach, the matters vomited are often mixed with bile, the breath is fetid, and the result is spontaneous abortion, unless this mode of relief be proposed and executed by the medical attendant.

Treatment.— The remedies which have been proposed for the relief of the vomiting of pregnancy are innumerable — a fact which in itself indicates that none of them can be always relied

upon. Indeed, it can scarcely be otherwise ; for the vomiting in this case is dependent not upon any disease of the digestive organs, but upon the presence of the fœtus in the womb ; and so long as this condition remain all attempts to regulate the digestive organs by remedies addressed directly to them are likely to be attended with only partial success. Yet it is fortunate that only partial success is required, since if the vomiting can be restricted within certain limits there will be no interference with the pregnancy.

It is best to begin by a regulation of the diet ; by avoiding irritating food ; by confining the diet to liquid articles of food, at least in the morning. Indeed, it sometimes happens that the vomiting can be very largely relieved by the simple device of taking the breakfast in bed and not rising for an hour or two after breakfasting. In some cases milk and lime water, barley water. soups and broths are retained on the stomach, though everything else be rejected ; occasionally eggs will be well borne, though this is the exception ; sometimes while all warm or hot articles are rejected at once, cold food will be well borne. In short, no rules for diet can be laid down ; the stomach is at this time extremely capricious, and we can ascertain what will suit it best only by trial in each particular case ; but it is desirable to make such trial with various articles of diet before resorting to medicines.

As to the remedies themselves, there is the same uncertainty of effect ; sometimes a glass of mineral water taken before rising seems to secure the desired result ; or pieces of ice held in the mouth until melted ; brandy and soda, a whisky sling, or a glass of champagne have each, in individual cases, prevented vomiting. The alcoholic beverages are especially valuable for this purpose in those cases in which there is considerable weakness and emaciation. A happy result will sometimes be secured by an effervescent draught, which is also desirable for the purpose of securing regular movements of the bowels. One of the most convenient of these draughts is made by dissolving in water one or two teaspoonfuls of the effervescent citrate of magnesia. If the vomiting do not yield to the use of these simple measures, it is desirable to secure the advice of the medical attendant, since most obstinate cases, which have resisted all changes of diet, and even a great variety of remedies, often yield to applications made directly to the mouth of the womb—a measure which must be, of course, referred to the physician.

A not infrequent annoyance of pregnancy is constipation. This habit, for it is oftentimes nothing more than a habit, is especially injurious during pregnancy, and great pains should be taken to avoid it. This does not imply that purgatives should be employed; indeed purgatives should be banished so far as possible during pregnancy. It will be rarely necessary to employ any other means than simple regulation of the diet, regularity in taking air and exercise and in attending to nature's calls. The diet for this purpose should include ripe fruits and fresh vegetables, brown bread, oatmeal and the like; if these measures be inefficient, enemas or the "cascara cordial" may be employed.

An uncommon annoyance of the pregnant state is diarrhea; if severe or obstinate it should be checked, but otherwise does not require especial interference. In most cases no medicine is required; by confining herself to milk, barley water, arrow root and rice for a day or two the patient will usually be relieved. At other times the cause is evidently indulgence in irritating food, some of which has remained in the bowels; in these cases a tablespoonful of castor oil will usually remove the irritating matters, and thus quiet the diarrhea.

A number of symptoms which occasion considerable annoyance and oftentimes anxiety, occur in the latter part of pregnancy, as the result of the pressure of the enlarged womb upon the veins. It is a familiar fact, that pressure upon the veins causes a swelling of those parts of the body below the point of pressure, as occurs in the end of the finger when a string is tied around the hand or the wrist. In the same way the pregnant womb presses upon the veins which pass into the body from the legs, and may thus cause a swelling of the lower limbs, usually beginning in the feet. This swelling is naturally greatest in the evening, after the woman has been all day erect, and has usually disappeared more or less when she rises in the morning. If no other symptoms occur to indicate interference with the general health, this swelling need occasion no anxiety, and usually requires no treatment if the woman will remain as quiet as possible, and avoid walking and standing.

If, however, there be a swelling not only of the feet but also of the hands; and if such swelling be accompanied by headache and disturbances of vision, especially if the pain be at the back of the head, and if, at the same time, there occur unusual feelings of languor and debility, there is cause for careful attention, for in

these cases there is frequently more or less disorder of the kidney, which may occasion trouble before or subsequent to confinement; indeed, it is usually desirable to call the attention of the medical adviser at once to this condition, since serious mishap may be thereby averted. Another result of this pressure is the enlargement of the veins of the leg usually just behind and below the knee, resulting in the condition called varicose veins. This condition is especially liable to occur in women who have previously borne children; sometimes the varicose veins disappear after confinement, since the cause — the enlargement of the womb—is now removed. Yet after two or three confinements this enlarged or varicose condition of the veins is usually permanent.

If this enlargement of the veins cause pain, it will be advisable to support the skin. This may be accomplished most simply by applying an ordinary bandage, but most effectually by the use of an elastic stocking. This garment should be made to order by a surgical instrument maker, since if not accurately fitted it may do more harm than good. It is hardly necessary to add that the pain and annoyance can be greatly diminished if the patient will retain the recumbent posture or keep the feet elevated on a chair when sitting.

During pregnancy women not infrequently suffer from enlargement of the veins in the lower part of the bowel, known as hæmorrhoids, or piles. This condition occurs with especial frequency in those who suffer from constipation. It occurs indeed rarely if a movement of the bowels be secured every day. It is desirable, therefore, to avoid hæmerrhoids, by securing regular movements of the bowels. Sometimes, however, this does not suffice; the hæmorrhoids persist and occasion the loss of considerable blood at stool. In these cases there is also usually severe pain.

Treatment.—Since hæmorrhoids which originate during pregnancy usually disappear spontaneously after confinement, the object of treatment consists merely in the adoption of such measures as will make the patient comfortable until the end of pregnancy. An operation is not required, and may indeed be positively dangerous. The first object is, as has already been stated, to secure regular movements of the bowels, which may be accomplished by small doses of cascara cordial, or by injections of warm water every night. If complete relief be not thus obtained, an ointment

made of tannin and opium may be applied to the part after each movement of the bowels.

Hygiene of Pregnancy.

It is not our intention to lay down a multitude of rules to guide the woman during pregnancy. The general principles should be borne in mind that the health of the mother is of the highest importance, not only for her own physical welfare but also for the development of the child; for the fœtus is of course merely a portion of the mother's body, which is acquiring the powers necessary for an independent existence. For nine months it remains a part of the maternal body, influenced, therefore, by everything which affects the mother. Moreover, since the powers which the child acquires during these nine months are the foundation for its separate existence, it is evident that causes which induce only a temporary effect in the mother may have a permanent influence on the subsequent life of the child. A woman may suffer very poor health during the entire term of her pregnancy, and yet after her confinement recover her usual healthy and hearty condition. But it is scarcely possible that the child born of that pregnancy, having therefore a very poor start in physical life, should become as vigorous as other children.

With regard to food, but two points need be especially mentioned: it should be abundant and taken at short intervals. As a rule the appetite is an ample guide and its promptings should be disregarded only when there is a craving for vinegar, chalk and similar useless articles. There is rarely danger that too much food will be taken, for especially in the latter part of pregnancy the demand for nourishment is really much greater than in the non-pregnant state. Preference should be and usually is naturally given to plain and wholesome food — meats, vegetables and fruits; it is desirable to avoid stimulating food — condiments, wines and pastry. It is usually better to take four, five or even six meals a day rather than indulge very heartily at the ordinary meal-times.

In regard to clothing, especial care should be taken for the sake of the fœtus. It may be laid down as a general rule that during pregnancy, especially during the latter months, flannel underclothing should be worn. It seems scarcely necessary to

remark that the body should be allowed perfect freedom for expansion. During the first three or four months, it is true, there is but little apparent increase in size, but after that time the corset as usually used causes damage, not only by compression of the fœtus and unfortunate changes in its position, but also by promoting swelling of the feet, varicose veins and the other difficulties resulting from impaired circulation. If the pregnancy must be concealed from motives of pride or delicacy, such concealment should not be attempted through tight lacing. The clothing everywhere should be loose and suspended so far as possible from the shoulders. Compression of the limbs by garters or otherwise, induces swelling of the feet and troublesome enlargement of the veins.

While cleanliness is of course especially important during pregnancy, yet the divers unnecessary features associated with bathing should be avoided. Very hot or cold baths, the shower and douche are undesirable, often dangerous; sea bathing also has been known to cause miscarriage. As a general rule it is desirable to take only a sponge bath as the daily habit with a lukewarm full bath not oftener than once or twice a week.

During pregnancy the woman usually requires more sleep than she is otherwise in the habit of taking; the inclination to lie late in the morning has at this time a physiological basis, and should be indulged. The same disposition inclines her, also, to naps during the day, which ordinarily confer profit as well as pleasure, for it should be borne in mind that a considerable part of the mother's vitality is now required for the development of the new being, and that this increased demand upon her strength must be met by additional hours of repose. It not infrequently happens, toward the close of pregnancy, that the woman experiences the sense of suffocation when she lies down; this occurs merely from the pressure of the enlarged womb, and can be obviated by supporting the head and shoulders, keeping the patient in the semi-recumbent position.

The mind of the woman requires not less attention than her body during pregnancy, since both the physical and mental welfare of the child is but a reflection — or rather continuation — of that of the mother. It is indeed a popular belief not only that the mental states of the pregnant mother are impressed upon the mind of her unborn child, but even that the sights which she may witness are sometimes impressed upon the child's body. We are all familiar

with the stories of cases in which infants have presented at birth various marks and peculiarities corresponding with objects which had made a decided impression upon the mother's mind during the pregnancy. We are told, for instance, that a baker's wife, who had been accustomed to see every day during the early months of her pregnancy a child who had two thumbs on one hand, gave birth in due time to an infant which presented the same deformity on the corresponding hand. Another mother, who was shocked one day early in her pregnancy at seeing a child with hare-lip, gave birth also to an infant with a similar deformity. Another lady, who had fainted at seeing leeches applied to the neck of a relative, was delivered of a child on whose neck was a perfect picture of a leech. Another woman who had, during pregnancy, experienced a constant desire to look at a watch, was not surprised to see in the eyes of her new-born child a distinct image of the face of a watch. Maria Theresa, Queen of France, is said to have given birth to a black child, the color of which she attributed to the fact that she had been startled some months previously by the sudden appearance of a black page in her service. And so we might go on multiplying indefinitely these and still more startling instances of the influence of the imagination and emotional excitement of the mother upon her unborn offspring. Yet it is only just to say that not a single instance is recorded by which we are justified in believing that the imagination or inclination or emotion of the mother can exert any influence upon the physical conformation of the child. The widespread belief in such events is due chiefly to the innate love of mankind, and more particularly womankind, for the mysterious and incomprehensible. In all matters pertaining to the mysteries of life we take far more pleasure in indulging the imagination than in exercising the reason, and are always delighted with an opportunity of displaying our credulity. Most of the instances of the class already indicated are pure fiction; and many of them clumsy fiction at that. It seems at first wonderful that a woman who had noticed a child with hare-lip should subsequently give birth to an infant similarly deformed; but when we remember that a certain percentage of all infants are born thus mutilated whether their mothers have seen similar children or not; and when we remember further that hare-lip is not, strictly speaking, a deformity, but merely an incomplete development exhibited by every fœtus at a certain stage of its existence, the wonderful part of such stories is dissi-

pated. And we can assure the youthful mother that she may gaze with impunity upon a whole museum of deformities and malformations, upon hare-lips, double thumbs, grinning monkeys, and similar attractions without the least danger of bringing a monstrosity into the world as a consequence. Yet at the same time it must be remembered that since the child is but the offshoot of the mother, its general mental qualities and habits will be determined largely by her mental qualities and habits during pregnancy. It is, therefore, desirable that the mother should be surrounded by all those influences which conduce to her contentment and gratification. The mother who is kept in a state of constant excitement and emotional disturbance during pregnancy will probably produce a peevish, irritable, or feeble-minded child; and conversely, the infant's chances for a well-balanced and easy-going temper are certainly improved if the mother have nothing to torment and worry her during her pregnancy. If this fact be borne in mind there is, of course, no occasion for specifying any rules about the matter.

It is easy to understand that the physical condition of the mother influences to a marked extent both the mental and physical characteristics of the child; if the mother be sick, feeble and but poorly nourished during pregnancy, it is scarcely to be expected that the infant will be robust and hearty. Yet there is a limit, doubtless, to the extent of this influence of the mother upon the physical condition of the child; and we are not prepared to believe those marvelous tales of the repetition upon the unborn child of physical impressions made upon the mother. There is a list of stories not less wonderful than those to which reference has just been made, illustrating this supposed transmission of physical influences. Thus we are told that a woman was in the latter part of pregnancy bitten in the right hand by a dog; and that two months afterwards she was delivered of a child whose right hand presented discolorations corresponding exactly to the marks made by the animal's teeth upon the mother's hand. It is only necessary to state that this and similar stories are not sufficiently authentic to warrant the conclusion indicated by them.

A matter requiring attention, especially during the first pregnancy, is the care of the breasts. It will be found advantageous during the latter weeks to use gentle friction over these organs, rubbing from the body toward the nipple; frequent bathing with salted water is also useful. In this way it will be usually possible to avoid

the retraction of the nipple, which is not infrequent in the first pregnancy. For the nipples themselves it is desirable to use a mixture of glycerine and cologne water in equal parts ; to this may be added in the last week or two before delivery a little alum. If the nipples become sore and fissured, presenting an appearance like a raspberry, they may be kept moist with a mixture of equal parts glycerine and rose-water containing borax — a teaspoonful of the borax being added to four ounces of the mixture. A most important feature in avoiding soreness and cracks of the nipples is their mechanical protection against friction by the clothing This may be accomplished in various ways, best, perhaps, by the use of nipple shields.

Accidents of Pregnancy. — First among these comes naturally the premature expulsion of the fœtus — an expulsion which is called abortion when it occurs before the seventh month, and miscarriage when occurring subsequent to that time. The causes which may induce abortion or miscarriage are in the ordinary course of events quite numerous. It is understood, of course, that we are discussing only miscarriage as it results from natural causes, and exclude for the present the artificial induction of abortion, and it may be further said that, adopting the names in common use among women, we shall apply the term " miscarriage" to premature expulsion of the fœtus at any period of pregnancy.

Under the conditions now prevalent in civilized society miscarriage is astonishingly frequent, for the investigation of many thousand cases has shown that one out of every three wives miscarries before she attains the age of 30 years. This, probably, falls below the actual frequency, because in the earlier months miscarriage is often unnoticed by the woman herself, and may even escape the observation of a physician in attendance. Furthermore, this accident occurs more frequently in the later than in the earlier years of childbearing. Abortion may, of course, take place any time subsequent to conception ; and it not infrequently happens during the first few weeks that no symptom is exhibited which attracts especial attention. The ordinary menstrual period fails to appear in a woman previously regular. Her suspicions are perhaps aroused, but if a discharge appears a few days later, she assumes that the period was simply delayed, and explains in this way also the unusual pain and increased flow. It often happens, indeed, that one monthly period will be passed entirely, but that at the next period there will be an

unusually abundant and painful menstruation. In such cases the woman rarely suspects that the clots discharged contain a blighted fœtus; yet such is in fact often the case. These instances do not usually require the attention of a physician; but they are, nevertheless, important facts for the woman to remember, since they often serve to explain subsequent disease of the womb. Practically, abortion is not usually certainly recognized as such by either patient or physician until the third month of pregnancy, at which time it occurs with especial frequence. It is fortunate, however, that during this period — the eighth to the twelfth week — abortion is not attended with as much danger to the mother as occurs subsequently. The most dangerous period for the occurrence of abortion extends from the tenth to the twentieth week; a miscarriage happening during this time usually requires the utmost care and skill of the physician to avert a fatal issue. This should be borne in mind, so that if the symptoms of abortion — to be presently mentioned — occur at this time, a physician should be immediately summoned, since his services are even more imperatively demanded than in delivery at full term.

Causes.—Abortion may be induced by causes affecting either the mother or the fœtus — more commonly the former. Among the physical causes may be mentioned any serious disease, especially the fevers, accompanied with a rash upon the skin; for it may be stated, in general terms, that a pregnant woman rarely undergoes an attack of small-pox or scarlet fever without abortion. Mechanical injuries also frequently induce miscarriage, which, as is well known, is very apt to follow falls, blows upon the abdomen, excessive straining, whether in lifting heavy bodies or in attempts to evacuate the bowels and bladder. Yet it is astonishing to observe what an amount of violence will sometimes be borne without exciting miscarriage. For instance, a noted physician of Scotland used to relate that his coachman once drove right over a woman who was in the eighth month of pregnancy, inflicting serious injuries upon her. The doctor, thinking that miscarriage must necessarily ensue, caused inquiries to be made, but found, to his surprise, that the pregnancy was not disturbed, and that the woman gave birth to a healthy child at full term.

Excessive emotion, such as fear, anger or grief, may sometimes be followed by this accident; so, too, may the abuse of purgative medicines. Thus the diseases consequent upon pregnancy —

such as morning sickness, irritation of the bowels and bladder — sometimes, though rarely, proceed to such a degree as to cause abortion. Another fruitful cause of premature expulsion of the fœtus is disease of the womb; in these cases there is often a certain regularity in the abortions; that is to say, this accident occurs uniformly at the same period in several successive pregnancies. On the side of the fœtus various causes may induce abortion, of which it is necessary to refer to only one: It is a well-established fact that if either parent have been previously subject to a certain contagious disease the wife is very apt, especially in the first years subsequent to this event, to have repeated miscarriages; usually, too, if the fœtus die from whatever cause, miscarriage generally follows within a few weeks. While we cannot enumerate all the causes of abortion, nor indicate the means for distinguishing these causes one from another, we would impress upon the mind of every woman the necessity of consulting her medical adviser if she have once had an abortion; for it is a curious fact that women seem to acquire a habit of abortion, and that their chances for miscarrying are very much increased if they have once miscarried, no matter from what cause.

Symptoms.— The symptoms of miscarriage vary with the period of pregnancy. In the earlier months there is often but little to indicate that this process is interrupted; indeed, as has been remarked, abortion may occur before there is any positive knowledge or even strong suspicion of pregnancy. During the first month or two the symptoms are usually indistinguishable from those of a painful menstruation; the only sign to arouse suspicion is an excessive flow containing possibly clots of blood. At this time it is not, however, a matter of so much consequence, since miscarriage is then attended with less danger; yet even then it is important to know, if possible, the true state of the case, since although there is no immediate peril to life, yet the foundation for menstrual disorders and diseases of the womb is often laid by neglect to recognize and attend to miscarriage in the early months; for it must be remembered that the womb increases in size from the very beginning of pregnancy; and when this process is interrupted, whether at full term or earlier, a certain time is required in order that it shall return to its former size. It is for this reason chiefly that rest and quiet are essential after confinement; and the same reasons demand that same rest and quiet after an abortion, even in

the early months. If, therefore, there be any reason for suspecting the possibility of pregnancy; if after missing one or two periods there occurs an apparently painful menstruation, accompanied with an excessive discharge including, perhaps, clotted blood, the woman should observe the usual precautions—should maintain the recumbent posture and avoid all mental and physical effort for some days after the flow has ceased.

Miscarriage occurring between the tenth and twentieth week is often accompanied by symptoms which indicate serious physical disturbance. Not infrequently one of the first indications is a severe chill, followed by fever, thirst, nausea and, of course, general indisposition. These symptoms, often accompanied by palpitation of the heart, coldness of the feet and dizziness, sometimes mislead the patient and her friends into suspecting some other difficulty. After some hours or days, however, the seat of the trouble is usually indicated by pain in the lower part of the back and abdomen, often shooting down the thighs. This pain at first continues, then becomes periodic in character, resembling, indeed, the true labor pains; and at this time there appears, if not already present, a discharge of blood. These two symptoms, pain and flooding, are regarded as characteristic of miscarriage; but it should be remembered that they may also occur without miscarriage; and indeed that miscarriage might occur, on the other hand, with but little pain and slight flooding.

Treatment.—The object of treatment depends upon the conditions, that is, upon the extent to which the miscarriage has already proceeded. Generally speaking it is, of course, desirable to arrest the expulsion and to quiet the womb, so that pregnancy may be continued to its natural termination. This is usually practicable, but not always, even when the nature of the difficulty is immediately recognized, for if the fœtus be already dead, it is impossible to prevent miscarriage when once inaugurated. Yet decision of this question must be referred in every case to medical adviser who should always be called at once. There are, however, certain measures which may be taken with advantage in every case until the arrival of the physician furnishes more exact instructions for the particular case in question. Whenever flooding occurs during pregnancy, whether accompanied with pain in the back or not, the woman should remain perfectly quiet, retaining the horizontal position until the flooding ceases; this is especially demanded if the

patient have suffered miscarriage previously. She should lie upon a hard bed with no more covering than is necessary to protect her; should eat only the blandest food—milk, arrow-root, broths; should avoid all nervous and emotional excitement, and even unnecessary movements in the bed, since every movement will probably be followed by a gush of blood. If these remedies be inefficient in controlling the flooding, fifteen drops of laudanum may be administered and repeated if necessary after an interval of two hours. The application of towels or flannel wrung out in cold water over the bowels is sometimes advantageous, but may defeat its own object by inducing contractions of the womb; it is therefore better to omit this measure until the arrival of the physician.

Prevention.—The prevention of miscarriage is theoretically quite simple, but practically not always feasible. It may be summed up in the words of Dr. Tilt, who says: "The way to prevent miscarriage is to lead a quiet life, particularly during those days of each successive month when, under other circumstances, the woman would menstruate, and to abstain during those days, not only from long walks and parties, but also from marital intercourse." It is especially desirable that women should observe these precautions during the first pregnancy, since, as has been already remarked, the occurrence of one miscarriage creates a decided predisposition to a repetition of this accident, which may, therefore, happen afterwards upon very slight provocation. If, in spite of all precautions, miscarriage does occur, it becomes necessary to observe especial care in avoiding it during subsequent pregnancies. In such cases it is generally advised that there should be a total abstinence from intercourse until after the sixth month, after which time the dangers of miscarriage are less.

Placenta Prævia.

One of the most serious emergencies of pregnancy arises from the condition known in medicine as placenta prævia—a condition in which the after-birth is attached to the womb at or near its mouth, and not, as is usually the case, at a considerable distance from this orifice. As a result of this location of the after-birth, there occurs some separation of it from the womb during the latter months of pregnancy, and since the after-birth is made up largely of blood-

vessels, this separation from the womb results in more or less flooding.

Symptoms.—Placenta prævia is fortunately a comparatively rare occurrence; in some instances, this condition is not indicated by any symptoms until labor itself begins, when the flooding instead of being slight in quantity, as is usually the case, occurs to a most alarming extent. As to the management of placenta prævia during labor, we have here nothing to say, except that it is one of the conditions which taxes to the utmost the physician's knowledge, skill and self-possession, and that the bare possibility of its occurence is of itself ample reason for securing in advance the attendance of a medical man at every confinement. In many cases, however, ample warning of this condition is given during the last three or four months of pregnancy. For it often happens that a flooding more or less severe occurs without apparent cause, when the woman has been subjected to no physical or mental strain; and this flooding is usually not accompanied by pain. Hence, we may say in general, that while flooding and pain are the usual symptoms of miscarriage, flooding without pain is often a symptom of placenta prævia. This flooding not infrequently occurs at night, even while the woman is asleep; and she may awaken to find that she has suffered a considerable loss of blood. After an uncertain interval, sometimes at that period which would have been the next menstrual period, flooding again occurs, also without perceptible cause. Such losses of blood, therefore, occurring after the sixth month, considerable in quantity and usually unattended with pain, should arouse a suspicion of placenta prævia, in which case a physician should be at once summoned, to determine definitely whether this suspicion be well founded. This he is usually able to do as early as the sixth or seventh month, and obtains thereby information of extreme value, which may enable him subsequently to avoid the catastrophe so often inseparable from this condition known as placenta prævia; a condition which but too frequently results in loss of life of the child or of the mother, or even of both.

Treatment.—A woman who is the subject of placenta prævia should remain, as she values her life and that of her child, under the constant supervision of her medical adviser; it is therefore not our purpose to indicate the usual measures employed, which can be anyhow carried out only by a medical man. But we may

say in general that the same measures advised for the prevention of threatened miscarriage are indicated also in the flooding which occurs in placenta prævia. The woman should maintain the recumbent posture, avoid all excitement of whatever nature, and take bland food. It is not, however, advisable to give laudanum, as was suggested in speaking of threatened abortion.

There is, however, a form of hemorrhage, or bleeding, which occurs even when placenta prævia does not exist; in the latter months of pregnancy a slight escape of blood appearing often in connection with bodily exercise is a not very unusual occurrence. This may be in itself a matter of but little moment, though it is not always possible, even for a physician, to say without a local examination of the parts whether the flooding is due to placenta prævia or not. In any case, the medical adviser should be consulted, since a hemorrhage during the latter months is always a symptom of possible mischief. In this connection it should be said that the bleeding sometimes occurs internally into the cavity of the womb itself, and in such cases there may be no loss of blood externally, and, indeed, no symptom which would direct the woman's attention to the womb as the source of the difficulty. The symptoms are various: There is sometimes complete collapse, the skin becomes cold and clammy, the breathing difficult, there is palpitation of the heart, and often nausea. At other times the symptoms are such as often attend a colic, and may be mistaken for such, while the fact is that the woman is rapidly losing blood, which is escaping from her veins into the cavity of the womb. After a time the womb feels distended, and there may be even a perceptible increase in its apparent size. In such cases it is usually desirable to stimulate the womb to contraction by gentle friction of the abdomen, which may be continued until medical assistance is secured.

Duration of Pregnancy.

For ordinary purposes it is sufficient to accept the popular idea as to the duration of pregnancy, namely: that it occupies a period of nine calendar months. To be accurate, however, it must be remarked that the average of a large number of cases observed with considerable accuracy is 280 days or ten lunar months—a

period, therefore, equivalent on the average to nine calendar months plus one week. The important thing to be borne in mind is, however, that this process, pregnancy, is not limited by iron regulations; that a certain amount of variation from the average period, whether greater or less, is the rule. In fact the term 280 days is given as the average, not because it is the actual time in the majority of cases, but because the average time of those periods, greater and less, is about 280 days. The determination of the exact duration of pregnancy in the human female is naturally a matter of almost insuperable difficulty; since it is, in the majority of cases, impossible to ascertain exactly the date of conception, this phenomenon not being marked by any features which render the fact of successful impregnation evident to the woman herself. For the same reason it is rarely possible to determine the extreme limits of the period during which the fœtus may remain in the womb—a period whose determination has at times extreme importance for the honor and rights of individuals and of families. Observation upon many of the lower animals has, however, shown that the term of natural pregnancy varies considerably both above and below the average. Thus, M. Tessier reported to the Academy of Sciences at Paris, a series of observations upon cows, undertaken for the purpose of determining the natural variations of pregnancy in these animals, whose sexual relations can of course be controlled and observed. The results show that, of 140 cows,

14 calved between the 241st and the 266th day.
53 calved between the 269th and the 280th day.
68 calved between the 280th and the 290th day.
5 calved between the 290th and the 308th day.

The extreme difference was, therefore, sixty-seven days; a matter of considerable interest, especially because the natural term of pregnancy in the cow averages about the same as in the human female. Observations upon mares have shown an even greater latitude in this process. Observations have shown a similar and almost equal variation in the duration of pregnancy in woman. The following table of cases observed by Dr. James Reid is a fair example of such observations. Of 500 cases,

23 were delivered in the 37th week—255 to 259 days.
48 were delivered in the 38th week—260 to 266 days.
81 were delivered in the 39th week—267 to 273 days.
131 were delivered in the 40th week—274 to 280 days.

112 were delivered in the 41st week—281 to 287 days.
63 were delivered in the 42d week—288 to 294 days.
28 were delivered in the 43d week—295 to 301 days.
8 were delivered in the 44th week—302 to 308 days.
6 were delivered in the 45th week—309 to 315 days.

There is, of course, an element of uncertainty as to the exact date of conception in the human species, which from the very nature of our social and sexual relations can rarely be excluded; but making due allowance for this — say two weeks — it is evident that the duration of pregnancy may vary in the human as in other animals over a considerable range of time. This fact is also demonstrated by the observation of instances in which pregnancy had been unquestionably the result of a single sexual act; instances which prove that pregnancy has endured 265, 302 and even 313 days after the last coitus.

As this matter of the possible limits of pregnancy has often times important legal bearings, enactments with regard to it have been incorporated in the legal code of various nations. The Code Napoleon fixes 300 days as the utmost possible limit for pregnancy, a period adopted also in Scotland; in Prussia 301 days is the utmost limit recognized by law; in these countries, therefore, the child of a woman who is confined 302 or more days after the death or departure of her husband, is considered illegitimate. In America, while there is no uniform law upon the subject, yet two cases are on record in which judicial decisions recognized the possibility that delivery might occur even 317 days after the last intercourse.

"Some reliable information in regard to this subject may, as we believe, be derived from observation of pregnancy in Jewish women. The author is mainly indebted to a very able physician accoucheur of that persuasion for the following information. Among Jews the sexes are separate during menstruation, and for seven clear days thereafter. The shortest period allowed for menstruation is five days, even should it last for an hour or two, so that the *minimum* period of separation every month is twelve days; and in anything approaching menorrhagia, of course, much longer. This law is observed by the vast bulk of the Jewish women, the exceptions being very few. After the period of separation, whatever that may be, the woman, besides an ordinary bath for cleansing purposes, must take what is called the 'bath of purification.' She simply dips in this but does not wash. This gives a fixed day from which a Jew-

ish woman reckons, as she knows the day she went to *the* bath, and calculates accordingly. Any one who may have an opportunity of making observations in this direction will find, first, that Jewish women calculate more accurately as to the duration of pregnancy; second, that according to their experience the duration of pregnancy seems to be rather less than is usually supposed; and third (although this has less to do with the subject more immediately under consideration), that, as has been observed by a late writer in Germany, this frequent and protracted abstinence from sexual intercourse may be admitted as a possible cause of the undoubted vitality of the Jewish race."—*Leishman.*

To Calculate the Time of Confinement.

Various plans have been devised for estimating the time at which labor may be expected; the simplest and most generally adopted is that first suggested by Naegele; his rule is to note the last day of the last menstrual period, subtract three months and add seven days. The date thus obtained will give at least approximately the day at which labor may be expected. If, for instance, a woman has ceased to menstruate on the 10th of June, the date of her confinement would be found by subtracting three months, which gives the 10th of March, and then by adding seven days, making the 17th of March the date at which confinement may be expected. There is in this method no pretense to absolute accuracy, as must be the case, indeed, when we consider the basis of this calculation; for this plan is based upon the assumption that conception usually occurs about a week after the cessation of the menstrual period; hence the addition of the seven days. Now, while as a matter of fact, conception does in perhaps a majority of cases occur about a week after menstruation, yet there is a considerable minority of instances in which conception does not occur at this date; indeed it may happen at any time during the month, especially during the week preceding the menstrual discharge. In these latter cases the confinement will naturally occur, not at the date ascertained by the above rule of Naegele, but usually some two weeks later or a week earlier.

There are several questions which might be discussed in this connection concerning the possibility of plural pregnancy. It is an

established fact not only that two or more ova may be impregnated about the same time, but also that a second ovum may be impregnated during the earlier weeks after the establishment of pregnancy — that is, after the fecundation of the first ovum. It is not necessary to enter into any discussion of the conditions under which more than one ovum becomes fecundated ; it may suffice to say that we are quite unable to control such conditions, and indeed even to detect them until the results — plural pregnancy — become apparent. If we except the numerous cases in which two or more children are born during the same confinement — within a few hours or days — there remain comparatively few cases of plural pregnancy ; in the majority of these the birth of the second infant occurs a few weeks after that of the first. In these cases it is usually evident that the first was a premature delivery, and that both children were conceived at the same menstrual epoch. There remain, however, a few cases in which a woman has given birth at an interval of three to five months to two children, each apparently at full term ; in these cases the most reasonable explanation is the assumption that a second pregnancy began during the continuation of the first. There is, indeed, in this assumption nothing opposed to facts ascertained with regard to conception.

Another curious phenomenon, which has been already repeatedly observed, is the birth of a fœtus within a fœtus, a well authenticated instance of which recently occurred in Germany. In these cases the inclosed fœtus is rarely, if ever, perfectly formed ; in fact, is usually but a portion of a child ; such cases are indeed apparently only examples of twin pregnancy in which one fœtus is not developed in the usual way.

In some instances of plural pregnancy, rare it is true, the explanation has been found in a peculiar conformation of the mother — a double womb. In these curious cases two pregnancies may, it is evident, occur quite independently of each other. One instance recorded by an English physician is sufficiently curious to justify repetition, since three children were born within four months. The mother was a woman 33 years of age, and in fourteen years of married life had given birth to six children. With one exception, when she was prematurely delivered of a seven months' child, her confinements had all been natural. In February, 1870, she ceased to menstruate ; on the 16th of July she had strong labor pains, and within twenty-four hours was delivered of twins, which the

medical attendant considered to be of about six months' growth. A week afterward she again summoned her physician, and expressed her conviction that there was still another child present in the womb; an examination confirmed her impression. Yet she began to menstruate and performed this function regularly for three months, at the end of which time, October 31st, she was delivered of a well-developed child. Subsequent examination showed that there was a well-defined partition between two cavities of the womb — in fact, a double womb. The curious features of this case became at once apparent: the two children born in July had been contained in one side of this double womb, the child born in August in the other side; the menstruation from July to August had proceeded from the former cavity.

The explanation of that not unusual occurrence (the birth of two or more children at one confinement) is to be found, doubtless, in the fact that two or more ova leave the ovaries at one menstrual period. In other cases it would seem that two ova, which have escaped from the ovaries at successive periods, have both been fecundated. This would doubtless be a more common occurrence, were it not that conception is usually followed at once by an arrest of activity in the ovaries, and therefore by an arrest of menstruation. Yet this arrest is not always immediate. Indeed, cases are known in which menstruation has continued uninterruptedly throughout pregnancy, and it seems by no means strange that one or more periods of ovarian activity should occur after conception; and in this occurrence lies, doubtless, the explanation of twin and triple pregnancy. It is scarcely necessary to remark that the conditions governing these accidents are practically beyond our control and our knowledge. Hence any detailed consideration of these accidents of conception and impregnation would be quite out of place in a treatise of this sort. One popular impression in regard to this subject may, however, be corrected. It is well known among stock breeders and farmers that if a cow gives birth to two calves, one of which is apparently a female, this latter animal, though to all appearances well-formed, is sterile. The reason for this sterility has been ascertained by dissection to be an incomplete development or even absence of the ovaries. These imperfect females are commonly known as "free-martins." It has been assumed and believed by analogy that a human female born as a twin, the other child being a male, is also sterile. This, however, is a mistake. Numerous

instances are on record (one having come under the personal observation of the writer), in which such females have become prolific mothers.

The physician is often asked whether it is possible to detect the presence of twins before birth; also whether it is possible to avoid this accident. To the latter query one can return only an unqualified negative. As to the detection of twins before birth, there are no difficulties in the later months of pregnancy. And this leads us to the discussion of a question which agitates the mind during the early months or years of married life: Whether it is possible to regulate voluntarily the sex of the expected child, and whether it is possible to detect the sex before birth. The latter question can usually be decided during the last two or three months before confinement; and this not by the form or size of the mother, which — nurses to the contrary notwithstanding — does not vary uniformly with the sex of the fœtus; nor is it true that the movements of a male fœtus are necessarily more vigorous than those of a female. It has been ascertained, however, by many observations, that the heart of the female fœtus beats more rapidly, on the average, than that of the male; indeed, that the heart-beats of the unborn female infant are usually more than 135 per minute, and those of the male fœtus usually less than that number. Yet it must be understood that this is not an invariable rule, since exceptions have been noted on both sides of the dividing line. Yet it may be assumed, with almost positive certainty, that if the pulse-rate do not exceed 118 or 120 per minute the child is a male; while if it do not fall below 142 the infant is a female. The chances of accuracy decrease the nearer the pulse-rate approaches 133 or 135. This detection of the pulse-rate in the fœtus must, of course, be referred to the physician, and even he not infrequently finds difficulty in solving the problem. For the voluntary determination of the sex of the child in advance there exist several popular rules. Many women, and not a few physicians, believe that if conception occur just before the time for a menstrual period, the child will be a male; and that conception just after a menstrual epoch produces a female child. This may be true, but we have no evidence to establish its accuracy, unless we accept as conclusive the results furnished by Thury, of Geneva. It had been noticed that the first eggs laid by queen-bees produced females, the later ones males. A similar assertion has been made with regard to hens. Thury, assuming these facts as a basis, proposed a

law for the determination of sex in stock-raising, asserting that if conjunction occurred during the early part of heat, female offspring would be produced; if during the later part, male offspring.

This plan was submitted to somewhat meager tests in Switzerland and France; the results though not invariable seem to sustain Thury's proposition. Thus one observer says: "In the first place, on twenty-two successive occasions I desired to have heifers. My cows were of Schurtz breed and my bull a pure Durham. I succeeded in these cases. Having bought a pure Durham cow it was very important for me to have a new bull to supersede the one I had bought at great expense without leaving to chance the production of a male. So I followed accordingly the prescription of Professor Thury, and the success has proved once more the truth of the law. I have obtained from my Durham bull six more bulls for field work; and having chosen cows of the same color and height I obtained perfect matches of oxen. My herd amounted to forty cows of every age. In short I have made in all twenty-nine experiments after the new method, and in every one I succeeded in the production of what I was looking for — male and female. I have not one single failure." Several other stock-raisers have reported limited observations to the same effect, and several physicians have asserted that the same law applies to the human animal; thus one writes: "Whenever intercourse has taken place in from two to six days after the cessation of the menses, girls have been produced; and whenever intercourse has taken place in from nine to twelve days after the cessation of the menses, boys have been produced." He neglects to state what the result was when conjunction had occurred at both of these periods. When we consider the number of instances in which the observance of this rule has utterly failed to produce the desired result; and when we further remember that, as there are but two sexes, any conceivable rule would by the laws of probability be successful in about one-half of the cases, it is evident that Thury's law has just about as much and no more claim upon our credence than any other that might be proposed.

The most recent sensation in this direction is the report of a Texas stock-raiser, who, having tried and abandoned Thury's plan, devised one of his own. His theory is that the sex of the fœtus is determined by the relative ardor of the parents at the time of conjunction — the offspring taking the sex of the less ardent of the two. According to his experience female offspring may be pro-

cured by imposing a period of abstinence upon the male previous to intercourse; and male offspring by the converse method. He, too, produces an array of experiments upon cattle by himself and others to prove the correctness of his proposition, but does not succeed in convincing one familiar with the general principles underlying the facts of reproduction. The popular idea ascribes a tendency to female offspring to a union in which the wife is older than the husband. For this belief there is no other foundation than the general fact that more male children are born than female, and that husbands are usually older than their respective wives. Others again assert that more females are born during warm years, more males in cold years. This, too, is a pure assumption, so far at least as the human race is concerned. Indeed, we may sum up this entire matter by saying that we have no exact knowledge by which we can fix at will the sex of desired offspring.

Upon the possible causes which determine sex there has been endless fanciful speculation, and there are indeed many curious and interesting facts concerning the relative numbers of the two sexes at different periods of life and under different social conditions. More males are born than females, the proportion being usually stated at 103 or 104 of the former to 100, yet among the adult populations women are almost invariably in considerable excess. In England there are said to be 105 women, in London even 112 to every 100 men. In newly-settled countries this ratio is of course liable to great variation; in some of our own Western States the men outnumber the women eight, ten or twelve to one. This of course results from the peculiarity of social relations and business pursuits, which necessarily exclude most women from these sections. Yet the fact remains that the adult population averaged throughout the world, displays an excess of females, notwithstanding the general excess already stated of male over female infants. The relatively excessive mortality among males indicated in this reversal of numerical majority between the sexes, occurs not alone, as we might suppose, in early adult life from the accidents, injuries and diseases to which masculine occupations necessarily expose men, but occurs also largely in infancy; for during the first and second years of life a larger number of males die than of females, so that in the fifth or sixth year of life females are already in excess.

Confinement.

A preliminary sign of labor, usually observed about two weeks before the onset of the pains, is a sinking of the womb in the pelvis, whereby many of the unpleasant features which had previously annoyed the woman are relieved. The abdomen usually becomes somewhat smaller, the breathing is rendered much easier, and there is often a general sense of relief and buoyancy, which attracts the attention of friends. Since this indicates approaching labor, it is evident that there should be no indulgence in unusual exercise, however much disposition there may exist. Another usual sign, which may appear from one to two weeks before labor actually begins, is an increased secretion from the genital organs. This is a cause for congratulation rather than for anxiety, and need occasion no interference other than measures of simple cleanliness. In return for these advantages, the woman is now often subjected to new annoyances. The descent of the womb, by which her breathing is relieved, often occasions irritation of the bladder and rectum, so that she has frequent, perhaps painful calls to evacute these organs. So too the increased secretion, which is itself desirable, is often accompanied by an uncomfortable swelling of the parts, which occasions physical discomfort and mental anxiety. Finally there occur the contractions of the womb, which indicate that this organ is preparing to expel its contents. These contractions usually continue for some days without calling the attention of the patient herself, though sometimes they recur by night so frequently and so severely as to keep the woman in a state of wakefulness and constant apprehension that labor itself is about to begin. It is well, therefore, to bear in mind that those contractions of the uterus which are directly instrumental in expelling the fœtus, are perceived by the woman, as "pains" in the back, extending down the thighs and often around to the front, and that they occur and recur at regular intervals — intervals which may vary, it is true, from ten to thirty minutes. These are the characteristics of the *true* labor pains, which may be and should be thereby distinguished from various other so-called pains which are apt to occur about this time. During these early pains there usually appears what is known as the "show" — a discharge of mucus and blood from the mouth of the womb. Yet this must not be relied upon as the invariable sign of beginning labor,

since it is sometimes scarcely observed, either because but little blood appears, or because the secretions from the part are already so excessive as to make the further increase pass unnoticed. Although the woman does not necessarily take to her bed during the early part of labor (in fact, most women cannot be persuaded to recline, but insist upon sitting or walking), yet these early pains should be taken as the signal for preparing the bed and such utensils as may be required during labor.

Much inconvenience and annoyance can be avoided subsequent to delivery by adopting a certain arrangement before labor begins. The bed may be conveniently arranged by placing upon the bedstead the following articles in the order indicated, from below upward :

Mattress.
Newspapers or oilcloth.
Lower sheet.
Four-fold sheet (pinned down).

Oilcloth — four or five feet square.
Quilt.
Sheet to cover quilt.

The three articles last named can be removed without disturbing the patient materially after the labor is over, leaving her comfortably placed upon clean linen with ample protection of the mattress from subsequent discharges.

The woman herself should be provided with certain articles. First, it is of course desirable that her garments shall, so far as possible, escape soiling during labor ; hence, the first requisite is brevity, which may be attained either by turning up and pinning or stitching the ordinary chemise, or, perhaps better, by preparing short gowns for the purpose. Another plan is to have the chemise tucked above the hips, its lower part being substituted by a folded sheet fastened about the waist. A second article which it will be found usually desirable to employ is a bandage. This should be made of unbleached muslin, long enough to encircle the hips and broad enough to extend from above the prominence of the hips half way down the thigh ; its average length, therefore, will be about four feet, its average breadth fifteen to eighteen inches. The size varies, of course, with different persons, and it may be fitted

in advance to each individual; the pattern may be obtained by measuring the body at about the fourth month of pregnancy.

For the child there may prepared flannel or woolen underclothing and a narrow flannel bandage four or five inches in breadth and fourteen or fifteen inches in length. There will be required, also, a bottle of fresh sweet oil and two lengths of twisted or braided thread; a paper of large pins and one of smaller ditto; some fine sponges previously washed and pounded so as to be free from sand; a box of unirritating toilet-powder; some fine soap; a small pair of scissors; an abundance of clean towels; a piece of old linen or cotton wadding, for dressing the naval string. All these articles should be properly arranged in advance within easy reach; perhaps the best way is to place them in a basket devoted to the purpose, which may be kept in the room.

The first stage of labor, which may vary from a few hours to one or two days, consists in the dilatation of the mouth of the womb. During this time the woman ordinarily prefers to remain upon her feet, and thus usually finds relief and comfort. This period is apt to be especially long and tedious at the first confinement, and may be quite short in subsequent labors of the same individual. During this time the pains have nothing of that bearing-down character which they subsequently acquire; they are described rather as "grinding," are felt in the front, and have what has been called a "wave-like" course — that is, a regular crescendo and minuendo of intensity. During these pains the abdomen may be felt to become hard, the breathing is somewhat retarded and the pulse increased in frequency. During this time, also, the genital canal becomes bathed with the secretions, which may or may not be tinged with blood. This is the period which is apt to be especially trying to the soul of the young wife. For hours she is annoyed and made restless by frequently-recurring pains, which seem to accomplish no good and merely exhaust her strength and patience. She should remember that this apparently useless annoyance is a most essential and unavoidable part of the process, and that little can be done by herself or by the physician to accelerate or shorten the process. She should not waste her strength by attempting to "bear down," for she will subsequently require all her energies for this purpose.

When the mouth of the womb has become dilated, the expulsion of the child begins — a change of programme indicated to the

mother by the altered character of the pains; these now become more frequent, severe and prolonged, while at the same time the woman now is conscious of an effort to expel a body from the abdomen,—to bear down—and naturally summons to her aid the voluntary muscles capable of assisting in the accomplishment of this object. This consciousness that she is working to overcome an obstacle usually confers a certain satisfaction upon the woman, who may have been discouraged and exhausted by twenty-four hours of annoying pains which seem to have no object, and hence present no hope of completion. The commencement of this, the second stage of labor, is often indicated by several occurrences which may alarm the inexperienced. Not infrequently the conclusion of the first stage is marked by the occurrence of a severe chill, which may be so violent as to shake the bedstead upon which the patient reclines. This seems to be a natural part of the process and calls for no interference other than warm coverings, and perhaps a hot drink. A second phenomenon is the escape of the "waters"—an occurrence which usually happens during the latter part of the first or the early portion of the second stage of labor.

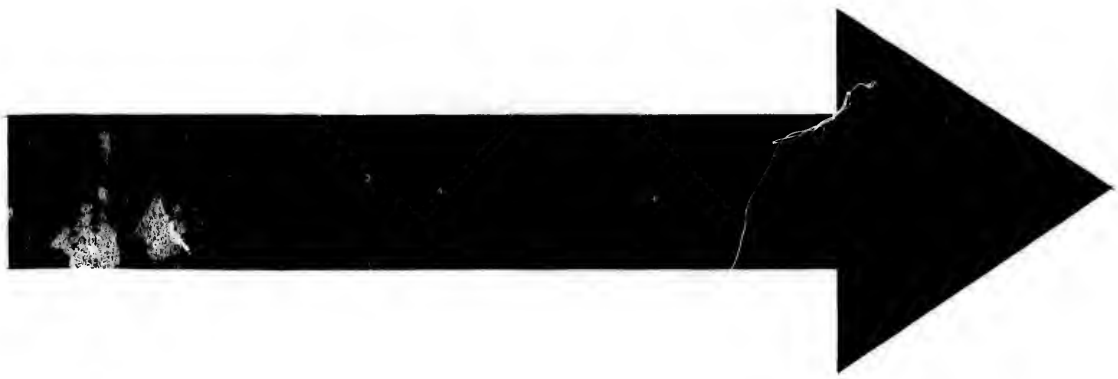
When the pains assume the expulsive character indicating that the second stage of labor has begun, the woman's inclination is usually to take to her bed. Yet to assist in her voluntary efforts of expulsion she almost invariably desires to have something to pull against; hence it is advisable to tie a twisted sheet to the corners of the bedstead, at the foot, so arranged that the middle of the rope thus formed shall be at a convenient distance for the woman's hands. While this ordinarily satisfies the demands of her nature at this time, yet one must be prepared for curious freaks and fancies.

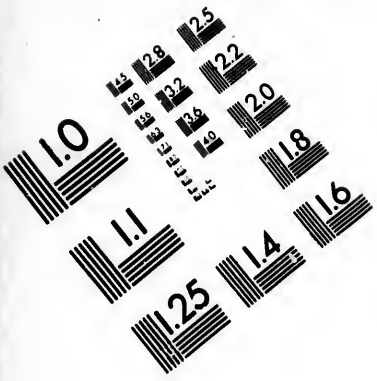
During the pains of the second stage, the expulsive efforts are often accompanied by such physical contortions as to excite the alarm as well as the sympathy of friends. It may be said, however, that no damage ever results to the patient from the excessive violence of her own efforts; no matter how long her respiration be arrested, nor how blue and distorted her face becomes; these are all natural accompaniments of the process, which need occasion no anxiety nor interference on the part of the friends at least.

It is certainly desirable, in the interest of the patient and her child, that a physician should be called in every case of labor. In many cases, it is true, his services are not imperatively demanded; in many others, professional skill saves the life of mother or child,

or both. Since it is impossible to predict in advance as a rule what cases will proceed quietly and easily and what ones will present serious complications, the only safe plan is evidently the presence of the best medical skill in every instance. Yet in many cases, particularly in the country, it is either impossible to secure the services of a physician, or if a medical man be engaged, he is often unable to arrive until delivery has occurred. In such cases, it is desirable for friends to observe certain precautions in the care of the parturient woman.

During the first and early part of the second stage of labor, the woman should be allowed complete liberty as to position, food, drink, etc. Care should simply be taken that she be not annoyed by the well-meant, though over-officious attentions and inquiries of friends. But few individuals should be admitted to the lying-in chamber. No examination of the parts by a non-professional person will be apt to afford any particular advantage or information, until the head of the child appears at the outlet of the vagina. At this period, it is often possible for the skilled hand, by judicious manipulation, to prevent a rupture of the parts, and subsequent disease of the sexual organs. It is impossible to convey in a few words the information necessary for the performance of such manipulation; it may be useful, however, to remark that if the pains be severe, and the head rapidly advancing, the hand of an attendant (covered by a towel) may be applied at the lower edge of the orifice in such a way as to force the head in its progress toward the upper edge of the opening; never let the child drop into the bed. So soon as the child's head is born, the finger may be applied to the neck to discover whether it be encircled by the umbilical cord; if such be the case, a gentle effort may be made to slip this coil over the head, whereby two objects are accomplished: the breathing of the child is secured and the escape of its body facilitated. A finger may be passed into the child's mouth to remove mucus, etc. The birth of the head—usually a moment of extreme agony to the woman, indicated by a piercing cry—is followed by a period of rest and relief, during which the patient recovers in part her exhausted energy and courage; then follows with much less effort and pain, the birth of the child's body, usually accompanied by a considerable flow of blood. Both mother and child should now receive especial attention. As to the former, a hand should be placed upon the abdomen, where a distinct firm ball, occupying the lower part of the





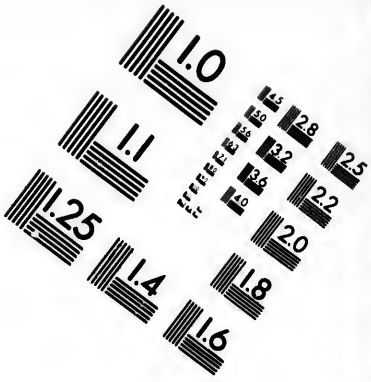
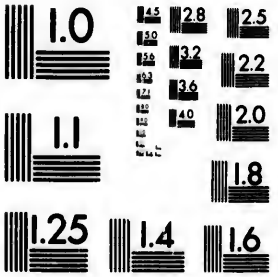
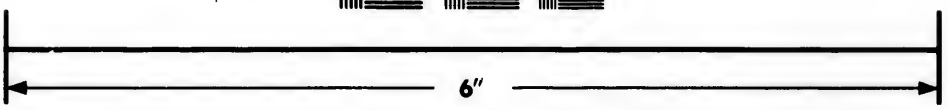
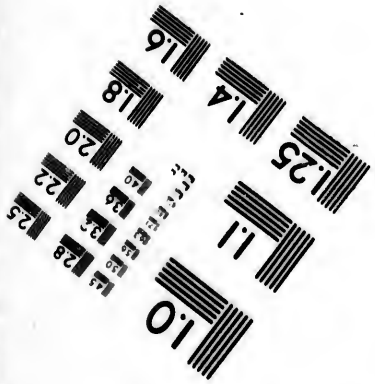


IMAGE EVALUATION
TEST TARGET (MT-3)







Photographic
Sciences
Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

abdominal cavity, should be felt; this may be gently and continuously pressed, whereby a certain amount of contraction of the womb will be secured. Meantime, another attendant should observe whether the child breathes, and if it does not, should take immediate measures to secure this action. Usually, so soon as the mucus has been removed by the insertion of the attendant's finger —or, indeed, without this precaution—the child responds with a lusty cry; if not, it may be stimulated by a few gentle taps with the open hand upon the most conveniently situated part of its anatomy, or by a few strokes with the wet end of a towel, or by sprinkling cold water violently upon its body. If one or all of these measures fail to induce vigorous breathing, it will be necessary to perform artificial respiration. This is a somewhat rare necessity, and may be most conveniently accomplished, after clearing out the infant's mouth and nostrils by the application of the attendant's lips to those of the child (the nose of the child meanwhile being held), whereby his own breath can be forced into the lungs of the infant—and then, of course, permitted to escape—at the rate of eighteen or twenty times per minute. This is a delicate and not altogether unobjectionable proceeding, which should be performed, if possible, by a medical man; and may be performed by others only as a last resort.

If there be any delay in persuading the child to breathe, the cord may remain uncut until respiration is established. So soon as breathing has begun (or before, of course, if any prolonged efforts are necessary to establish the respiratory functions, and there be no pulse in it) the cord may be cut. The piece of twisted thread, previously prepared for this purpose, is tightly tied around the cord at a distance of about two and a half or three inches from the child's body; a second piece is similarly tied about an inch further from the child, and the cord is then cut between the two. The objection to using tape, as is so often done for this purpose, is merely that the tape, because broad, cannot be made to penetrate the jelly-like substance of the cord, and does not, therefore, secure a compression of the artery and veins enclosed within the jelly-like material; hence there sometimes occurs a serious loss of blood from the cut end of the cord. The tape, too, slips more readily than thread, and if not very tightly tied, may even after several hours, slip off entirely and permit serious or even fatal hemorrhage. In cutting the cord care should be taken — particularly if the opera-

tion be performed under the bed-clothes — that nothing except the cord, that is, no fingers nor toes of the child be accidentally caught between the blades of the scissors. The infant is now removed from the bed and received upon a blanket or piece of flannel held in the hands of a nurse, upon which the child should be transferred to a place of safety, such as a bed in a neighboring room; sometimes, in the excitement of the moment, the infant will be deposited in a large arm-chair or similar receptacle, where it may easily be smothered or crushed by individuals not aware of its presence. Caution is necessary in handling the child; for being covered with an unctuous material it may readily slip from a careless hand. Indeed, the only way for securing a grasp at once firm and yet not severe, is to place one hand under the back of the neck, so that the neck lies between the thumb and forefinger, while both knees are similarly held in the thumb and forefinger of the other hand. The child may be left wrapped up in its blanket or flannels — space being allowed it to breathe — while the mother receives the attention which she requires.

After the birth of the child there usually occurs a cessation of activity in the womb for ten to thirty minutes. During this time a sense of coldness, even positive chills, may occur. Within half an hour after the birth of the child it will usually be found that the after-birth has been detached from the womb and is lying in the vagina, whence it may be extracted by gently pulling upon the cord. In every case it is desirable, however, to keep the hand upon the abdominal wall over the womb, as already directed in speaking of the birth of the child. It will be found that after some minutes the womb becomes hardened and presently decreases materially in size, indicating the expulsion of the after-birth. If this do not occur spontaneously in fifteen or twenty minutes the process may be materially hastened by grasping the womb through the abdominal wall in the hand, and gently compressing the organ at intervals of a minute or two. This kneading movement may be repeated and pressure continued until the after-birth is delivered. Meanwhile the cord may be very gently pulled, never with any considerable force, for it should be remembered that if there be any obstacle to the delivery of the placenta the application of force to the cord may result not in pulling the after-birth away, but in tearing in two the cord, or even in turning the womb inside out.

After the removal of the after-birth, the womb should be dis-

tinctly felt as a very firm, hard body, about the size of a cocoa-nut, in the lower part of the abdomen. And it is important that the condition of the womb be observed from time to time for several hours after delivery. For one of the serious complications of labor arises from a failure of the womb to contract properly or to stay contracted; as a result of which failure hemorrhage may occur to a serious or even fatal degree. If at any time the womb, which has thus properly contracted after delivery, be found to have increased in size and to have become softer, it is probable that blood is escaping into its cavity. In this case energetic compression and kneading of the womb through the abdominal wall should be performed.

The three uppermost articles on the bed next to the patient's body may now be moved a little — six or eight inches toward the foot of the bed, so as to give an opportunity for cleansing the mother. This may be best performed by simple washing with warm water, to which a little alcohol may be added if desired. If her garments have been soiled, they should at once be replaced by clean ones, and then the upper sheet, quilt and oilcloth may be removed from the bed without disturbing the patient further than by the elevation of her hips. In this way she is brought to rest upon a clean four-fold sheet. A large folded napkin should be placed between her thighs, but not brought upward and pinned as is so often done, so as to close the orifice of the vagina. For by this latter plan the fluids which must necessarily escape into the vagina are retained in that cavity and may give rise to disease by undergoing putrefaction there; by simply placing the napkin between the thighs we do not impede the escape of these discharges. The bandage may now be applied; either the one already indicated, or, in case this is lacking, an ordinary bolster cover will answer the purpose. The bandage should be first fastened in the middle, large pins being placed at distances of one or two inches; it may be drawn tight enough to feel snug, but nothing is gained by excessive pressure.

After the mother has been comfortably placed in a clean bed, and after the child has been applied to the breast, she should be left in quiet to repose for an hour or two, with strict injunctions under no circumstances to change her position from the recumbent posture; this rule is rendered necessary by the danger of hemorrhage consequent upon the erect position or even upon raising the body to the sitting posture in the bed. A cup of tea or a glass

of wine may be refreshing, and should be granted if desired, but need not be forced upon the patient. It will be necessary often to change the napkins, and the opportunity should be improved to wash the parts with warm water and alcohol. This process should be repeated at less frequent intervals during the first few days, as often and as long as is necessary to secure perfect cleanliness. Every day the bandage may be loosened and the womb compressed gently for a few minutes, after which the bandage may be reapplied with a comfortable degree of pressure. This is a most important measure, by which we may hope to avoid not only the severity of the usual after-pains, but also to escape the dangers of puerperal diseases or "child-bed fever."

After the first week, the bandage has fulfilled its purpose, and may be dispensed with, unless the patient complains of a sense of insecurity, when its adjustment should be moderately loose.

The bandage is useful so long as it can grasp and compress a solid body, *i. e.*, the womb. When this can no longer be felt, it has done its real work, and if (tightly) persisted in, may even contribute to prolapsus of the womb.

Attention to the Child.

So soon as the necessary attentions to the mother permit, the child should be washed and dressed. The first step consists in thoroughly lubricating the infant's body with sweet oil, or fresh lard, since with soap alone it is impossible to remove from its skin the unctuous material which naturally covers it. It is best to anoint but a portion of the infant's body at a time, keeping the rest covered meanwhile; then this portion may be thoroughly washed with soap and water itself, covered, and another part of the skin treated in the same way. The object of this measure is, of course, merely to prevent a chilling of the child by evaporation from its skin; hence, in warm weather or a warm room, one may adopt the more expeditious plan of oiling the entire body, and the immersing of the child in a basin of warm water, where the soap may be applied. One precaution is always necessary: care to avoid the entrance of soap into the infant's eyes. The navel-string is now also dressed by wrapping it with a piece of well-oiled muslin or plain cotton wadding. The flannel bandage is now applied over

the navel-string, and the woolen clothes, already prepared, put on. The infant should then be applied to the breast immediately; if it refuse to nurse, it may be tempted by applying a little sweetened milk to the nipple. This immediate application of the child to the breast is of extreme importance for both mother and infant; any tendency on the part of the womb to relax, and thus permit the escape of blood—"flooding"—is likely to be at once arrested by the nursing of the child; the milk channels of the breast are opened, and the dangers of an undue accumulation of milk—"milk fever"—in the third day diminished. The child derives from the first nursings very little nourishment, it is true, but a much needed laxative, which stimulates its digestive organs. It should not be forgotten, if there be any signs of flooding, that the most efficient means for checking this, which a layman can use, are the application of the child to the breast and the kneading of the womb. It sometimes happens that the nipple is so retracted, either from the pressure of the dress during pregnancy or other cause, that the child fails in its efforts to nurse; in this case, it is usually easy to secure a proper protrusion of the nipple by filling a soda-water bottle with hot water, pouring out the contents, and then applying the neck of the bottle around the nipple. During the cooling of the bottle, the contraction of the contained air results in the desired protrusion of the nipple; the breast-pump may be employed for the same purpose. This difficulty is seldom serious if properly managed. At other times the infant, especially if prematurely born, seems unable to nurse—a most unsatisfactory condition, in which the only remedy is to attempt an artificial nursing, by milking the breast into the mouth of the child.

The most serious difficulty with which the infant has to contend at the beginning of his career is the persistent habit of nurses, of substituting for the natural and proper diet which nature ordains, the various mixtures which they themselves prescribe. It should be remembered and insisted upon, that although during the first two days the secretion of the mother's breast does not resemble milk, yet it contains just the essentials for the infant's nourishment, and that the introduction of sugar and water or catnip tea into the immature stomach of the child may have unpleasant results. If it be absolutely necessary to furnish some artificial nourishment, a mixture of cow's milk and water, three parts to one or thinner still, a little sweetened, will be the best and most convenient substitute;

but everything else should be abandoned so soon as the mother's milk is sufficiently abundant to nourish the child. So the castor oil and other laxatives so dear to the average nurse's heart are, to say the least, unnecessary for the child. Except under special conditions, which will be presently noticed, every mother should expect and be encouraged to nourish her own offspring; and this, too, not simply for the benefit of the child, but also for her own interest; for the act of nursing promotes the return of the womb to its natural size, which ordinarily happens during the first two months after delivery; a failure to nurse is often accompanied by an incomplete reduction in the size of the womb and the subsequent derangement of the sexual organs. Again, it is well known that the process of nursing affords a certain protection against recurrence of menses, and against conception. The child should be accustomed from its birth to take the breast at regular intervals, which may be at first two or three hours, and gradually extended as the infant becomes older. In this way time is afforded for the breasts to fill with nutritious milk, while the mother secures opportunity for necessary sleep; and on the other hand the child's digestive organs obtain the needed intervals of repose.

Care of the Mother After Labor.

The diet during the first three or four days should be ample and nutritious, though, of course, in a form which is easily digestible. The old idea of starvation diet after delivery is permanently abandoned. After the first day, during which the woman rarely has much appetite, she may receive as much food, in the shape of broth, soup, beef tea, eggs and milk, as she is inclined to take. One point may be profitably borne in mind: that she will obtain more benefit and less discomfort by taking food in small quantities at short intervals, than by indulging in larger quantities at longer intervals. After five or six days she will usually have, if everything go on well, both the desire and ability to take ordinary food; at this time her only care need be to avoid stimulating and highly-spiced food.

For two or three days after delivery there is usually a torpor of the bowels, and oftentimes of the bladder as well. The time-honored custom of giving a dose of castor oil on the third day is

still largely observed, and it will be doubtless insisted upon during the natural life of the present generation of nurses. With reference to this matter, it may only be said that if a movement of the bowels have occurred just prior to delivery, as should be the case, there is no necessity for an evacuation on the third or fourth day. Furthermore, castor oil as ordinarily given usually provokes straining at stool, and sometimes causes hemorrhoids or piles; hence if it be necessary to administer a laxative at all, one of the saline purgatives — preferably Husband's magnesia — may be better given instead. In many cases it is quite unnecessary, and therefore undesirable, to administer any medicine, since the bowels move spontaneously; and a simple enema of warm wa ·, with or without the usual addition of soap or salt, will secure the desired result without straining.

The bladder, too, often requires attention; sometimes there will be no voluntary evacuation of the urine for one or two days after delivery — a state of inactivity which may be attended with serious local or general effects. The condition of the bladder is one of the first points to which a physician directs a ·ttention in his first visits after delivery; in the absence of a medical attendant the friends should observe whether the bladder is evacuated, and if this function be not performed, cloths wrung out in hot water may be applied over the lower part of the abdomen. This simple measure will usually suffice to stimulate the bladder to contraction; if it do not, the catheter must be employed. These measures should be instituted early, so that the urine may be evacuated within twelve hours after the completion of labor, and at equal intervals thereafter.

After-pains usually ensue upon delivery, and at times constitute a most annoying and even painful feature of the case. These after-pains are the natural accompaniments of those contractions of the womb which continue after the expulsion of its original contents, and which seem to be caused by the presence of blood clots in the womb and by the natural reduction of size which now begins. These may be often modified, or perhaps avoided, by the exercise of proper care to prevent the accumulation of blood clots in the womb. If the directions already given for securing prompt and efficient contractions of this organ be observed; if the hand be kept upon the abdomen over the womb for an hour or more from the time of the expulsion of the child; and if the delivery of the placenta be followed by gentle kneading of the womb; if the bandage be daily loosened, and any blood which may have collected

in the womb be expelled by stimulating the organ to contraction through the abdominal wall; if these measures have been duly observed, the after-pains will usually be but slight. These pains are provoked and aggravated by any irritation of the vagina or of the rectum; hence due care should be observed to remove such causes of irritation so far as possible by avoiding unnecessary manipulation of these parts. The application of the child to the breast is usually followed during the first three or four days by somewhat painful uterine contractions — another indication of the immediate sympathy which prevails between the womb and the breasts. A certain amount of after-pain is then natural and cannot be avoided; and up to a certain extent no interference is required beyond the application of hot cloths to the abdomen; if, however, these pains be so severe and persistent as to interfere with sleep, they should not be neglected. Measures should be taken to expel the possible contents of the womb, and to quiet the irritation by the administration of an opiate; the gentle injection of a quart of warm water into the vagina may also be employed. It may also be a consolation to a young mother to know that she will probably escape after-pains at her first confinement, since these occur with especial force and frequency in women who have previously borne children.

The Lochia. — For a variable time after delivery, ordinarily eight to twelve days, there is a discharge from the vagina termed the lochia. This discharge results from the changes which are going on inside of the womb as a preparation for the return of this organ to its previous condition, it is ordinarily composed, during the first day or two, of almost pure blood, but becomes in the succeeding days lighter in color and less in quantity. The amount and character of this discharge should be carefully noticed, since it furnishes valuable information as to the above-mentioned changes, and therefore as to the probable outcome of the case; for in certain complications, such as puerperal or child-bed fever, the lochial discharge is either suppressed or assumes an extremely offensive character. On the other hand, the persistence of a bright red color after the ninth or tenth day indicates that the womb is not undergoing the usual and proper reduction in size. In ordinary cases the lochia requires no interference other than simply cleanliness, which must be, however, strictly observed. The external part may be washed without unnecessary violence with warm car-

bolized water; and if there be any unusual odor, the vagina also should be gently syringed out two or three times a day with a two-per-cent. solution of carbolic acid. To promote the escape of the discharge from the vagina, it may be advisable to change the woman's position, having her lie upon one side and the other; and so soon as practicable, she may, for the same purpose, elevate her shoulders upon pillows.

For the first few days after delivery the woman should, in a great majority of cases, maintain strictly the recumbent posture; on the third or fourth she may be permitted, if all goes well, to sit up in bed for a short time and to assume any other desired position. But it must be remembered that this is not equivalent to getting out of bed and performing any of her domestic duties; while special cases demand special regulations, it may be stated, as a *generally applicable rule*, that the woman should not assume the erect posture nor even leave her bed for two weeks after delivery. This may seem an unnecessarily long period for those who have been accustomed to the nine-day rule of nurses; but it should be remembered that the object of repose after delivery is to promote that process whereby the enlarged uterus undergoes a reduction in size—resumes nearly the size, shape and position which characterized it before conception had occurred. This process, whereby the pregnant womb returns after delivery to the unimpregnated state, is termed the *involution of the uterus*. This involution is a gradual process which requires from six weeks to two months for its completion; if, for any reason, the process be arrested, the womb remains, of course, larger than it should be, and, as a result of this increased size and weight, it drags upon and stretches its supports —a condition known as "falling of the womb." It is of the utmost importance that every opportunity should be allowed the womb to undergo this natural reduction in size; that no impediment of any sort should be opposed to this involution, since such impediment must necessarily endanger a subsequent falling of the womb. Now, it is a fact easily understood, that in the recumbent posture the decrease in the size of the womb occurs more rapidly and more surely than if the woman be allowed to perform the usual domestic duties, or even to stand and walk. Hence the advice that a woman remain in bed two weeks after delivery, that is, until the process of involution of the womb has been well initiated, and that for at least two further weeks she assume none of the responsibilities of

housekeeping. Many times a more prolonged confinement to bed will be necessary; if, for example, as has been already stated, the lochial discharge retain its bright red color beyond the usual time, it is evident that the involution of the womb is not proceeding with the usual rapidity, and that it will not be wise for the woman to rise even at the expiration of two weeks.

Lactation.

During the latter months of pregnancy the breasts usually secrete more or less fluid. The quantity is, in comparison to what occurs after delivery, quite small, and the quality and appearance are not such as characterize the milk. During the first day or two after delivery the breasts present no especial change in most women, but on the third day the secretion of milk, properly speaking, begins. This secretion of milk is what is termed by nurses a "rush of milk" to the breasts. It is no uncommon occurrence for this secretion of milk to be accompanied by more or less severe disturbance to the patient. In nearly all cases the breasts swell, become tender upon pressure, and even painful; oftentimes the woman complains of headache; in some cases there is even a pronounced chill, and considerable fever. This is what is ordinarily termed "milk fever," and may be mistaken as an indication of childbed fever. In the latter case there is, however, tenderness over the womb and some derangement of the lochial secretion, while in milk fever the pain and tenderness are located in the breasts.

Milk fever is especially apt to occur if there have been some neglect in putting the child to the breast during the first two days after delivery, or if the child have refused to nurse. In some cases, too, milk fever may occur even though the babe has nursed properly, simply because of the profuse secretion of the milk—more than the child has been able to absorb. In such cases relief may be obtained by the gentle application of the breast pump two or three times a day, and by gentle friction of the breasts with sweet oil; the motion of the hand should be from the base of the organ toward the nipple. Friction may be especially directed to any knots or lumps which may be felt in the breast, and which are at first merely accumulations of milk in the tubes, but which sub-

sequently may give rise to inflammation and abscess. Another important measure is the application of cooling lotions to the breast, either simple cold water, or perhaps a thin layer of pounded ice enclosed in a cloth. At times the weight of the breast occasions considerable pain, which can be relieved by simply suspending the organ in a handkerchief tied around the neck. Nurses are in the habit of attempting to relieve this swollen condition of the breast by frequent applications of the child. This measure is open to certain objections on the part of both mother and infant; since the effect of the child's nursing is not simply to empty the breasts, but also to stimulate them to an increased secretion of milk, it is obvious that such a course may defeat its own object by increasing rather than diminishing the quantity of milk constantly present in the distended breast; furthermore, such frequency of nursing promotes the formation of fissures and abrasions of the nipple.

The fluid secreted by the breast during the first two days, technically called colustrum, acts as a laxative upon the child's bowels and prepares the way for the digestion of the milk. While it is desirable that the child should imbibe this fluid, yet the two frequent presence of colustrum in the child's intestines may easily induce a state of irritation unfavorable for the digestion of the milk. The result is often vomiting and diarrhea in the infant, when it will be apparent that it is nursing too frequently.

It occasionally happens that a woman will accustom herself from the very first to give but one breast to the child, because perhaps the other nipple is somewhat tender. It is evident that this tends directly to promote the accumulation of milk and subsequent trouble in this breast. It is desirable, therefore, that the child should be applied on every occasion to both breasts. It is much better to partially empty both than to leave one untouched. It sometimes occurs also, in cases where the secretion of milk is quite abundant, or the demands of the child are less than usual, that there is a more or less constant escape of milk during the intervals between nursing. Thus a certain amount of loss is of frequent occurrence especially during the early period of nursing, yet it is a thing to be avoided if possible, not only because of the discomfort which results from the constant moisture of the breasts and clothing, but also because soreness and fissures of the nipple are thus promoted. This condition of things would occur less frequently if the child's nursing were regulated from the very beginning — if it were permitted to

suckle only at intervals of two hours, and were applied on each occasion to both breasts. When this condition has been once established, this same regulation as to nursing is perhaps the most important feature in the treatment. In addition, one may use the cooling lotion if the overflow of the breasts evidently results from excessive secretion. There are cases, however, which resist all efforts at control. In such instances, the application of the child to the breast often causes a severe neuralgic pain which is often followed by a contraction of the breast, causing the milk to spurt in jets from the nipple. Indeed, at times, the sympathy between the breasts is so intimate, that the application of the infant to one nipple is followed by a spurting of milk from the other. This condition sometimes yields to treatment, but, in exceptional instances, causes such trouble that the woman is compelled to wean her child.

Attention should be called to one point in connection with the excessive secretion of milk, namely: that this fluid may be abundant in quantity and yet deficient in quality. Hence it does not follow because the mother has abundance of milk, that the child is necessarily well nourished; there may be either an absence of the nutritious elements of the milk — which is watery, therefore — or there may be present certain constituents which are injurious to the child. The infant may, therefore, starve or be poisoned, even though supplied with an abundance of mother's milk. The existence of such conditions must, of course, be detected by the condition of the child; derangements of its digestion sometimes demand weaning, even though the mother have an abundance of milk. In such cases medical advice should be sought; it will sometimes be found possible to restore a healthful condition of the milk by regulating the diet and habits of the mother. Sometimes the fault will be found to be an undue richness of the milk — a condition which often occurs when the breasts are over stimulated by too frequent application of the child. The result of such condition is marked derangement of the child's stomach and bowels. In such cases suspicion is rarely directed to the milk, because the general appearance and health of the mother, as well as the quantity or milk furnished, seem entirely satisfactory. In this condition medicines are of no avail; the remedy is usually to be found in carefully regulating the diet of the mother, by causing her to avoid stimulants and over-feeding, to which she often becomes addicted by the advice of the nurse; for while admitting the value of malt

liquors and wines under given conditions of the nursing woman, yet there seems to be a general impression that such beverages should constitute an essential part of the mother's diet. It would be better, of course, in every instance, to take liquors only by the advice of the medical attendant; yet in every case in which the child exhibits disturbances of digestion without apparent cause, it is advisable for the mother to restrict very materially her indulgence in ales or wines.

Another complication of lactation, more frequent and more evident than the former, is the failure of the mother to secrete a proper amount of milk. The greatest diversities are encountered in this particular; while it is true as a rule that the healthiest and most robust women furnish the most satisfactory nourishment for their offspring, yet no prediction can be made upon this basis alone. It may be stated in general, that the failure to nurse properly is found more common among those accustomed to indolent and luxurious lives — is, therefore, most frequently observed in cities; nor is it certain that the ability to nurse the child will persist throughout the usual time. Among the causes which may arrest the secretion are the various acute diseases, especially those which supervene immediately upon delivery. In such cases the secretion of milk is often resumed after recovery from the disease, though sometimes the quality is so changed as to make the milk unfit for the child. In other cases again the secretion is not established at the usual time, and when it does appear, is present in insufficient quantity. In such cases artificial feeding must, of course, be employed. Though even then it is desirable, for the sake of both mother and infant, that the child should have whatever the mother can furnish, provided, of course, the quality be unobjectionable.

The Relation Between Lactation and the Sexual Functions.

Since the nourishment of the child by the secretion of the breast is a part of the reproductive process — and one, too, which abundantly taxes the physical powers of the woman — we would expect to find what we know to be the case, namely, that the other reproductive organs, the womb and ovaries, usually remain in a quiescent state until lactation is completed; hence it is that concep-

tion rarely occurs until the child is weaned. But it should be remembered that this intimate sympathy between the breasts and the sexual organs is one which may react upon the former as well as upon the latter; and that undue sexual excitement is apt to be followed by injurious influence upon the secretion of milk. For this, among other reasons, it is a matter of the utmost importance, that during the early period of lactation there may be a total abstinence from intercourse, which should be allowed not earlier than the third month after delivery.

Another most important reason for such abstinence is the fact that a failure to observe it often interferes seriously with the involution of the uterus, which is not always completed within two months after confinement. If the period of nursing be not unduly prolonged, if the child be weaned between the tenth and twelfth month, menstruation is usually deferred so long as lactation continues. Yet exceptions to this rule do occur; either because of undue sexual excitement, or for some undetermined reason, menstruation occasionally begins five or six months after delivery. In such cases the woman is often urged to discontinue nursing for the sake of her child. In regard to this we would simply say that the appearance of the menstrual discharge does not necessarily demand the discontinuance of lactation; the decision must rest entirely upon the health of the child. If this be evidently impaired from the time when menstruation began, it is always advisable that the infant be weaned, otherwise not. It is observed that in the majority of cases, when menstruation begins so late as the fifth or sixth month, lactation may be prolonged without interference during the usual period.

Quite otherwise is it, however, if conception occur while the mother is still nursing. For in this case her energies, unequal to the increased demand made by the attempt to perform both functions, will be devoted to the child in the womb to such an extent as to interfere seriously with her nursing. This does not necessarily imply that the milk will be dried up, since the contrary is often observed, but the effect upon the child is always evident. The milk plainly suffers such a change in quality as to render it injurious to the infant, and in every case the child should be weaned just so soon as the fact of conception is apparent. In some cases, indeed, it has been observed that a previously healthy child, thriving upon the milk of a healthy mother, becomes suddenly and unaccountably

ill. Obstinate derangements of digestion, resisting all remedies, either in the shape of drugs or in attention to the mother's diet, transform the previously rosy babe into a deathly caricature of its former self. The mystery has been only explained a few months later by the evident pregnancy of the mother.

Hygiene of Lactation.

As the nursing mother is furnishing nourishment for her child as well as for herself, she may be expected to exhibit more than the average appetite. Up to a certain degree this is, of course, to be encouraged. Yet it may not be forgotten that it is possible to gormandize during lactation as well as at other times, and that articles of diet which may be well borne by the woman herself can nevertheless have an injurious influence upon the child. While it is not desirable to attempt to regulate the diet during nursing by any rigid set of rules, yet it is well for the mother to bear constantly in mind the fact that she must eat for the child and not simply for herself. If there be signs that the supply of milk is failing, it is desirable that the mother should first attempt, before weaning her child, to increase her own strength and activity by a change of surroundings. Oftentimes marked improvement in the secretion of the breast follows a change of air, increased attention to exercise, regularity of meals and sleep. In such cases, too, the breasts may be stimulated by the frequent application of the infant. One of the most common and persistent errors in nursing is the habit of using the breast as a means for stopping the child's crying. This is doubtless a matter of temporary convenience, but one which reacts with pernicious effect upon both parties subsequently. The child which nurses satisfactorily every two hours, does not need and cannot digest more food; if it cries, the cause must be sought in other grounds than hunger. After the first two or three months the intervals between nursing may be lengthened to three or even four hours by day, and at night the child's nursing may be restricted to three or even two occasions. Indeed, if the task of nursing be evidently too much for the mother, it is well for her to refrain entirely at night, when the child may be fed artificially. The evidence of over-nursing occurs in the form of general debility,

languor, headache, pains in the back and shoulders, sometimes derangements of vision or hearing. These often disappear if the regularity in nursing, to which attention has been called, be enforced.

It is generally known that the mental condition exercises marked influence upon the composition of the milk. Many stories are told — some of them doubtless true — of the disastrous effects induced upon children by giving them the breast immediately after a period of excitement; and it is certainly true that a woman laboring under constant anxiety or mental strain of any sort is not apt to furnish proper sustenance for a nursing child. It follows, therefore, that the maintenance of proper mental balance, the avoidance of excessive emotion or mental effort, should evidently be one factor in the hygiene of lactation.

A healthy woman can usually furnish all the nourishment required by her infant during the first five or six months of its existence. During this time the child requires no other food than that obtained from the mother. During the early months the infant requires feeding from ten to fifteen times per day; but as time advances it becomes capable of absorbing more food at one time, and of satisfying its hunger by indulgence at greater intervals. During the fourth month the child rarely requires feeding more than five or six times in twenty-four hours. A woman's capacity for the secretion of milk rarely exceeds two or three pints; and as this amount of nourishment is scarcely sufficient to sustain a child of six or seven months, it usually becomes necessary to add artificial food from this time onward. Yet, in the interest of both, the child should not be deprived of its mother's assistance before the completion of its first year.

The most troublesome complications of nursing arise from fissures and abrasions of the nipple. The treatment of these must usually be left to the medical attendant, and even then often prove extremely obstinate. The woman herself can, however, accomplish considerable in the way of preventing these accidents; to do this she may attend to two objects — the hardening of the nipples and their protection from injury by her clothing. As has been already indicated, the preparation of the nipples for nursing should begin some two or three months before delivery, and should consist of ablutions with cool soft water and gentle friction from the sixth month of pregnancy onward; during the last month or two the

wash for the nipple should be employed morning and night. This may consist of equal parts of glycerine and cologne water; to this there may be added, if the nipples be at all tender, a little borax. After delivery, considerable protection can be afforded by the use of an ointment made by mixing finely-powdered gum arabic with pure lard. Protection against the clothing can usually be secured by simple attention to the arrangement of the dress; but if there be, notwithstanding, decided tenderness of the nipples, protection can be afforded by the use of nipple-shields. If abrasions occur during nursing they may be sometimes healed by the application of astringent ointments. In the preparation of these, care must be taken not to use any substance which could be injurious to the child. One of the best applications may be obtained at the drug store by asking the druggist to make an ointment of the following ingredients:

Tannic acid, - - - - -	Three grains.
Glycerine, - - - - -	One drachm.
Simple cerate, - - - -	One ounce.

This may be applied to the nipple three or four times a day, care being taken to remove it and cleanse the nipple before the child is applied to the breast.

Fissures of the nipple—often called *chaps*—are even more annoying than abrasions; the application of the ointment just mentioned, not merely upon, but in the fissure, will sometimes bring relief; if not, and if the use of the artificial nipple be also unsuccessful, the matter should be placed in professional hands without delay, since such fissures, when neglected, may render nursing impossible. It will be well to avoid any experimentation with different remedies that may be recommended by friends, since such efforts usually result merely in aggravating the condition.

Another unfortunate complication of nursing is what is termed *milk abscess*, which sometimes supervenes upon sore nipples, though it may occur also without this provocation; it is the general belief that its formation is often due to an injudicious application of the breast pump. The beginning of the inflammation which subsequently results in abscess formation, is usually indicated by chills, often severe and repeated, and by a sharp pain in a particular part of the breast, aggravated by nursing. In the course of one or two days considerable fever supervenes, accompanied by extreme tenderness of the breasts on pressure. The pain caused by the appli-

cation of the child is so severe that the organ is no longer used for nursing. It is sometimes possible at this early stage to cut the process short by the use of evaporating lotions, and by the exercise of care to prevent the accumulation of milk within the organ. In most instances, however, these measures fail; there forms at the site of the pain and tenderness a hard knot which is soon surrounded by a swollen and doughy area. After a variable time—a few days to several weeks—this knot becomes soft and less exquisitely tender; the neighboring portion of the breast, or even the entire organ, is greatly swollen, hot and red; oftentimes the skin appears glazed. These signs indicate the formation of matter within the organ—a condition often indicated by renewed chills. Sometimes the first abscess formation is followed by the appearance of other abscesses in different parts of the breast; and it may happen that after the first has disappeared other abscesses will be formed weeks or months later.

The treatment of this affection must be relegated immediately to the physician; the symptoms are detailed above merely that the nature of the affection may be early recognized, and hence prompt measures be taken to avert the more serious results. In the majority of cases it becomes absolutely necessary to open the abscess—a proceeding which is, in the more favorable instances, followed by speedy disappearance of the symptoms. Yet it must be confessed that the most skillful treatment is often futile in preventing tedious and exhausting disease of the organ.

The Selection of a Wet-nurse.

Various circumstances, sometimes quite unexpected, may compel the mother to cease nursing her infant. Indeed, the instances are not infrequent in which some hereditary taint or acquired disease makes it desirable that the mother should not, even if she can, suckle the child. In such instances the best substitute is, of course, the wet-nurse, though circumstances often compel the employment of another and less expensive mode of sustenance—artificial feeding. Methods for accomplishing this latter object will be discussed in subsequent pages, but a word with reference to the selection of a wet-nurse may be in order here. It is desirable that she shall be able to furnish sufficient

milk of good quality, and free from any constitutional taint. The best index to her physical qualifications is the condition of her own child. Generally speaking, a wet-nurse should be between eighteen and thirty years old; her confinement should have occurred at about the same time, or a little later, than that of the woman for whom she is to be a substitute; one who has previously borne children is to be preferred, not only because of the increased experience gained, but also because the milk is of better quality in subsequent than after the first confinement. After the applicant has given satisfaction as to her character and history and present condition, she should be submitted to a rigid and thorough examination by a physician in order that no contagious disease which may be lurking in her system shall be overlooked; for it should be understood that an apparently healthy woman may be capable of communicating, either through her breast or her lips, a disease which would either destroy the infant's life or prove a life-long curse.

If the child be still-born, or die soon after birth, the mother's interest will be promoted not by drying up the milk at once, but by encouraging the secretion for at least six or eight weeks. The object of this is to promote the involution of the womb, which proceeds more rapidly and surely if the breasts are kept active. The same principle applies if it be necessary for the mother to discontinue nursing during the first two months of lactation. In either case the best substitute for the child is the judicious application of the breast-pump, at regular intervals, aided by gentle friction of the breasts toward the nipple.

Care of the Infant.

Before birth the child is but a portion of the mother's body, enjoying the advantages of the protection and nourishment which she provides for herself. At birth the infant is deprived of these favoring influences and compelled to conduct an existence independent, to a large extent, of assistance from others. It is not surprising that the experiment is in many cases a failure; that the tender little creature, deprived of the warmth and shelter of the maternal body, and thrown upon its own resources, compelled to eat, digest and breathe for itself, instead of having food and air

furnished it as before, should succumb to the unaccustomed influences, notwithstanding the most assiduous attention. The mortality among infants is accordingly large—one of every ten dies during the first month, and fifteen of every 100 during the first year. Many of those which have survived the first difficulties of life with the assistance of the mother's breast, die when they are compelled to surrender this aid and masticate their own food. Hence it happens that at the end of four years there remain alive but three out of every four infants born. Yet even without these figures it would be self-evident that the new-born infant demands especial and intelligent care and attention.

In the course of a few days after birth the navel-string, which has been at delivery enclosed under a flannel bandage, withers and falls off. If, before this happens, there be a decided odor of putrefaction, it is necessary to cleanse and dress the string somewhat frequently. It sometimes occurs that after the stump has dropped off the navel remains unhealed, raw, perhaps even ulcerated. If this occur, the matter should be brought at once to the attention of a physician, since the result may be serious injury to the child. For some weeks after birth this spot in the abdominal wall remains weak, and may easily be made to protrude when the child strains, especially if the infant be addicted to violent crying and screaming. In such cases there may result a rupture, or hernia—a source of serious annoyance and even danger in subsequent years. To guard against this, it is advisable in every case to place a soft pad over the navel and keep it bound on by means of a flannel bandage or adhesive plaster.

While the clothing of the child is to be regulated to a certain extent by the climate and season, yet it will be found advantageous to place flannel next to its skin all the year round. The advantages comprise not only the maintenance of an equable temperature, but also the absorption of the secretions of the skin, which might otherwise be a source of irritation. This regulation acquires double importance in the case of those infants prematurely born, and, therefore, less capable of maintaining an independent temperature.

A most important element in securing the well-being of the infant is strict cleanliness; and in nothing else is the difference between an attentive and a careless nurse more evident than in the management of the napkins and in the protection of the child's

skin from its own discharges. It may be, in general, stated that soreness and rawness about the child's thighs indicate neglect of cleanliness either of the infant itself or of the napkins. So far as the child is concerned, there should be, and is usually, no difficulty, since the warm bath is everywhere procurable. It is, however, to be borne in mind, that the infant can be bathed to excess; during the first weeks of its existence the child should not be put into the bath more than once a day, nor remain there more than two or three minutes; feeble children must be bathed with still more caution, since the warm bath is quite exhausting. Yet many infants which are regularly and carefully cleansed suffer, nevertheless, from soreness of the skin; and many a mother applies industriously, but unsuccessfully, a variety of baby powders, and is puzzled to know why the child's skin remains sore. There is just one slovenly habit which is apparently responsible for much of the trouble of this sort: many mothers, namely, seem to consider that the napkins require washing only after being soiled; and that if only wet they may be reapplied after drying by the stove. This idea is, of course, a mistake, since the urine contains a number of substances which are extremely irritating when applied to the skin; the napkins should be washed in one case as well as in the other.

After the first ten or twelve days the child may be carried out thoroughly wrapped up if the weather be properly warm (70° F.); and unless the inclemency of the season absolutely forbid it, the infant should receive a daily airing and sunning as regularly as plants.

Food.—It need hardly be repeated that the most appropriate and desirable nourishment for the new-born child is derived from the mother's breast; yet it may with propriety be remarked that this nourishment is of itself amply sufficient for *all* the needs of the infant; and that sugar and water, and a dozen other mixtures which are poured into the helpless child during the first few days of its life, may do harm, but can do no good. If the secretion of milk be delayed beyond the usual time, nothing should be given the child except a little water simply *stained* with cream. So soon as the secretion is established there should be no further administration of artificial food. The best assurance of health to the child during the first seven months of its existence, is an ample supply of mother's milk.

In a considerable minority of cases, however, it becomes neces-

sary, on account of some of the causes already indicated, that artificial food should be substituted entirely or in part for the breast. These are the cases which furnish so much sickness or mortality, especially in our larger cities. It must not be understood that artificial feeding implies in itself anything injurious to the child, but as ordinarily employed it is such a poor substitute for the natural food that the results are, as a rule, very unsatisfactory.

With care and attention a bottle-fed infant may and often does enjoy the most robust health; and there are certain combinations of artificial food which give, as a rule, excellent results as a substitute for mother's milk. Yet while physicians are accustomed to rely upon these substitutes, they are equally well aware that there must be an adaptation of means to meet the requirements of individual cases; that the effects upon the child, as indicated by the condition of his digestive organs must be carefully observed, as an index to possible modifications of diet. A food which may meet the requirements in four successive cases may require modification in the fifth; and it is extremely important for mothers to realize the fact that there is no such thing as a universal infants' food; that the nourishment of infancy must vary, not only according to age and season, but also with individual peculiarities; and that her vigilance may not be relaxed, so soon as she has obtained from a friend or physician a formula for preparing infants' food. The best plan in every case in which difficulty is experienced is to place the matter in the hands of a physician. Yet a few directions for the composition of food, which will in many cases answer all requirements, are appended:

The simplest substitute for mother's milk is obtained by diluting cow's milk. The milk of the cow differs from that of woman in two essential details: It is considerably richer in solid constituents but contains less sugar. To approximate it to human milk it is merely necessary then to add a certain amount of water and sugar, preferably "milk sugar." The amount of dilution varies with the age of the infant; since mother's milk is less rich in the early months of nursing than it subseqently becomes, a correspondingly greater amount of water must be added to the cow's milk to secure the proper consistence. The milk, as obtained from the cow should be mixed with its own bulk of water for a child one or two months old; if the milk be obtained from a dealer it will rarely be necessary to add more than half its bulk of water; the mixture may be

sweetened with table sugar, or better with sugar of milk. This preparation often answers admirably as a substitute for the mother's breast, especially in the country; in large cities the plan is less often successful, since the milk cannot be obtained so fresh, and in warm weather at least, has always undergone fermentation whereby irritating compounds are formed. Yet it is oftentimes possible to obviate, to a certain extent, these disadvantages by previously boiling the milk. Yet if it be impossible to secure fresh and pure cow's milk, it will be best to resort to one of several other modes of preparing artificial food. A very popular mixture, and one which has rendered valuable service, is an attempted imitation of the natural composition of milk — a popular and ready form of Liebig's food. The ingredients required are:

Malt, - - - - -	One-half ounce.
Flour, - - - - -	One-half ounce.
Skimmed milk, - - - -	Six ounces.
Bicarbonate of potassium, - -	Seven grains.
Water, - - - - -	One ounce.

Malt should be crushed or ground in a coffee-mill. All the ingredients may be mixed, put into a clean pan, boiled for eight or ten minutes and constantly stirred; then strained through an ordinary piece of muslin; if the child must be fed from the very first, it will be desirable to increase the quantity of water in the above mixture to six ounces. After the first two or three weeks the quantity named will be insufficient, as the child requires two or three teacupfuls. The mixture tastes quite sweet; no sugar should be employed. The disadvantage of this food is the necessity for this somewhat complicated preparation every twelve or twenty-four hours.

A most satisfactory and generally applicable food can be obtained from arrow root and cream. Dr. Meigs, of Philadelphia, gives the following directions: "A scruple of gelatine (or a piece two inches square of the flat cake in which it is sold) is soaked for a short time in cold water and then boiled in half a pint of water until it dissolves — about ten or fifteen minutes. To this is added, with constant stirring, and just at the termination of the boiling, the milk anda rrow root, the latter being previously mixed into a paste with a little cold water. After the addition of the milk and arrow root, and just before the removal from the fire, the cream is

poured in and a moderate quantity of loaf sugar added. The proportions of milk, cream and arrow root must depend on the age and digestive powers of the child. For a healthy infant less than a month old, I usually direct from three to four ounces of milk, half an ounce to an ounce of cream and a teaspoonful of arrow root to half a pint of water. For older children, the quantity of milk and cream should be gradually increased to a half or two-thirds milk and from one to two ounces of cream. I seldom increase the quantity of gelatine or arrow root."

A still simpler food may be prepared simply from arrow root and cream. Two teaspoonfuls of arrow root are added to half a pint of water, stirred over the fire until pasty, and then strained; a tablespoonful of cream is then added and given warm.

The most important feature in the success of artificial feeding is perfect cleanliness of the bottles and tubes employed; and only such bottles and tubes should be used which can be readily taken to pieces and thoroughly cleansed, from the point of the rubber nipple to the bottom of the bottle. A failure to observe this simple precaution will certainly vitiate any and all attempts at artificial feeding, whatever material be employed; for there occurs fermentation in the milk and other matters collected at the joints and in the crevices of the feeding bottle; and these fermented matters passing into the child's stomach with the next installment of food, must derange its digestion. For cleansing the bottles and tubes, warm water containing a little borax may be used. The success of the attempt to substitute artificial food will be ultimately measured by the welfare of the infant; yet careful observation may early indicate the imperfections of the method in use before the child's health has been seriously impaired. Perhaps the most important indications of failure in the character of the food are to be observed in the appearance of the infant's discharges, which should be always carefully inspected by the mother herself and not left entirely to the chance observation of the nurse. Indeed, it may be said as a general truth, that serious disorders of infancy—which are, in a majority of cases, derangements of digestion and their consequences—might be often avoided if the appearance of unnatural stools were always regarded as a demand for a careful supervision of the diet; and this applies to children at the breast, as well as those artificially nourished. In this way it would be often possible to avoid that scourge of infancy—summer com-

plaint; the first indications of this affection should be met not so much by medicines as by a regulation of the child's food and general management.

Whether sustained by the breast or by artificial means, the infant will usually, in six or seven months, be able to digest other food also; yet a mistake is often made in permitting the child to have such food at a too early date; not infrequently a four months babe is supplied with crackers and similar articles, while the mother wonders why the child is not well. As a rule, nothing should be given aside from the regular diet until the completion of the sixth or seventh month, and then it may not feed promiscuously upon whatever chances to be in its way, but must be gradually accustomed to the digestion of solid food. As a preparation, it may be well to give the child, even as early as the fourth or fifth month, some of the artificial food already mentioned, without, however, discontinuing the breast; later, soups and broths — containing but little fat — may be administered in small quantities. The general principle should not be forgotten, that until the child has some teeth it cannot properly dispose of anything solid; the attempt will almost certainly result in disaster to its alimentary organs.

Teething.

This term is applied to the period at which the growth of the teeth causes their penetration through the covering of the gums. It is understood, of course, that their development has begun at a period previous to birth, but their growth appears to have no particular influence on the general condition of the child until the commencement of the irritation caused by the protrusion of the teeth through the membrane covering the gums. This irritation is doubtless often the cause of troubles manifested in other parts of the body; yet there is a too prevalent disposition to ascribe all the ills which afflict babyhood during this period, to the process of teething. Any indisposition of the child, whatever its nature or wherever manifested, is often regarded merely as a manifestation of the teething process, the evil result of which is that affections dependent upon other causes which might be detected and removed, are regarded as inevitable because the child is teething. The fact is, that many a child acquires its milk teeth without suffering any

appreciable disturbance of its general health; and that the troubles ascribed to teething are oftentimes the result of errors of diet and improper management, which originate quite independently of the teeth, and are merely aggravated by the effects of the irritation in the gum.

The first teeth ordinarily appear during the sixth or seventh month, though there may be variations of several months either way. In fact, instances are recorded in which some teeth have been cut before birth. If there be any irritation, it is often manifested some weeks before the tooth becomes visible—in which fact lies sometimes the explanation of an unusual fretfulness. It is desirable to know and note the periods at which the teeth appear, since in order to avoid the complication of teething, the child should be weaned at one of the longer intervals. The teeth ordinarily appear in a certain order, and at regular periods, which may be grouped as follows: *First.* The first to appear are usually the two middle teeth of the lower jaw, technically called incisors; this ordinarily happens in the course of the seventh month. *Second.* After a pause of one or two months the corresponding teeth of the upper jaw appear, usually followed, after a short interval, by two more, one on either side of the two central teeth. *Third.* There now occurs a pause of six or ten weeks. It is during this pause, while the child is quite free from any irritation of the gums, that weaning is ordinarily advisable. This pause occurs, it will be noticed, during the tenth and eleventh month. *Fourth.* At the completion of the first year there usually appear the first grinding teeth. *Fifth.* At about the eighteenth month, the eye-teeth appear, ordinarily in the upper jaw first. *Sixth.* The full set of twenty teeth is completed during the early part of the third year, by the appearance of the remaining grinding teeth, or molars.

So long as the process of teething proceeds naturally, and causes nothing more than restlessness, or perhaps even slight fever, no interference is demanded. The advance of the tooth into and through the gum is, of necessity, slow, but cannot be hastened by recourse to the lancet. There are cases in which, undoubtedly, the gums should be lanced; but it is just as certain that the early and frequent use of the lancet is undesirable. We may say, in general, that the gum should be lanced, first, when the child is evidently in pain, and the tooth is so nearly through that a slight incision will relieve the tension of the gum; second, when the gums are hot,

tender, swollen and full of blood, in which case an incision, even if it do not remove an obstacle to the progress of the tooth, will nevertheless relieve the congestion of the part; third, when the irritation in the gum is so great as to disturb the child's nervous system, inducing, perhaps, convulsions. In this case, even though the gums be not obviously swollen, an incision will often relieve the difficulty entirely.

Weaning.

The separation of the child from the breast is an epoch in its existence which is often attended with more or less constitutional disturbance. The time at which this separation should occur may be fixed by some unforseen conditions which render the mother incapable of providing sufficient and proper nourishment for her offspring. Such circumstances may arise at any time, and imperatively require that weaning occur at once. Yet, under ordinary circumstances, considerable latitude is allowed as to the choice of the time at which nursing shall cease. It might be, and by some has been, assumed that the child should be more or less sustained by the mother until it has acquired a complete set of teeth; and it does sometimes happen that nursing is continued for two years. Another inducement for prolonged nursing is the protection thereby afforded to a greater or less extent against conception. This hope has induced many a mother to prolong lactation beyond the usual limit. While it is impossible to continue nursing for an indefinite time, yet a variety of considerations indicate that the best period for weaning is usually between the tenth and thirteenth months; though, as will be presently explained, circumstances may require a certain departure from this rule. The first consideration must be the health of the child and of the mother. Now, as a rule, the infant begins to take other food than the breast as early as the seventh or eighth month, and usually becomes largely independent of the mother by the tenth or twelfth month. By this time, too, the quality of the milk has usually deteriorated, so that even though nursing be continued the mother's milk furnishes but a part — usually a small part — of the infant's nourishment; at the same time the mother's health is often unequal to the task of furnishing so much nutriment in addition to that required for her own body.

By the end of the first year, therefore, the child is usually abundantly able to digest its own food, while the mother should be relieved from the additional and no longer essential burden; and since there occurs during the last two months of this time, an interval of complete freedom from the annoyance of teething, it will be, as a rule, found advisable to wean the child during the eleventh or twelfth month of its life. Yet this is a by no means inviolable rule; indeed, there are circumstances under which a prolongation of nursing is advisable in the interest of the child. It may be stated, as a general principle, that the child should not be weaned while some of its teeth are cutting through, nor just before the hot weather of summer. If, therefore, an infant be an exception, in that these months of the first year are employed in teething; or if the child have been born in the early summer it will be advisable, as a rule, to postpone weaning until the objectionable circumstances be removed. So, too, it is necessary to postpone weaning until any ailment which may happen to affect the child — even if only an ordinary catarrh — shall subside. If, in consequence of inability on the part of the mother, it become necessary to wean the child during any such circumstances, it may be desirable to procure a wet-nurse.

As to the process of weaning, but little need be said, except that it should be gradual; that an interference with the child's health is far less probable by this plan than if nursing be suddenly discontinued. By withholding the breast altogether at night, and by substituting artificial food on certain occasions during the day, the infant may be accustomed to the new regime without appreciable inconvenience or bodily disturbance. If weaning be postponed until the end of the first year the mother will rarely have any difficulty with the breasts. The gradual decrease in the demand upon them will usually be accompanied by a corresponding decrease in their activity. The breast-pump should not be used; it will rarely be necessary to adopt any other measures than simple friction with camphorated or sweet oil.

DISEASES OF CHILD-BED.

Child-birth is to be regarded as a natural process, not as a disease; and so the phenomena which necessarily follow contain ordinarily no element of disease and require no further interference than has been already indicated in the preceding pages. There may be some local difficulty in the breasts during the establishment of activity in these organs; there may be some spasmodic pain in the abdomen during the first few days, constituting the so-called after-pains; there may be some soreness at the orifice of the vagina from unimportant lacerations and abrasions. But aside from these there should be no marked symptoms; there should be observed no fever, pain nor soreness; after four or five days the secretion of milk is established; after two weeks the lochial discharge has ceased and any soreness about the genital organs that may have existed has disappeared; and after six or eight weeks the womb has returned almost to the size that it had before impregnation; and the woman should be as well in every regard as she was before assuming the duties of maternity. While such is the natural course of events, yet many instances present serious interruptions and ultimately fail in restoring the woman to a condition natural and proper for maternity. The number of women who suffer from ills originating in the genital organs is almost as great as the number of women who have borne children; and the majority of these, at least, date their difficulties from confinement.

The diseases that can be traced directly or indirectly to child-birth may be properly considered in two categories—the acute diseases that follow immediately upon confinement and the chronic affections, which may first become manifest some months or years subsequently. Chief among the former stands

Child-bed Fever.

This affection, technically known as puerperal fever, is a term employed to designate several diseased conditions which may affect the sexual organs immediately after confinement, and which have

certain symptoms in common, whence they are commonly classified together under the general name puerperal fever.

Symptoms.—For the first two or three days after delivery, there may be no indication of anything wrong; but on the fourth or fifth day the woman becomes somewhat listless, loses her appetite and has perhaps a slight headache. A few hours subsequent to the development of these symptoms, there occurs a chill which is often of such violence as to shake the patient's bed; this is followed by a high fever, intense pain in the head, flushed face, suffused eyes, pain and extreme tenderness in and around the enlarged womb. Within twenty-four hours the abdomen is often somewhat bloated; the lochial discharge ceases, or is at least much diminished and often very offensive; the milk not infrequently is greatly lessened in quantity. In severe cases delirium occurs after a few hours of intense fever.

Causes.—The various affections collectively known as puerperal fever, originate in one of two ways: first, and usually, in the neglect to secure complete evacuation of the womb and subsequent cleanliness of the vagina; secondly, and less often, except in hospitals, by infection either from other lying-in women or from the subjects of surgical injuries and infectious disease. It may be said, in general, that the most efficient means for the avoidance of puerperal fever consists in the most scrupulous care as to all the details already indicated as essential in the conduct of labor. The presence of the hand on the abdomen over the womb from the moment that the child is expelled and until at least an hour have elapsed; the removal of the after-birth by gentle kneading of the womb; the repetition of this process for several days after delivery, in order to expel clots of blood that may have formed in the womb; the careful cleansing of the external parts every few hours and of the vagina, by the use of the syringe; the maintenance of the recumbent posture for twelve or fourteen days after delivery—all these are important aids in avoiding the disasters of child-bed. The disease is, fortunately, rare in private houses, but numbers many victims in hospitals or other institutions where many sick are gathered under one roof. During certain seasons, too, child-bed fever seems epidemic, occurring under the most favorable conditions, even in farm houses far removed from all other human habitations. The treatment of this affection will, of course, be referred to the medical

attendant. Before his arrival it is advisable, so soon as the symptoms above detailed have established the nature of the case, to adopt at least three measures: first, the administration of five or ten grains of quinine every three hours; second, the administration of a laxative, or if the stomach be irritable, the injection of warm water into the bowels; third, the application of heat and moisture to the lower part of the abdomen. This latter measure can be best effected by putting the woman bodily into a bath of a temperature of 100°, and permitting her to remain there fifteen minutes, after which she may be briskly rubbed with a coarse towel and wrapped in warm blankets. If there be no facilities for a full bath, the next best thing is a hip bath; in the absence of this, two quarts of warm water may be slowly injected into the vagina by a Davidson syringe. In any case, flannels wrung out in hot water should be applied to the abdomen and covered with oiled silk; these cloths should be frequently changed so as to keep the skin warm and moist. After five or six doses, the quinine should be given at longer intervals or in smaller quantities—about three grains every four hours—since the administration of large doses for a long time is followed by ringing in the ears and a semi-stupor, which may last for several days.

It is not advisable for the non-professional person to go further than the above treatment, except under medical advice. The physician may find some source of infection — such as a piece of the after-birth — which it is possible to remove; or he may suggest some additional remedies which the circumstances of the individual case may suggest. The chief indications are as already indicated, to keep the temperature down by the application of hot water and the administration of quinine, and to keep the parts clean and moist. Another distressing incident of child-bed is *puerperal mania*. This is by no means a rare occurrence. It happened in one in every ten cases observed for a considerable time in Paris — and this is probably a low estimate of its frequency.

" In the majority of cases, the disease first manifests itself within a fortnight after delivery; in such cases there is usually, even from the time of delivery, an unusually troubled and agitated manner, a suspicious look upon the face, indicative of anxiety; a marked peevishness of temper and objection to control or direction; not infrequently violent fits of passion are exhibited without apparent provocation; occasionally one of the first indications will be a sul-

len obstinacy or listlessness and stubborn silence. A patient lies on her back, and can by no means be persuaded to reply to the questions of her attendants, or she will repeat them as an echo, until all at once, without any apparent cause, she will break out into a torrent of language more or less incoherent, and her words will follow each other with surprising rapidity. These symptoms will sometimes show themselves rather suddenly, on the patient's awakening from a disturbed and unrefreshing sleep, or they may supervene more slowly when she has been harassed with watchfulness for three or four nights in succession, or perhaps ever since her delivery. She will very likely then become impressed with the idea that some evil has befallen her husband, or what is still more usual, her child — that it is dead or stolen ; and if it be brought to her, nothing can persuade her it is her own ; she supposes it to belong to somebody else ; or she will fancy that her husband is unfaithful to her, or that he and those about her have conspired to poison her. Those persons who are naturally the objects of her deepest and most devout affection are regarded by her with jealousy, suspicion and hatred. This is particularly remarkable with regard to her new-born infant, and I have known many instances where attempts have been made to destroy it when it has been incautiously left within her power. Sometimes, though rarely, may be observed a great anxiety regarding the termination of her own case, or a firm conviction that she is speedily about to die. I have observed, upon occasions, a constant movement of the lips while the mouth was shut, or the patient is incessantly rubbing the inside of her lips with her fingers, or thrusting them far back into her mouth ; and if questions are asked, and particularly if she be desired to put out her tongue, she will often compress the lips forcibly together, as if with an obstinate determination of resistance. One peculiarity attending some cases of puerperal mania, is the immorality and obscenity of the expressions uttered ; they are often such, indeed, as to excite our astonishment that women in a respectable station of society could ever have become acquainted with such language."—*Ramsbotham.*

In many cases lochial discharge ceases and the milk dries up, though this is by no means an essential feature of the case. It is often difficult to persuade the patient to eat, indeed at times it is necessary to employ force to supply her with nourishment. Another unpleasant feature is an occasional disposition to commit suicide.

This disease is, fortunately, only temporary, as a rule, and but few deaths occur during its course. In a certain number of cases insanity persists, and may even become permanent. Yet in the majority of instances the delusions gradually disappear, and in the course of three to six weeks the patient becomes again quite rational.

Puerperal Convulsions.

A most distressing as well as serious accident of child-bed, is the recurrence of convulsions. They are, by the way, a feature not merely of the period following delivery, since they may occur during labor or during the last three months of pregnancy. In discussing the compications of pregnancy, it was noted that persistent swelling of the feet, when accompanied by pain in the top and at the back of the head, was a condition calling for the immediate attention of the medical adviser. The physician recognizes in such cases the probability that some time, either before, during or subsequent to labor, he will have to deal with a case of convulsions. Many times there occur derangements of vision and of hearing, and often pain in the abdomen. Just before a fit the pain in the head becomes aggravated and continuous, and the patient not infrequently becomes quite blind. The convulsion itself throws the body into the most violent contortions, an extremely painful spectacle for the friends. After its subsidence — it may last from two to ten minutes in all — the patient remains for a time stupid, or may even fail to regain her consciousness before death. If these convulsions occur with great frequency before delivery, and if the patient's health is evidently impaired, it may become necessary for the physician to induce premature labor to save the life of the mother. If they occur just subsequent to delivery, they need rarely occasion anxiety for the immediate future. In every instance there may be no interference except by professional hands, for most of the agents used — such as chloroform and chloral — may not be entrusted to irresponsible hands.

Milk-leg.

This occurs as the result of an inflammation in some of the large veins and lymphatics leading from the thigh into the trunk. As a result of the obstruction to the return of blood from the limb

there occurs a swelling, often of enormous extent, causing a peculiar, pearly-white hue of the skin. On account of this color of the skin and from the fact that in this as in the other affections of childbed, the milk is often suppressed, it was supposed that the milk had been diverted from the breasts into the leg; whence the term. Although with the acquisition of more definite knowledge this curious fancy was abandoned, the term "milk-leg" is still retained.

This disease may occur at any time during the first month after delivery, but begins with especial frequency between the tenth and sixteenth days. There is often a premonitory stage, comprising a feeling of weight in the pelvis, and often a pain in the groin or hip. About this time, or previously, there usually occurs a severe chill, followed by fever, after which the swelling begins in the groin and progresses down the leg. Within a few days the entire limb is white and swollen, and feels, as patients often say, as if it were a wooden leg.

Although this is a painful and troublesome affection, it is, fortunately, rarely fatal. In the course of three or four weeks the limb has usually resumed its original size, and subsequently regains entirely its proper functions.

Treatment.—While the limb is swelling, good can often be accomplished by wrapping the leg in flannels wet with hot water, upon which a little turpentine may be sprinkled. The leg should be kept elevated. After the swelling becomes less painful, absorption of the fluid and the return of the limb to its natural size can be promoted by frictions, with stimulating liniments. These are especially desirable in those cases in which convalescence is slow, the leg seeming more or less paralyzed though the swelling has quite disappeared.

THE MOTHER.

The memories of childhood, the long, far-away days of boyhood, the dear mother's love and prayer, the voice of a dear departed playfellow, the ancient church and school-house, in all their sweet and hallowed associations, come upon the heart in the dark hour of sin and sorrow, as well as in joyous time, like the passage of a pleasantly remembered dream, and cast a ray of their own hallowed purity and sweetness over them.

How all-powerful, for good or evil, is the influence of a mother.

During those hours of infancy, passed in unavoidable seclusion, when the affections and mental powers can be moulded into any form by the plastic hand of maternal love, then it is that the bent is taken for weal or woe, which all future life cannot alter. The father, whether he hold a public station, or in a private capacity, sees but little, and at distant intervals, of his children, and has hardly time to salute them with a hurried embrace and a kiss of tenderness, before his avocations summon him again into the great world to engage once more in its engrossing pursuits. But the mother for whom domesticity has a charm, to whom her children are company, and the world exercises over their nascent powers an influence proportioned to her own good sense and attachment to the idols of her heart—omnipotent though imperceptible—and it is not too much to say that all the kindly sympathies and swelling affections of the youth and mature man can be traced to their rise when lying at their mother's feet, or listening with head on her knees to her mild yet awful rebuke.

While the confiding voice of childhood appeals to her in doubt, ignorance, danger or distress, she feels that by her child she is invested with the attributes of Deity; while it is nestling itself in her arms and hanging with unbounded credence upon her words, her spirit is started into fresh resolves of perfection by the fearful conviction that she is its book of wisdom, love and beauty; and if a Christian mother she searches with an almost agonizing anxiety for the best possible means of transferring the earth-bound devotion of her child to Him who is alone worthy of worship. As oft as the consciousness of her unbounded influence flashes upon the Christian mother's heart it is followed by the conviction that her image should hold but a secondary place in the affections of that being which has been the burden of her days and nights of care; and while she labors and prays that it may be even so, who can paint the desolation that settles upon her soul and makes her cling closer to her hopes of heaven, as imagination, stealing long years ahead, gives to her child a companion and offspring, thus removing her in careworn age from the second even to the fourth place in its regard.

Philosophers have analyzed, divines lectured, and poets sung of maternal love; but which of them has brought from its fountains to the heart of man those nameless, numberless, impassioned sympathies which make the melody of a mother's tenderness! No, there is nothing like it. In all after years we may set our heart on what joy we will, but we shall never find anything on earth like the love of a mother. Perhaps a more beautiful compliment was never paid to

female character than that rendered by the late John Randolph, of Roanoke. When Minister to France he said he was kept from whirling down the tide of infidelity, which was then carrying everything before it, by the remembrance that when a child his dear mother would put his little hands together and teach him to say, "Our Father which art in heaven!" Touchingly beautiful as is this little story, it is but the history that thousands of others might relate with equal interest. Oh, man! canst thou read through the tear that trembles in the mother's eye, the piercing grief of her soul, as gazing upon the fond prattler, the thought protrudes itself that all her pains, her sleep-dispelling solicitude, and above all, the strength and devotedness of her love, may be repaid with ingratitude.

Were the affections of the mother felt and cherished by her children with corresponding sympathy, doubtless this earth would exhibit much more of heaven than at present. A mother teaching her child to pray is an object at once the most sublime and tender the imagination can conceive. Elevated above earthly things, she seems like one of those guardian angels, the companion of our earthly pilgrimage, through whose ministration we are inclined to do good and turn from evil. A dear mother is the first to fold and rock our puny frames; the last to desert our clay-cold dust; the rich rejoicing, fresh, lovely and exuberant vine to twine in graceful fitness round the rugged oak of manhood, clinging the closer the louder the storm blows and the thunder roars. There is something indescribably lovely in a devotedly pious mother; something that reminds the soul at once of those bright angelic spirits which surround the throne of God. That calm serenity and composure, those eyes which beam with looks of holy tenderness and compassion for immortal souls.

It was December. The ground was covered with snow, the north wind blew violently, and whistled as it passed among the willows that shaded the tombs of the graveyard of the village of Peasley. A watchman was finishing his nightly rounds. At that moment the moon cast her pale beams over that portion of the burial ground appropriated to the poor; the sound of some one in distress attracted his attention, and as he approached a new-made grave he found a young child, who, extended on the ground, was endeavoring to dig the earth up with his little hands. It was poor Paul, left an orphan in the village but two days before. "What are you doing there, my boy?" said the watchman. The poor boy raised his head and wiping the tears from his cheeks, replied, "I am looking for my poor mother." The watchman, affected by the answer, took the child in his arms and

carried him from the mournful place. For several days he was carefully watched; however he soon stopped crying and everyone thought he had got over his sorrows; but about a month after, during a night still colder, he was found lying on his mother's grave dead. The poor orphan had found her! The next day he was buried by her side. "Blessed are the poor in spirit, for they shall see God." If the love of a mother surpasses all other love, you, who are a son, ought with the full measure of gratitude to return her affection. You are bound to her by the strongest ties; treat her with never-failing tenderness. She will love you whatever be your character, but let her have cause to glory in her child. Disappoint not her hopes; do not by your vices plunge a sword in her bosom; do not break her heart, do not compel her to wish that God would hide her in the grave. Look unto Jesus, the pattern of every excellence; love your mother as He loved His mother; obey, honor, cherish and protect her, as He obeyed His earthly parent. Finally, imprint on your mind the words of the wise man: "He that is obedient unto the Lord will be a comfort to his mother." Remember that thou wast born of her, and how canst thou recompense her the things she has done for thee? Forget not, then, the sorrows of thy dear mother.

In no situation and under no circumstances does the female character appear to such advantage as when watching beside the bed of sickness. The chamber of disease may indeed be said to be woman's home. We there behold her in her loveliest, most attractive point of view; firm, without being harsh; tender, yet not weak; active, yet quiet; gentle, patient, uncomplaining, vigilant. Every sympathetic feeling that so peculiarly graces the feminine character, is there called forth; while the native strength of mind which has hitherto slumbered in inactivity is roused to its fullest energy. With noiseless step she moves about the chamber of the invalid; her listening ear ever ready to catch the slightest murmur; her quick kind glance to interpret the unuttered wish, and supply the half-formed want. She smoothes with careful hand the uneasy pillow which supports the aching head, or with cool hand soothes the fevered brow, or proffers to the parching lip the grateful draught; happy if she meet one kind glance in payment for her labor of love. Hers is the low whispering voice that breathes of life and hope, of health in store for happy days to come, where the dark power of death no more shall have dominion over the frail, suffering, perishable clay. Through the dim, silent watches of the night, when all around are hushed in sleep, it is hers to keep lone vigils and to hold communion with her God, and silently lift up her

heart in fervent prayer for the prolongation of a life for which she cheerfully would sacrifice her own. And even when exhasuted nature sinks to brief repose, forgetfulness is denied. Even in sleep she seems awake to this one great object of her care. She starts and rises from her slumbers, raises her drooping head, watching with dreamy eyes the face she loves, then sinks again to rest, to start with every chime of the clock or distant sound, which formerly had passed unheard, or only served as a lullaby to her sweet sleep. How lovely does the wife, the mother, the sister, or the friend become to the eye of grateful affection while ministering ease, comfort, nay, almost life itself, to the husband, the son, the mother, or the friend.

A mother's love! How thrilling the sound. The angel spirit that watched over our infant years and cheered us with her smile! Oh, how faithfully does memory cling to the fast-failing mementoes of a parent's home, to remind us of the sweet counsels of a mother's tongue. And, oh, how instinctively do we hang over the scenes of our boyhood, brightened by the recollections of that waking eye that never closed while a single wave of misfortune or danger sighed around her child! Like the lone star of the heavens in the deep solitude of nature's night, she sits the presiding divinity of the family mansion, its delight and its charm, its stay and its hope, when all around her is overshadowed with the gloom of despondency and despair.

There does not exist anything in human nature more perfect than the affection which a mother bears for her children. Love in its true character is of divine origin, and an emanation from that Spirit who Himself is love, and though oft degraded on earth, we yet find it pure, sublime and lasting within the maternal heart. Man is frequently captivated by mere external graces, and he dignifies that pleasure, which all experience in the contemplation of the beautiful, by the title of love; but the mother makes no distinction, she caresses the ugly and deformed with kindness equal to, if not surpassing, that she bestowes on the more favored. Too frequently are interested motives the basis of apparent affection; but it is not so with her, who clings more fondly to her children in their poverty, their misfortunes and their disgrace. The silken chain with which we are bound one to the other is sometimes broken with facility; a word, a look, may snap the links never to be re-united; friendship decays or proves false in the hour of need, we almost doubt the existence of constancy. Away with this doubt while the maternal heart continues as a temple for the dwelling of God's holiest attribute. She has watched her infant from the

cradle; she will not desert him until separated by the grave. How anxiously she observes the budding faculties, the expansion of mind, the increasing strength of body! She lives for her child more than for herself, and so entwined has her nature become with his that she shares in all his joys, and, alas! in all his sorrows. "Not because it is lovely," says Herder, "does the mother love her child, but because it is a living part of herself—the child of her heart, a fraction of her own nature. Therefore does she sympathize with his sufferings; her heart beats quicker at his joys, her blood flows more softly through her veins when the breast at which he drinks knits him closer to her."

Should her son fall into poverty, become a bankrupt in fortune, he is shunned by former acquaintances and despised by most of his fellow-beings; but one will be found like a ministering angel at his side, cheering his despondency, encouraging him to renewed exertions, and ready herself to become a slave for his sake. If exposed to censure, whether merited or unmerited, all men rush to heap their virtuous indignation on his head; they have no pity for a fallen brother, they shun or they curse him. How different is the conduct of that being who gave him life! She cannot believe the charge; she will not rank herself among the foes of her child. And if at length the sad truth be established, she still feels that he has not thrown off every claim, and if an object of blame he is also one of pity. Her heart may break, but it cannot cease to love him. In the moments of sickness when stretched on the bed of pain, dying perhaps from a contagious disease, he is deserted by his professed friends, who dare not, and care not to approach him, one nurse will be seen attending him. She will not leave his precious existence to the care of hirelings, though now every instant in his presence seems an hour of agony. His groans penetrate her heart, but she will not let him hear the sad response; she weeps, but turns away, lest he should see her tears She guards his slumbers, presses his feverish lips to hers, pours the balm of religion on his spirit, and points him to the mercy of that Judge before whom he may shortly appear. When all is silent she prays for his life, and if that may not be, for his happiness in the life to come. He dies. The shock, perhaps, deprives her of life, or if not, she lives as one desolate and alone, anxiously looking forward to that world where she may meet her darling child never to part again.

With equal simplicity and eloquence the tender affection of Hagar for her child, as expressed in the Old Testament. In a wilderness, herself parched with thirst, and fainting from fatigue, she beholds her infant—her only companion—dying from want of nourish-

ment. The water bottle was empty. Placing her boy beneath a shrub and moving to some distance she cried, "Let me not see the death of my child." Let me not behold the severance of those ties which nature compels me to support and cherish. Let not mine eyes witness the gradual departure of that angel spirit which I had hoped would afford me comfort and consolation in my declining years. And "she lifted up her voice and wept." But she was not left childless, "for God was with the lad."

If we reflect upon the inestimable value of a true parent, we can appreciate the beauty of the Psalmist's expression when he compares himself laboring under extreme grief to one "who mourneth for his mother." And was it not in accordance with the perfect character of our Saviour that some of His last thoughts should be for the welfare of her who had followed Him through all His trials? When extended on the cross, pointing to the disciple whom He loved, He said to Mary, "Woman, behold thy son," and to the disciple, "Behold thy mother," and from that hour that disciple took her to his own home.

TO WIVES.

The first enquiry of a woman after marriage should be, "How shall I continue the love I have inspired? How shall I preserve the heart I have won?" Marriage is a solemn and important event. I care not respecting the circumstances that may be thrown around it; nor does it matter whether the rite be performed in Friend-like simplicity, or by every ceremony calculated to impress the senses, yet the importance of it remains, the awful responsibility continues. It may have been brought about by selfish and interested motives; it may be the result of parental authority, or it may, as it ought always to be, the result of pure love and strong attachment, yet in either case it is alike binding for life, and will be the cause of happiness or misery, not only through time but in eternity.

How much then depends on this step, and what feelings press upon the mind! The home of childhood, the family circle, the loving mother, the kind father, the affectionate brother and sister, are all to be left, and another is to be your bosom companion; another to be the sharer of your joys and sorrows, your griefs and cares. New scenes, new duties, new trials, and new circumstances, will surround you, and you are now to act and live for others. Insincerity at the bridal altar is a crime of the blackest character, and he who would be false

there would be false anywhere; and she who would be untrue at such a time would be untrue on every occasion. But where all is sincerity, confidence and love, happiness is then present indeed, and will continue through life. Changes cannot alter their affection for each other, afflictions only bind them closer, cares and anxieties only afford opportunities for the exercise of sympathy, and every year unites them by nearer and dearer ties. Marriage places woman in that sphere where she may attain the greatest happiness, so does it advance her to a station of power and responsibility. Her power over her husband's happiness is almost absolute. By wisdom, by steadiness, by forbearance, by meekness, she may be to him a tower of strength; but no tongue can tell the ways in which she may annoy him and make him wretched.

Then cultivate and exhibit with the greatest care and constancy cheerfulness and good humor; they give beauty to the finest face and impart charms where charms are not. On the contrary a gloomy, dissatisfied look is an antidote to affection; and though a man may not seem to notice it, it is chilling and repulsive to his feelings, and he will be very apt to seek elsewhere for those smiles and that cheerfulness which he finds not in his own house. Endeavor to make your husband's habitation alluring and delightful to him. Let it be a sanctuary to which his heart may always turn from the calamities of life. Make it a repose from his care, a shelter from the world, a home not for his person alone but for his heart. He may meet with pleasure in other houses, but let him find pleasure in his own. Should he be dejected, soothe him, should he be silent and thoughtful, do not heedlessly disturb him, should he be studious, favor him with all practicable facilities, or should he be peevish, make allowance for human nature; and by your sweetness, gentleness and good humor urge him continually to think, though he may not say it, "This woman is indeed a comfort to me; I can not but love her and requite such gentleness and affection as they deserve." Particularly shun what the world calls "curtain lectures." When you shut your door at night endeavor to shut out at the same moment all discord and contention, and look on your chamber as a retreat from the vexations of the world, a shelter sacred to peace and affection. How indecorous, offensive and sinful it is for a woman to exercise authority over her husband, and say, "I will have it so; it shall be as I like." But I trust that the number of those who adopt this unbecoming and disgraceful manner is so small as to render it unnecessary for me to enlarge upon the subject. The aim of a wife is to become the friend, the partner,

the consolation of her husband, to educate her children, to shun every approach to extravagance. The want of economy has involved millions in misery. The power of a wife for good or evil is altogether irresistible. Home must be the seat of happiness.

A good wife is to a man wisdom, and courage, and strength, and hope, and endurance. A bad one, is confusion, weakness, discomfiture and despair. No condition is hopeless when the wife possesses firmness, decision, energy and economy. There is no outward prosperity which can counteract indolence, folly and extravagance at home. No spirit can long resist bad domestic influences. Man is strong but his heart is not adamant. He delights in enterprise and action, but to sustain him he needs a tranquil mind and a whole heart. He expends his whole moral force in the conflicts with the world. His feelings are daily lacerated to the utmost point of endurance by perpetual collision, irritation and disappointment. To recover his equanimity and composure home must be to him a place of repose, of peace, of cheerfulness, of comfort; then his soul renews its strength, and again goes forth with fresh vigor to encounter the labor and troubles of the world. But if at home he finds no rest, and there is met with bad temper, sullenness or gloom, or is assailed by discontent, complaint and reproaches, the heart breaks, the spirits are crushed, hope vanishes, and the man sinks into total despair. Every wedded pair might be happy did they bear each other's burdens, and strive with half the zeal they sometimes exert to make each other miserable, to contribute to each other's mutual happiness.

We conceive of no more heaven-like circle than is embraced within the limits of a virtuous and happy family. There is nothing beneath the skies more ennobling to human nature than such a household, where mildness and virtue, kindness and love, industry and peace go hand in hand together; where a contented and cheerful spirit chases away the gloom of the world, and religion with her sweet lessons of philosophy softens and purifies the heart, where the head of the family is recognized and respected as such, and the greatest happiness within the circle is derived from his approving smile; where the low, sweet voice of woman is seldom heard but in accents of gentleness and love, and the name of mother is never uttered unassociated with some endearing epithet. Such a family can only be collected together under the influence of a happy marriage. A union of hearts as well as hands; a tie consecrated by pure and chaste affection; an engagement formed on earth, but sanctioned in heaven. On such a union the angels in the bright abode of the blest must gaze with looks of interest and delight.

The gem of all others which enriches the coronet of a woman's character is unaffected piety. Nature may lavish much on her person, the beauty of her countenance, the grace of her mien, the strength of her intellect; yet her loveliness is uncrowned till piety throws around the whole the sweetness and power of its charms. She then becomes unworldly in her desires and aspirations. The spell which bound her affections to things below is broken, and she mounts on the silent wings of faith and hope to the habitations of God, where it is her delight to hold communion with the spirits that have been ransomed from the thraldom of earth and wreathed with garlands of glory. Her beauty may throw a magical charm over princes, and conquerors may bow with admiration at the shrine of her beauty and love; the sons of science may embalm her memory on the page of history; yet her piety must be her ornament, her pearl. Her name must be written in the "Book of Life," that when the mountains fade away and every memento of earthly greatness is lost in the general wreck of nature, it may remain and swell the list of that mighty throng who have been clothed in the mantle of righteousness and whose voices are attuned to the melody of heaven. With such a treasure every lofty gratification on earth may be purchased; friendship will be doubly sweet; pain and sorrow will lose their sting; and the character will possess a price far above rubies. Life will be but a pleasant visit to earth, and death the entrance upon the joyful and perpetual home. And when the notes of the last trump shall be heard, and sleeping millions awake to judgment, its possessor shall be presented faultless before the throne of God.

No man ever prospered in the world without the co-operation of his wife. If she unites in mutual endeavors or rewards his labors with approving smiles, with what confidence will he resort to his merchandise or his farm, fly over lands, sail over seas, meet difficulties and encounter danger, for he knows that he is not spending his strength in vain, but that his labor will be rewarded by the sweets of home. Solicitude and disappointment enter the history of every man's life, and he is but half provided for his voyage who finds but an associate for happy hours, while for his months of darkness and distress he has no sympathizing partner. Two persons who have chosen each other out of all the species with the design to be each other's mutual comfort and entertainment, have in that action bound themselves to be good humoured, affable, discreet, forgiving and patient with respect to each other's frailties and imperfections to the end of their lives.

I have often had occasion to remark the fortitude with which

women sustain the most overwhelming reverses of fortune. Those disasters which break down the spirit of man and prostrate him in the dust, seem to call forth all the energies of the softer sex and give such intrepidity and elevation to their character that, at times, it approaches to sublimity. Nothing can be more touching than to behold a soft and tender female, who had been all weakness and dependence and alive to every trivial roughness while treading the prosperous paths of life, suddenly rising in mental force to be the comforter and supporter of the husband under misfortune and abiding with unshrinking firmness the bitterest blasts of adversity.

With a true wife a husband's faults should be sacred. A woman forgets what is due to herself when she condescends to that refuge of weakness, a "female confidante." A wife's bosom should be the tomb of her husband's failings, and his character far more valuable in her estimation than his life. If this be not the case she pollutes her marriage vow. Such a wife may do much for her partner in life, for her family, for society, for the world: she will be truly blessed in the favor of God, and in death will have an approving conscience—having faithfully discharged her duty.

There is nothing under heaven so delicious as the possession of pure, fresh, immutable affection. The most felicitous moment of a man's life, the most ecstatic of all his season of delight, is that in which he receives an avowal of affection from the idol of his heart. The springs of feeling, when in their youthful purity, are fountains of unsealed and gushing tenderness; the spell that once draws them forth is the mystic light of future years and undying memory. Nothing in life is so pure and devoted as woman's love. It matters not whether it be for a husband, or child, or sister, or brother; it is the same pure, unquenchable flame, the same constant and immaculate glow of feeling, whose undeniable touchstone is trial. Do but give her one token of love, one kind word, one gentle look, even if it be amid desolation and death, the feelings of that faithful heart will gush forth in a torrent—in despite of earthly bond or mercenary tie.

More priceless than the gems of Golconda is the female heart: and more devoted than the idolatry of Mecca is woman's love. There is no sordid view or qualifying self-interest in the feeling. It is a principle and characteristic of her nature—a faculty and infatuation which absorbs and concentrates all the fervor of her soul and all the depths of her bosom. I would rather be the idol of one unsullied and unpolluted heart than the monarch of empires. I would rather possess the immaculate and impassioned devotion of one high-souled and enthusiastic female than receive the sycophantic fawning of millions.

How sweet is the society of a beloved wife, when wearied and broken with the labors of the day, she comes forth to soothe with her endearments and tender care. The solicitude, the anxieties and the heavier misfortunes of life are hardly to be borne by him who has the weight of business and domestic cares at the same time to bear. But how much lighter do they seem when, his necessary avocations being over, he returns to his home and finds there a partner of his griefs and troubles, who takes for his sake her share of domestic labor and soothes the anguish of his fretted soul. A wife is not, as she is falsely represented and esteemed by some, a burden or a sorrow to man. No! she shares his burdens and alleviates his sorrows; for there is no difficulty so heavy or insupportable in life, but it may be surmounted by the mutual labors and the affectionate concord of that holy partnership.

MOTHER'S AFFECTION.

The mother's affection! Alas! how little do we appreciate a mother's tenderness while living; how heedless are we in youth of all her anxieties and kindness. But when she is dead and gone; when the cares and coldness of the world come withering to our hearts; when we know how hard it is to find true sympathy; how few love us for ourselves, how few will befriend us in our misfortunes; then it is that we think of the mother we have lost. It is true I had always loved my mother, even in my most heedless days of infancy, when I was led by a mother's hand, and rocked to sleep in a mother's arms, and was without care or sorrow. "Oh, my mother!" exclaimed I, burying my face again in the grass of the grave, "Oh, that I were once more by your side sleeping, never to wake again on the cares and troubles of this world."

Scarcely a day passes that we do not hear of the loveliness of woman, the affection of a sister, or the devotedness of a wife; and it is the remembrance of such things that cheers and comforts the dreariest hours of life, yet a mother's love far exceeds them in strength, in disinterestedness, and in purity. The child of her bosom may have forsaken and left her, he may have disregarded all her instructions and warnings, he may have become an outcast from society and none may care for or notice him, yet his mother changeth not, nor is her love weakened, and for him her prayers still ascend. Sickness may weary other friends, misfortunes drive away familiar acquaintances,

and poverty leave none to lean upon, yet they affect not a mother's love, but only call into exercise in a still greater degree her tenderness and affection. The mother has duties to perform which are weighty and responsible; the lisping infant must be taught how to live, the thoughtless child must be instructed in wisdom's ways, the tempted youth must be advised and warned, the dangers and difficulties of life must be pointed out and lessons of virtue must be impressed on the mind. Her words, acts, faults, frailties and temper are all noticed by those who surround her, and impressions made in the nursery exert a more powerful influence in forming the character of youth than do any late instructions.

If passions are unrestrained, if truth is not adhered to, if consistency is not seen, if there be want of affection, or a murmuring at the dispensations of Providence, the youthful mind will receive the impression and subsequent life will develop it. But if all is purity, sincerity, truth, contentment and love, then will the result be a blessing, and many will rejoice in the example and influence of the pious mother.

There is something in sickness that breaks down the pride of manhood, that softens the heart and brings it back to the feelings of infancy. Who that has languished even in advanced life in sickness and despondency, that has pined on a weary bed in the neglect and loneliness of a foreign land, but has thought of the mother that looked on his childhood, that smoothed his pillow and administered to his helplessness? Oh! there is an enduring tenderness in the love of a mother to a son, that transcends all other affections of the heart. It is neither to be chilled by selfishness, nor daunted by danger, nor weakened by worthlessness, nor stifled by ingratitude. She will sacrifice every comfort to his convenience; she will surrender every pleasure to his enjoyment; she will glory in his fame and exult in his prosperity.

Diseases of the Vulva.

The term *vulva* is applied to the orifice of the vagina and the folds of skin which surround it. The most common affection of this portion of the body is a simple inflammation.

Symptoms. —The parts are at first dry, red, hot, swollen and itching. After a few hours the surface becomes moist, and finally covered with a profuse secretion of pus; within a day or two small superficial ulcers often appear. If the inflammation extend into

the vagina, the surface of the latter assumes the same condition. Not infrequently the orifice of the urethra becomes also inflamed; indeed, the inflammation may extend along the latter into the bladder. In these cases every evacuation of the urine is attended with a violent, scalding pain. In the milder cases, the general health is not specially aff cted; in the severer ones there may be fever, thirst, headache, and general discomfort.

Causes.—Want of cleanliness; friction from clothing; skin affections; excessive intercourse; (in children) scrofula.

One point should be always borne in mind with reference to discharges of matter from the sexual organs of either sex, whatever be the cause. Extreme care is necessary to prevent the transfer of any particle of this discharge into the eye; special towels must be devoted to the local affection, and the hands carefully washed after any contact with the discharge. A failure to observe these precautions has caused the loss of many an eye by inducing an intense inflammation. This same effect may be produced also upon other mucous membranes than that of the eye; hence intercourse may be followed by a disease of the husband. Several cases are on record in which this accident has given rise to unfounded suspicions of the wife's chastity.

If properly and promptly treated, the disease usually subsides within a few days; but if neglected it proves obstinate, and often causes, moreover, soreness and abrasions of the skin on the thighs from contact with the discharge.

Treatment.—Measures for treatment consist, first and always, in local applications. The first essential is cleanliness, which may be accomplished by frequent washing with warm water into which a little borax has been stirred. Another measure which is most useful in promoting cleanliness is rest in a recumbent posture, whereby the amount of the secretion is materially diminished. The part should be washed in this way, at least, every three hours. A better and more effectual measure is a hip-bath, containing borax, at the same intervals. After washing, the parts may be protected from the clothing by the applications of cloths dipped in the following lotion:

Tincture of opium (laudanum), -	One ounce.
Sugar of lead, - - - -	One drachm.
Water, - - - - -	One pint.

This may be applied on each occasion after the parts are bathed.

Abscess in the Vulva.

On either side of the orifice of the vagina are small glands which naturally secrete a watery fluid and communicate by a fine hair-like canal with the surface. At times these canals become closed, and the fluid being no longer allowed to escape, distends the glands themselves, making a doughy, painless swelling. If this condition remain unrelieved there often occurs an abscess in and around the gland. This affection often follows the disease just described — inflammation of the vulva.

Symptoms.— This condition may remain for some time undiscovered, being, perhaps, first detected by pain during intercourse, or by the accidental discovery of a tumor in the part. This tumor is well defined, soft, and may vary in size from that of a hazel-nut to the dimensions of a small hen's egg; by the time that pus has formed the vulva is very tender and hot. In many cases the abscess opens spontaneously; indeed, the first intimation of its existence is sometimes the discharge of matter. In other cases the abscess dries up and disappears spontaneously; or becoming less tender and painful, it may remain for months or years without seriously inconveniencing the patient.

Treatment.— If there be considerable pain and tenderness, these symptoms may be relieved by the application of a flaxseed poultice or of cloths wrung out in hot water; indeed, this is usually all that is required. At times the size of the tumor and its consequent interference with natural functions require the evacuation of the matter by the lancet. This should be left to the physician, since he will at the same time take measures to prevent a recurrence of the abscess — a not infrequent occurrence if no treatment be adopted.

Eczema of the Vulva.

The skin of the vulva is liable to the same affections as the skin of the body in general; but there is one affection which occurs with especial frequency in this part — the condition known technically as eczema and popularly as "salt rheum" or "tetters."

Eczema is caused by the application of irritating substances to the skin; hence it occurs with especial frequency in the cases in which an irritating discharge is permitted to come in contact with the skin, and may indeed result from simple lack of cleanliness, even though there be no noticeable discharge from the vagina.

Symptoms.— Eczema usually begins by an intense itching of the skin, which is red and hot; in a few hours there appear a number of minute watery blisters which soon burst and leave a raw, moist surface. In many cases the first crop of blisters is followed within a day or two by a second, and this by succeeding ones; the effect is a considerable watery discharge and the accumulation of crusts or scabs over the raw surface.

Treatment.— In every case the possible cause must be sought; it will usually be found in a discharge from the vagina. In this case the treatment of the eczema must, of course, include the cessation of this discharge. Eczema of the vulva is a somewhat frequent complication during the latter months of pregnancy; in this case it seems to result from the imperfect circulation, and cannot be successfully treated until the womb has expelled its contents and thus permitted the blood to return from the vulva without obstruction. After removing, so far as possible, the cause, the eczema itself may be treated by the application of the lotion containing laudanum and sugar of lead mentioned above. If there be at the same time eczema upon other parts of the skin, it may be necessary to employ medicine internally as well.

Pruritus (Itching) of the Vulva.

Intense itching is a symptom of various diseased conditions of the vulva, some of which have been already mentioned; but there remain numerous cases in which no cause for the itching is apparent — there being no visible disease of the vulva or vagina. Sometimes, while beginning in the vulva, the itching extends so as to include the skin around and even down the thighs; in pregnant women it sometimes spreads also upward over the abdomen. In all these cases the trouble begins in the vulva and usually remains limited to this region for a considerable time before extending.

At first the irritation is usually slight and transient, so as to occasion the patient but little annoyance; in many instances it is first observed just before or after menstruation, and may remain for some time limited to this period of the month. But the malady gradually becomes more intense and prolonged, and is moreover aggravated by the patient's efforts to relieve the itching; the rubbing and scratching not infrequently induce also a genuine eczema. The irritation is usually worse at night, and may even deprive the patient of sleep. In most cases the degree of annoyance varies considerably, being aggravated by anything which causes a flow of blood to the sexual organs — a warm bed, menstruation, indulgence in highly-seasoned food, etc. In course of time there usually results some disease of the skin, which may be mistaken for the cause instead of the result of the affection.

Causes.—Numerous conditions predispose to this annoyance, among which may be mentioned lack of cleanliness, luxurious habits, constipation, but chiefly leucorrhœa. Pruritus may be present not only when the whites are abundant, but also where the amount of the discharge seems quite insignificant. In every instance it should be especially noticed whether there is *any* vaginal discharge of any sort. Yet there remain numerous cases in which no local affection of the vulva and no general disease can be found to account for this troublesome symptom; and these are the most intractable cases.

Treatment. — Since the itching is usually but a symptom, the treatment comprises first of all, the detection and removal of the cause; in those cases in which leucorrhœa, or some affection of the skin, can be detected, we may indulge a reasonable hope that the cure of these affections may be followed by cessation of the itching; in cases of leucorrhœa, the use of hot hip-baths, and of vaginal injections, as previously directed, will often relieve the itching; in such cases, advantage may be derived from the introduction into the vagina at night of a tampon — a bunch of cotton saturated with glycerine, with a string tied about it; in many cases of severe itching, these tampons may be kept in the vagina by day as well as by night, a fresh one being substituted every twelve hours. In case there is evident disease of the skin, this should be at once subjected to treatment. In every instance, except when there is considerable abrasion of the skin from

scratching or other cause, one of the following lotions may be applied on cloths to the skin :

Sugar of lead,	One drachm.
Carbolic acid,	Ten drops.
Laudanum,	One ounce.
Water,	One pint.

Mix and apply as directed. Or,

Borax,	One ounce.
Morphine,	Five grains.
Water,	Half-pint.

It is often desirable to have some application which will not evaporate so rapidly as those just mentioned ; such a salve may be made of the following ingredients:

Dilute prussic acid,	Two drachms.
Sugar of lead,	Fifteen grains.
Cocoa oil,	Two ounces.

One of these mixtures will, in any case, give temporary relief; but a permanent cure will sometimes require a complete change in the mode of life, perhaps a change of residence and of climate.

Excessive Sensitiveness of the Vulva.

This is an affection sometimes associated with pruritus, but often occurring alone. As a result of this condition, even gentle contact with the surface causes extreme pain, and may even be followed by convulsions. This condition is often observed in hysterical women, or may occur without such accompaniment at the change of life. It is usually brought to the notice of the physician when it occurs as an obstacle in the consummation of marriage. In a considerable number of cases improvement of the general health and avoidance of those causes which have been mentioned as predisposing to hysteria will usually be followed by relief from this annoyance. In some instances, on the other hand, nothing but surgical interference has been found effectual.

In a certain class of these cases contact of a foreign body with the part causes not only the sensation of pain but also a spasmodic

contraction of certain muscles, whereby the orifice of the vagina is partly closed. In the majority of these instances sexual intercourse is simply impossible, and sterility usually occurs, as was the case with thirty-two of thirty-four instances recently observed by Scanzoni.

Treatment.—This whole subject may be well summed up in the remark of Dr. Sims: "From personal experience, I can confidently assert that I know of no disease capable of producing so much unhappiness to both parties to the marriage contract, and I am happy to state that I know of no serious trouble that can be so easily, so safely and so certainly cured." The necessary treatment consists simply in overcoming the muscular resistance by the fingers while the patient is under the influence of ether or chloroform. Yet, though the remedy is so simple and so safe, it is a curious fact that some married women have suffered from this annoyance for twenty and even thirty years; have, indeed, been for such periods wives in name only.

DISEASES OF THE WOMB.

Inflammation.

Without entering into particulars of classification, we may speak of inflammation of the womb as either *acute* or *chronic*. The *acute* inflammations of the womb — the diseases of child-bed being excluded — are of far less frequent occurrence than the slower and more chronic inflammations.

Causes. — Exposure during the menstrual flow; inflammation of the vagina; suppression of menstruation; excessive or violent intercourse; certain constitutional diseases; attempts at abortion; injections of cold water.

Symptoms. — The patient ordinarily complains of weight and a dragging pain in the small of the back, often extending around to the front and down the thighs; there is usually also an itching and burning sensation in the vagina, and frequently such irritation of the bladder and rectum as to compel frequent evacuations of these organs. The general symptoms are not usually severe; some headache, loss of appetite; perhaps slight fever may

be observed. After three or four days, or perhaps sooner, there appears a discharge from the vagina, at first clear and glairy, subsequently white or yellow, and even bloody. By this time there is usually considerable pain in the lower part of the abdomen, accompanied by an effort to "bear down," such as is felt during labor. It is important that this malady be not allowed to proceed, not because of its own intrinsic danger, but because there usually occur complications in various other of the sexual organs which seriously impair the woman's health.

Treatment.—The patient should be required to keep quiet in bed. At intervals of three or four hours, she should receive a vaginal douche, for which at least a quart of hot water should be used. In the intervals between these injections, hot, moist flannels should be kept applied to the vulva and groins. Twice or three times a day the patient should rest for fifteen or twenty minutes in a hot hip-bath. Internally, it is usually advisable to administer opium in some form—say ten drops of laudanum at intervals of two or three hours until three doses have been taken. After an interval of twelve hours, the same amount may be repeated.

A vaginal douche may be administered either with a Davidson syringe, or, better, from a fountain syringe. The latter may be readily constructed in a few moments by attaching a rubber tube to an opening at the bottom of a wooden or glass vessel; or still more simply, by making a siphon out of a rubber tube, one end of which remains immersed in the vessel. The vessel containing the hot water may be suspended by a nail on the wall or held in the hand, while the other end of the tube is introduced into the vagina. Care should be taken not to suspend the vessel more than two or three feet above the level of the other end of the tube, for since the force with which the water flows increases with the height of the vessel, a greater elevation than that named may result in damage to the womb from the violence with which the stream strikes the mouth of the organ (or rather from entrance of fluid into the womb cavity, and even abdominal cavity).

Chronic Inflammation of the Womb.

When one considers the exposed position of the mouth of the womb, liable to friction and violence during so many of the ordinary duties of life as well as by the performance of the sexual

functions, it is not surprising that this organ is frequently the seat of inflammation. In fact inflammation of the womb is one of the most frequent complaints to which the genital organs of woman are liable, and occurs with especial frequency in married women.

Among the causes which predispose to this affection are various general conditions as well as certain local affections of the sexual organs; among them may be mentioned, prolonged mental emotion; excessive physical exertion; imperfect nutrition; prolonged nursing; frequent confinements; insufficient repose after delivery. These influences do not necessarily cause the disease, but simply by exhausting the strength or impairing the health of the patient prepare the way for an inflammation of the womb, if this organ be exposed to certain unnatural influences. Among these exciting causes may be mentioned, violent or excessive intercourse; attempts to prevent conception; attempts at abortion; injury to the womb during labor; exposure during menstruation.

Symptoms. — The symptoms which may be induced by this condition vary with the cause as well as with the general condition of the patient. At times the inflammation may exist for a considerable period without giving rise to any notable impairment of function, and perhaps without attracting the woman's attention to her condition. One of the first symptoms usually manifested is pain in the back and dragging sensation in the loins and pelvis, increased by muscular effort and exercise. In an early stage of the affection there usually occurs a profuse glairy or white discharge; this discharge is usually stringy, and by this characteristic may be usually distinguished from the leucorrhœa which occurs from disorders of the vagina. Not infrequently the discharge from an inflamed womb is streaked with blood, especially for two weeks after the completion of the menstrual flow. Sooner or later there occur inevitably derangements of the menstrual function; the discharge may be too abundant or too scanty, too frequent or too seldom; but in nearly all cases menstruation is painful. The monthly discharge not infrequently contains clots; sometimes a cast of the cavity of the womb may be expelled. Upon these symptoms there follows derangement of the sexual functions, intercourse being accompanied by pain; this form of uterine inflammation may occur in women who have long ceased to menstruate, and is then usually indicated chiefly by the leucorrhœa.

After the local affection has continued a certain time, the

patient begins to manifest symptoms of constitutional affection. There is marked loss of appetite and impairment of digestion, the results of which are soon manifest in her imperfect nutrition. She becomes nervous, irritable, even hysterical. One of the early and persistent signs is headache, located usually at the top of the head. A not infrequent occurrence is the manifestation of many of the usual signs of pregnancy; vomiting often occurs, darkening of the area around the nipples, enlargement and unusual sensations in the breasts. When to these are added, as is by no means seldom the case, a distension of the abdomen from the accumulation of gas in the intestines, and irregularity or suppression of the menses, it is not surprising that many women, even those who have been pregnant, should mistake the cause of the difficulty. In fact, however, pregnancy is less probable during the existence of this disease, since the inflamed condition of the womb renders this organ incapable of nourishing and retaining the ovum. Though pregnancy is rarely completed so long as the womb is inflamed, yet abortions during the early months are by no means uncommon. These may constitute, indeed, one of the symptoms of the disease. Cases are known in which repeated abortions or sterility were the first symptoms which drew attention to the existence of the inflammation.

Treatment.—The treatment of this affection must comprise two distinct objects. First and chiefly, the avoidance of those personal habits almost inseperable from our usual modes of living, and second, the application of remedies to the womb itself. If it be possible to accomplish the first of these aims, the second will be often unnecessary. The unfortunate feature in the case is that the causes which predispose to and favor the continuance of the disease are often so intimately associated with the woman's life as to make it impossible to remove them. It is absolutely necessary, though practically often impossible, that the patient should avoid hot rooms, long hours in bed and other violations of hygienic principles so commonly committed. Regular evacuations of the bowels and bladder must be secured, and sexual passion but rarely indulged. This condition of the womb, with its accompaniments of ill health, is usually followed by dyspepsia, which in its turn aggravates the original difficulty, and requires treatment. In short, it may be accepted as a rule, that the disease of the womb will persist until the general health of the woman is improved by fresh air, good diet and proper exercise. Not less important is the avoidance of mental

strain, emotional or otherwise. In most cases the end will be soonest attained by complete change of residence, air and social surroundings.

The local treatment—the applications to the womb itself—can be made by professional hands only. Yet benefit may be derived from the application of hot water to the genital organs; this may be best accomplished by using a hip-bath of *lukewarm* water, containing a little borax, morning and night. If the leucorrhœa be profuse, injections of lukewarm water containing a little alum or borax may be employed three or four times a day; in these cases the water should be, as already said, lukewarm, and not hot, as was directed for the treatment of *acute* inflammation of the womb. The improvement of the general health, though most rapidly and effectually accomplished by a change in the habits of life, can be materially hastened under other circumstances by the employment of certain tonics. Among others the following may be taken:

Sulphate of magnesia, - -	One ounce.
Sulphate of iron, - - -	Half a drachm.
Dilute sulphuric acid, - -	One drachm.
Water, - - - - -	Half a pint.

A tablespoonful of this may be taken in a glass of water every morning upon rising.

Chronic Enlargement of the Womb.

This condition occurs, in a great majority of cases, in consequence of the failure of the womb to return to its proper size after child-birth. As has been stated in previous pages, there occurs during the two months following the delivery, if all goes well, a rapid decrease in the size of the womb; this process—termed *involution*—may be interrupted by a variety of causes, chief among which is the habit of rising too early after confinement and the assumption of domestic duties immediately after the woman leaves her bed. It cannot be too often nor too emphatically stated that the first two months after confinement should be devoted to this process, whereby the womb resumes its natural and proper size; it is poor economy—a loss and not a saving of time—for the woman to rise too soon after delivery—for she can scarcely

hope to escape subsequent ills which will seriously impair her health and usefulness. Hence it is that so many women date their ills to the time of confinement.

Causes.—The first in the list of the causes of this affection is, as already indicated, premature rising from the bed after confinement. The woman may have enjoyed good health during her pregnancy; the labor may have been natural and easy, and yet the failure to observe proper precautions after delivery may be followed by the condition under discussion.

Perhaps the next most frequent cause is abortion; if the natural course of pregnancy be interrupted, the natural process subsequent to pregnancy—that is, involution of the womb—also fails to occur with the same precision and uniformity. Furthermore, after abortion, there is ordinarily no activity of the breasts; and it is a well-established principle that the involution of the womb is hastened and promoted by a free secretion of milk. One more factor is also to be taken into consideration, namely, that after abortion the woman ordinarily rises and resumes her duties at a much earlier period than after confinement at full term.

In addition to these causes connected with pregnancy there are several which may induce a chronic enlargement of the womb in a woman who has never been pregnant; the long-continued existence of a chronic inflammation of the womb usually results in an increase in the size of this organ; the same result may follow displacements of the womb; the growth of tumors in this organ; and inflammation in some of the tissues near the womb; the presence of tumors in the abdomen not connected with the womb itself, and in some instances the difficulty seems to be due to excessive sexual indulgence, especially at the time of the menstrual discharge.

Symptoms.—The symptoms caused by this complaint are largely identical with those attendant upon a chronic inflammation of the womb. Among them may be mentioned, pain in the back and loins; pain in the head (especially at the top); languor and debility; derangements of menstruation; leucorrhœa, and pain during intercourse.

This condition—chronic enlargement of the womb—may, like a simple chronic inflammation, give rise to many of the symptoms which commonly occur during pregnancy: the enlargement of the breasts and abdomen. The derangement of the stomach may arouse

a suspicion that conception has occurred. Indeed it not uncommonly happens that young married women are completely deceived in this regard, and the physician himself may be unable to decide during the first two months of observation. It may be in general stated that the most decisive though not infallible means for deciding between the two is to be found in the condition of the menstrual function. If conception have occurred, the menses are usually suppressed; if inflammation or enlargement be the cause of the symptoms, the menses may be *deranged* — increased, diminished or irregular — but are rarely *suppressed*.

Numerous complications often supervene upon this affection, complications affecting the bladder and rectum especially. Sometimes the symptoms arising in these other organs may obscure the original complaint, by directing the attention to the complication. Thus it is not seldom to meet cases in which the most prominent symptoms are frequent and painful evacuation of the bowels or bladder; and leucorrhœa is a by no means constant symptom of this affection. Other complications that may follow, though with less frequency, are hysteria, dyspepsia and disorders of the ovaries.

Treatment.—In determining what measures may be best adapted for the relief of this condition, it is extremely important to ascertain as accurately as possible the influences that cause it. In none of the diseases of women is there a greater diversity of causes, and therefore a greater difference in the measures which may secure relief in various cases. In some instances the condition of the womb results from the depraved condition of the general health. In this case the remedies must evidently be addressed to improving the general condition, and must therefore consist of the various measures mentioned in discussing the chronic inflammation of the womb. In such cases a simple change of residence, a vacation at the sea-shore or among the mountains, will accomplish far more than any amount of drugs. There are, on the other hand, numerous instances in which the difficulty begins in the womb, and the other features of the case are merely subordinate and subsequent to this primary affection in the womb. Not infrequently the entire difficulty seems to originate in a laceration of the neck of the womb which occurred during delivery. A simple operation whereby this laceration is healed is followed by a disappearance of all the symptoms. Hence it is advisable in every case in which the com-

bination of symptoms above mentioned justifies a suspicion of womb disease, to consult the medical adviser, in order to ascertain at least whether the original difficulty is one of the womb primarily or whether the womb disease is a sequence rather than a cause of the constitutional affection.

There is one remedy which is in the majority of cases beneficial, though it cannot be relied upon alone to accomplish the desired result. This is the ergot of rye. This medicine may be taken—prepared as the *tincture* of ergot—to the amount of twenty drops two or three times a day. The liquid may dropped into water and sweetened if necessary. If this remedy be employed without the advice of a physician, it is advisable to begin by the use of smaller doses, not more than ten drops at a time, because the first few doses may be followed by intense pain in the womb and its surroundings, the result of the uterine contraction. The degree of pain which may be thus induced depends largely upon the condition of the womb itself. Another valuable means consists in the vaginal douche, or hip-bath, the latter preferred. If it be impossible to take a hip-bath regularly twice a day, the douche may be employed three or four times a day, and in the horizontal position. By means of the fountain syringe already described a stream of warm water may be introduced high up in the vagina against the mouth of the womb. The douche should be continued for twenty or thirty minutes at each application. At night a tampon of cotton, soaked with glycerine, may be introduced into the vagina and pushed up against the neck of the womb. In every case a string should be tied around the cotton, by which means the tampon can be easily removed in the morning.

Peri-uterine Inflammation.

This affection consists, as the name indicates, in an inflammation of the tissues which surround the womb. It is a not infrequent accompaniment of the various inflammations of the womb itself, the inflammatory process extending from this organ into the tissues around it.

Causes.— The most usual are abortion, confinement, imprudence during menstruation, inflammation of the womb or ovaries, injuries from instruments, coition.

Symptoms.—The symptoms vary according to the severity of the case as well as the previous condition of the patient. There is frequently a pronounced chill, followed by high fever; pain and tenderness in the lower part of the abdomen, which are aggravated by motion of the body; sometimes nausea and vomiting occur. In other cases the onset of the difficulty is far more gradual; there may be no acute symptoms which direct attention to this part of the body, beyond some pain and tenderness and perhaps derangement of the menstrual function. In these cases, however, there has usually existed previously some disease of the womb.

The course and duration of peri-uterine inflammation vary extremely according to the attendant circumstances of the case. The affection may subside before five weeks, leaving the womb essentially unchanged; these are the most favorable and the rarest cases. In more numerous instances the result is a displacement of the womb, which becomes bound down in this unnatural position by the products of the inflammatory process. This is the origin of so many of the obstinate cases of uterine displacement which are treated unsuccessfully by one physician after another for years; they are in fact incurable. Another termination of this difficulty is an abscess in the neighborhood of the womb—a process usually indicated by a rapid succession of severe chills, extreme pain, high fever and general prostration. These abscesses often break spontaneously into the vagina or the rectum, or even into the bladder; in any case the most obstinate and annoying discharge usually results and the patient's general health is seriously impaired. In other still more unfortunate cases the abscess does not escape externally, but causes a general inflammation of the membrane which lines the abdomen and covers the bowels—an inflammation which is technically called *peritonitis*. This is one of the gravest affections that can afflict the patient, and usually results either in death or in permanent invalidism. In the most favorable cases the woman's life is made wretched by obstinate and painful derangements of menstruation, displacements of the womb, and general ill-health.

Treatment.—The object of treatment in the early stage is to limit the extent of the inflammation, and thereby to avoid, if possible, not only the more painful, but also the more disastrous consequences of the disease. Whenever, therefore, the symptoms already mentioned as indicating the onset of this affection are noted

— chills, fever, pain and tenderness in the abdomen — the woman should go to bed and *stay* there. It is impossible to over-estimate the important, indeed the absolute, necessity for perfect rest during this condition. The next most important measure is the application of heat and moisture to the inflamed parts; this is accomplished first and best by frequently-repeated and long-continued use of the vaginal douche, the water being made as hot as can be conveniently endured; the same object will be furthered by the application of hot moist cloths over the womb and between the thighs. It is important, also, to secure an evacuation of the bowels, which may be best accomplished, not by the use of cathartics, but by an injection of warm water into the rectum. From fifteen to twenty drops of laudanum, the quantity varying according to the amount of pain, may be at once administered and repeated in four hours. The further management of the case must be left to the medical adviser; it would be impossible and impracticable for us to relate to the non-professional reader the steps necessary to ascertain the progress of the disease and to prevent the manifestation of its worst symptoms, for the treatment consists — aside from the general directions already given — in local examinations and applications through the vagina, which can be performed only by a physician.

In many of these cases in which the initial symptoms have been so slight that the physician was not called, the damage is done beyond repair before medical advice is finally summoned; the patient is already an invalid, and is apt to remain one for years. In these cases medical treatment is seldom of much avail; there is not much hope of restoring the womb and surrounding tissues to the proper and natural condition; the chief object must be to place the patient in the conditions most favorable to health, in order that she may endure, as best she can, the array of uncomfortable symptoms constituting "female weakness." The general directions are essentially those stated in connection with the discussion of chronic inflammation of the womb, and need not here be repeated; yet especial stress should be laid upon two items: the importance of rest and of abstinence from sexual intercourse.

Displacements of the Womb.

The womb is held in its natural position chiefly by certain bands, which are attached at one end to the sides of the uterus, and at the other to various points around the pelvis. The womb, it will

be remembered, is shaped somewhat like a pear, and these bands are attached chiefly about midway between the large and small ends of the organ. These two ends, therefore, remain somewhat movable, that is to say the top of the womb — the large end of the pear — can be bent backward or forward from the rest of the organ. Such a bent position of the womb is called technically a *flexion*. At other times, the entire womb changes the direction of its axis, that is to say the middle where these bands are attached remains fixed, while the top moves forward and the lower end of the womb backward. Thus the pear may, instead of standing almost vertically in the pelvis, turn over so as to lie almost horizontally. This displacement is called a *version*. It may also happen that the womb had been for some cause so increased in size and therefore so heavy that the natural bands are unable to support it. The result is that these bands stretch and allow the womb to sink deeper into the vagina than its natural position. This is the condition known as prolapsus, and popularly as "falling of the womb."

Causes.—One of the most frequent causes of displacement of the womb is the increase in size consequent upon chronic inflammation of the organ; and another, scarcely less frequent, is the failure of the womb to return to its natural size after delivery, or after abortion. These all act by causing such increase in the weight of the womb that the supporting bands are no longer able to maintain the organ in its proper position. Then, again, there are causes which lead to the same result, by weakening the support of the womb or by forcing this organ out of its proper position. Among these are the excessive stretching of all these parts during the process of delivery; rupture or tearing of the uterine supports by pregnancy and confinement; the pressure upon the womb from above, exerted by the weight of clothing suspended at the hips, and aggravated by the pressure of a tight corset. And last must be mentioned the affection already described under the name of peri-uterine inflammation. By far the most important of all these influences, by reason both of their frequency and of their obstinacy, are the results of confinement.

Falling of the Womb — (Prolapsus).

This condition is usually found in married women, as would be expected from the fact that its cause lies so often in pregnancy and confinement. Yet it may occur in girls previous to marriage,

and in women who have passed the child-bearing period. In the former, the cause must be sought in improprieties of dress and in the inflammations of the womb consequent upon imprudence during menstruation. And there is still another factor which is more frequent and obstinate in later years, but which may nevertheless assist in displacing the womb in young women — namely, habitual constipation. In old age there is also a condition peculiar to advanced life, which assists in promoting a falling of the womb — namely, a weakening of the uterine supports as a part of the general debility of the patient.

Symptoms. — It is a singular fact that the unnatural sensation which accompanies a falling of the womb, does not bear any direct and constant relation to the amount of displacement of this organ; there are instances in which the womb descends to the orifice of the vagina or even protrudes from that orifice without exciting marked discomfort in the patient. On the other hand, most severe and annoying symptoms are sometimes experienced for which no other possible cause can be discovered than a slight prolapsus, and which disappear so soon as this prolapsus is remedied. In most cases in which the womb has been forced but a little from its natural position, there will be observed pain in the back and loins, a sense of weight in the pelvis, leucorrhœa, inability for physical exertion, pain and difficulty in evacuating the bowels and bladder. It is a little remarkable that this particular displacement of the womb is not usually accompanied by derangement of menstruation — a point which is of value in distinguishing a simple prolapsus from the other displacements, versions and flexions which are usually so accompanied. A simple prolapsus moreover does not seem to cause sterility, while this condition is often associated with other displacements of the womb. The course of this affection varies extremely, as has been already indicated, though all cases of it agree in one respect, that there is no tendency to spontaneous recovery. The patient's health and comfort are impaired, her ability and disposition for exertion diminished; but the disease itself has no tendency to induce a fatal result, unless indeed it be complicated by some of the other affections which so often follow in its trail.

Treatment. — The treatment of prolapsus comprises two essential features: First, the removal of the cause, if such cause

can be ascertained; second, the replacement of the womb in its natural position. Under the former head must be included measures for preventing constipation, for removing the weight of clothing from the hips, and for obviating pressure upon the abdomen. If the patient be especially fleshy and have borne several children, benefit may usually be secured from the use of an abdominal supporter also. This part of the treatment may, therefore, consist in a regulation of the diet and the use of such medicines as will secure the daily evacuation of the bowels; in the use of a corset suspended from the shoulders; and in the employment of a bandage which may be buckled around the hips so as to support the abdominal wall. In addition to this, measures of especial caution should be taken during every menstrual period, since at this time the womb is heavier than in the intervals. These measures may consist in rest and the recumbent posture. The result of these efforts will be not to restore the womb to its proper position, but simply to remove the obstacles in the way of such restoration by means applied directly to the womb itself.

First among these come injections with astringent remedies — that is, tannin, alum or oak bark. These may be reinforced by cool hip-baths and vaginal douches. The improvement of the general health will also favor success in the restoration of the womb.

It is possible that these measures, when faithfully and conscientiously applied, may in certain mild cases effect the desired result. Yet, in the majority of instances, it will be necessary to employ in addition local mechanical means in order to restore the womb to its proper position and maintain it in that position. These means consist in instruments constructed for the purpose and known as *pessaries*. There is an almost infinite variety of these instruments, though they are all constructed upon one or two general plans; in the one the instrument is made to rest upon the vagina and the floor of the pelvis, and upon these supports the uterus is raised and sustained. In the other kind the instrument which sustains the womb is itself supported not by the vagina but by a strap attached to a belt around the waist. The materials employed for the construction of these instruments is usually hard rubber, the object being to employ some material which will not be corroded and become unclean through the action of the vaginal secretions.

It is utterly impossible to attempt to describe rules for the application of these instruments, since each must be adapted to the particular wearer with as much care and accuracy as are employed in the fitting of a garment; and this it is hardly necessary to say can be accomplished only by skilled hands. The pessary must, therefore, be selected, adapted and introduced by the physician, who will moreover furnish such instructions as are necessary for the comfort and profit of the patient. Certain rules must be observed in the wearing of pessaries of any sort. Details as to their introduction and withdrawal vary with the different kinds. Most varieties should be removed every day; many are to be worn only during the day; and there are but few which can be worn with profit and without discomfort during the menstrual period. In every case extreme care as to cleanliness must be observed. Warm vaginal douches should be employed morning and night, and the pessary carefully washed in lukewarm water after every removal. The neglect of these precautions will be followed not only by annoying sensations, but even by serious ulceration of the womb or vagina, or both. In many cases the first attempt at fitting the pessary may be unsuccessful. The instrument may give considerable pain and discomfort. In such cases the patient should at once report the fact to the physician, who will insert an instrument of somewhat different pattern or size or shape.

In the worst cases these measures will hardly suffice; for in some instances the displacement is so great that the womb escapes from the body and appears external to the vaginal orifice. In these cases an operation is usually the only resort which affords any hope of success. In the majority of instances this extreme displacement is a gradual process, accomplished during months or years; yet in some cases the same amount of displacement—even external to the body—may occur suddenly, as the result of excessive effort in lifting a heavy weight for instance. These cases have been known to occur even in unmarried women. When the womb is thus exposed to unnatural violence, as must, of course, happen in this exposed position, it usually becomes the seat of ulceration and inflammation. One of the first requisites for the treatment of this condition consists, after replacing the organ into the vagina, in absolute rest upon the back in bed.

Flexions.

A bending in the direction of the uterus, so that the top of the organ is curved backward or forward — in other words, a flexion — is one of the most common of uterine complaints. The accompanying symptoms vary somewhat, not only according to the severity of the complaint, but also according to whether the organ is bent forward or backward. The causes have already been enumerated in discussing displacements of the womb in general.

Symptoms.—A certain degree of displacement, either backward or forward, may last for years without directing the attention of the individual to these organs. Yet, sooner or later, some or all of the following symptoms are usually manifested: Pain in back and loins; irritability of bladder and rectum; derangements of menstruation; leucorrhœa; inability for physical exertion.

In many cases the patient is actually bedridden and may remain so for years. Some of these cases can be rapidly restored to health by simply returning the womb to its proper position; yet, in the majority of cases, the long-continued interference with health results in a series of complications which make successful treatment extremely difficult. Among these complications are dysmenorrhœa, sterility, inflammation of the uterus and of adjoining structures, tendency to abortion.

Treatment.—The same measures which have been recommended as promoting the restoration of a prolapsed womb are useful in overcoming the different flexions and versions of the uterus. These latter, too, must be treated by the physician with pessaries; but he must be the judge of the sort to be employed and the mode of application. It will generally be advisable in these cases of flexions and versions for the woman to remain in bed for three or four days after the first insertion of the instrument.

Tumors of the Uterus.

The tumors which are developed in the uterus may be described, for our purposes, under three varieties: Fibroid, cancerous and polypous. The fibroid tumors of the uterus consist essen-

tially of the same material as the substance of that organ itself; the tumor is really merely an excessive growth of certain portions of the womb. This growth is an extremely common occurrence, so that in the majority of cases the *post-mortem* examination of women of 35 or more years old reveals the existence of small fibroid tumors. In most instances, however, these tumors occasion no symptoms during life, so that neither patient nor physician has any suspicion of their existence; it is only when these growths attain a certain size that they occasion derangement of the sexual organs. There seems to be practically no limit to the size that they may attain; such tumors have been known to weigh over fifty pounds, and to be so large as to make locomotion impossible. It is only, however, in advanced life that fibroid tumors of the womb attain this enormous size; indeed, such cases are exceptional any how. It is a curious observation that the occurrence of these tumors is favored by certain conditions of race, and seems to be favored by inactivity of the sexual organs. Thus it is known that fibroid tumors occur with greater frequency among females of the negro race than among white women; and it seems to be established that they are more apt to occur in women who have never borne children than in others. It is also believed that the growth of these tumors is favored by menstrual disorders of long standing; though it may be a question whether the sterility which usually accompanies such obstinate menstrual disorders be not really responsible for both disorders and tumors.

In most cases the development of fibroid tumor of the uterus, which usually begins between the age of 30 and 45 years, is attended by certain complications which attract the attention long before the tumor itself becomes large enough to cause any increase in the size of the abdomen. Among these complications are inflammations and displacements of the womb; derangements of the bladder and rectum; piles and menstrual disorders. Doubtless many of the symptoms which so usually accompany fibroid tumors of the womb as to be considered characteristic of this affection are really due to these ordinary complications.

Symptoms.—Among the most prominent symptoms are:

Profuse menstruation, the interval between the periods being usually shortened. Leucorrhœa, the discharge often tinged with blood. Pain in the back and pelvis, and pain during menstruation. Irritation of bladder and rectum. These symptoms need not all

occur in one and the same case; nor are they always present in the same relative degree. The differences seem to depend largely upon the position which the tumor occupies in the uterus. Thus those tumors that are situated in the part of the uterus lying next to the bowels do not usually occasion the same amount of leucorrhœa or difficulty with the bladder and rectum as the others; yet these attain the greatest size. Those that project into the cavity of the womb, on the other hand, while early attaining the same dimensions, occasion, nevertheless, more marked and annoying symptoms in the early stage of their development. It is extremely difficult for a non-professional person to arrive at a definite and decided opinion as to the existence of a uterine fibroid, because there are several other conditions which may readily be mistaken for this affection, especially in the early months of their existence. Among these are pregnancy, ovarian tumors, peri-uterine inflammations, and certain disorders of the bowels; indeed, instances have been known in which the results of habitual constipation have been mistaken for a fibroid tumor of the uterus. These mistakes result in part at least from the profound conviction entertained by almost every woman who has attained the age of 30 years, that she has or soon will have a tumor. It is the experience of most physicians that the vast majority of women who suffer from any derangement of the sexual organs are fully convinced before consulting a medical adviser that they are going to have either a tumor or a cancer. With regard to this prevalent dread, it should be remarked that fibroid tumors of the womb have been but very rarely known to cause death, and that the cases in which they attain such size as to seriously incommode the patient, or even attract her attention, are very few indeed. For it must be remembered, that probably 40 per cent. of women who attain the age when the change in life may be expected have fibroid tumors of the womb; and it is no exaggeration to say that nine out of every ten of these have never suspected the existence of such a growth. And there are cases in which the physician, while suspecting the existence of a fibroid, is unable to make a definite decision, because the growth never attains a size sufficient to make it perceptible.

The symptoms which ordinarily arouse the woman's suspicions that something is wrong are *menorrhagia* or *metrorrhagia*, leucorrhœa and painful menstruation. Menorrhagia, or profuse menstruation, may of course occur from various causes; indeed, some

women are not at all uniform in the amount of their menstrual discharges. Yet the occurrence of several successive profuse menstruations without apparent cause, and especially if the period between the monthlies be shortened, may indicate the existence of a fibroid tumor. Yet it must not be forgotten that this series of events may occur from other causes; that they do not, therefore, proves conclusively the existence of a fibroid. If such a tumor be actually present there will usually follow, witnin a few months, a more or less profuse leucorrhœa (if this have not previously existed), and slight enlargement in the lower part of the abdomen. It may happen that the patient's general health is meanwhile somewhat impaired, though this seems to result rather from anxiety and mental worry than from the direct influence of the tumor upon the patient's nutrition. As the tumor increases in size these symptoms become more and more marked; the monthly flow becomes very long and so profuse that the woman is much exhausted by the loss of blood — indeed, it is sometimes necessary to adopt certain measures for the repression of this flow as a means of saving the woman's life. The enlargement caused by such a tumor can, after it has attained a certain size, usually be distinguished without difficulty from the increase in size due to pregnancy; the fibroid tumors are usually located on one side or the other of the abdomen, present a different shape and are harder. Yet it is not so easy to distinguish between these tumors of the womb and tumors of the ovary.

As has been already stated, fibroid tumors of the womb rarely cause a fatal result. The most disastrous effects to be expected from them are the physical annoyance occasioned by their size and the exhausting effects of the profuse menstruation and leucorrhœa which so often accompany them. It is, fortunately, to be expected in the majority of cases, that after attaining a certain size the tumor will cease to grow, after which time the symptoms usually diminish somewhat in severity. It is further well established that the growth of these tumors is arrested at the change in life, even if they have been rapidly increasing in size up to that time, for this period marks the cessation of activity in all the sexual organs, the womb included. At this time the supply of blood to all the sexual organs and their appendages is much decreased; as a result of which the fibroid tumors no longer receive the necessary amount of nourishment, and therefore not only cease growing but usually

undergo a certain decrease in size. Indeed, throughout their entire course they are affected by whatever influences the womb itself. Thus they become larger during menstruation and pregnancy, and they may constitute a serious obstacle to delivery by dropping into the pelvis and becoming wedged there by the advancing child.

Treatment.—The treatment of fibroid tumors of the uterus may be summed up, so far as medicines are concerned, in one measure,—the use of ergot. Numerous other remedies have been, it is true, employed and recommended, but nothing else can be relied upon to give definite results. Among other things, electricity has been employed by inserting the poles of the battery directly into the tumor by means of needles. Possibly the future may decide that this measure is effectual in this, as in other desperate cases, but at present our reliance is upon ergot. The effect of this drug is to cause contraction of the blood vessels which supply the uterus and the tumor with blood; in other words, to starve the tumor. It must be admitted that in some cases of long standing ergot, like everything else, is ineffectual. Yet, it is equally certain, that in the majority of instances, before the tumor has attained a large size, ergot does at least arrest the growth of the fibroid, and may even cause a marked decrease in size or total disappearance. It is advisable always to have the supervision of a physician when ergot is administered, for the drug may occasion a variety of unpleasant symptoms, among them nausea, vomiting and colicky pains. Indeed, it becomes often necessary to administer the drug as an injection under the skin—*hypodermically*, as it is called—because of the patient's inability to retain it upon the stomach. When taken by the mouth, it is well to begin with a dose not exceeding ten drops of the tincture, which may be repeated three times daily. Even this amount will sometimes cause severe bearing-down pains for half an hour after taking it. Beneficial effects of this remedy are rarely seen until it has been administered in this way for several months, yet this must be considered not as discouragement but as a stimulus to a faithful trial of the article, for it is to be remembered that ergot is the sole hope in the way of medicines. While the attempt is thus being made to remove the cause, several complications may require treatment; these arise from displacement of the uterus, and, therefore, pressure on surrounding organs, and from derangements of menstruation. Some of the uterine displacements may, perhaps, be remedied by the use of pessaries, as before

indicated; the pressure upon neighboring organs can be, in some instances, relieved by the judicious use of abdominal supporters. The excessive menstrual flow is usually the most alarming and injurious feature of the case. In almost every instance where the presence of a fibroid is accompanied by profuse menstruation, it is advisable for the patient to remain in bed for a day or two before and during the flow. It may be possible to accomplish good by the administration of dilute sulphuric acid, ten to fifteen drops in a teaspoonful of water every four hours; or gallic acid, ten grains in water every four hours. Yet, perhaps, the best measure for controlling hemorrhage is the use of a tampon in the vagina. This may be made by saturating the cotton with a solution of alum. It is advisable, however, not to apply this tampon until after the flow has continued three or four days; that is, until a sufficient amount for a natural menstruation has escaped. The tampon may be renewed three or four times a day until the flow is somewhat controlled, yet all these measures in obstinate cases fail to relieve the difficulty. The hemorrhage may become so profuse and long-continued as to blanch and weaken the patient materially. In such cases, the services of the medical adviser should be at once procured, since the matter is too serious to be longer entrusted to unskilled hands.

In all instances, the object must be simply to control the more unfavorable symptoms, with the hope that the ergot may be successful in at least arresting the growth of the tumor. If these means fail, there remain no other measures for relief than surgical interference. The danger and the success attendant upon operations for the removal of uterine fibroids depend almost entirely upon the location of the tumor or tumors. When the fibroid projects into the uterine cavity, the chances of its removal by the use of ergot are most favorable; and, if this fail, it is not seldom accessible to the use of instruments through the vagina without exposing the patient to extreme danger. Yet one difficulty in these cases is the fact, that uterine fibroids are rarely solitary; if one be present there is almost an absolute certainty that others are growing in its vicinity. Hence, the removal of one tumor through the vagina does not necessarily cure the disease, nor relieve the symptoms, which may be continued by other fibroids which remain. The complete removal of such tumors can usually be secured only by an operation whereby the abdomen is opened. The results which

have thus far attended this operation are not such as to encourage surgeons to undertake it. It is advisable in those cases which cannot be relieved by other means than such an operation, to employ all possible means for arresting the growth until the occurrence of the change in life, after which time no further danger is to be apprehended.

Polyps.

By a polyp of the womb we understand a tumor which projects into its cavity, or even hangs into the vagina. These growths are often merely enlargement of the mucous membrane which lines the cavity of the womb.

Causes. — While it is impossible to say, with certainty, what induces such growths, it is well ascertained that they occur with especial frequency after a long-continued inflammation of the womb, and after obstinate derangements of menstruation.

Symptoms. — The earliest manifestations of a polyp in the womb do not differ materially from those of other uterine affections; there is pain in the back and loins, derangement of menstruation, which is usually more profuse and painful. Sooner or later, there appears leucorrhœa; the menstrual discharge contains abundant clots, yet it will be seen these symptoms alone do not afford positive proof of the existence of a polyp — since they may be also induced by other conditions. The final proof consists in the detection of a tumor by a vaginal examination.

Polyps of the womb are attended with no danger to the life of the patient; though so long as they remain the woman's health will be more or less seriously impaired, and the performance of her sexual functions interfered with. In some cases, nature effects a spontaneous cure, whereby the tumor is made to drop off and escapes by the vagina. Yet these are exceptional cases; in the majority of instances, the symptoms already mentioned persist, and increase in violence, until the patient's life may be rendered unendurable.

Treatment. — Until the symptoms have become such as to seriously annoy the patient, it may be well to attempt palliation, rather than cure, since the latter measure is not wholly devoid of

danger. To mitigate the severity of the symptoms, several measures may be employed; first, the uterus may be replaced — for it is usually somewhat displaced by the tumor — and held in position by a pessary; care may be taken to transfer the weight of the skirts from the hips to the shoulders; constipation should be avoided, and the bladder regularly evacuated. During the intervals between the monthlies ergot may be administered in the quantity mentioned when speaking of fibroid tumors, with the hope of securing the separation and expulsion of the growth. During the menstrual flow the patient should be kept in bed, and after the escape of the quantity of blood usual to her natural monthly periods — say after two or three days — a tampon saturated with a solution of alum may be introduced into the vagina, with the hope of arresting the flow. If the hemorrhage be found steadily to increase at successive menstrual epochs, so that the loss of blood becomes a serious factor in the case, it becomes necessary to resort to curative measures. These consist simply in the removal of the growth — a proceeding which must, of course, be relegated to the medical attendant. The danger attendant upon this operation will depend very much upon the position and the size of the tumor; in the majority of instances, there is little difficulty and no danger in the operation; exceptional cases occur, in which serious results may follow. The question as to the advisability of the operation will, of course, be determined by the physician.

Cancer of the Uterus.

This, one of the most dreadful of the ills that flesh is heir to, is certainly the most dreaded by women; and it must be admitted that this dread is well founded, not only in the incurability of the disease, but also in the frequence of its occurrence. Cancer may, of course, affect males as well as females, and many other organs as well as the uterus; yet it is definitely established by the observation of thousands of cases, that cancer attacks three times as many women as men, and that in one out of every three cases in which the disease occurs in woman it begins in the womb. Yet it must be remembered that these are relative, and not absolute, figures; in other words, that although one-third of all women who become victims of cancer have cancer of the womb, yet these con-

stitute a very small minority of women; that the great majority can rest assured of entire freedom from this affection. This fact is so self-evident that it seems scarcely worthy of especial attention; but stress is laid upon it from the fact, that almost every woman who suffers from any affection of the womb — and a great many others — live in constant dread of becoming victims to this disease.

There is a prevalent belief, even among physicians, that the development of disease may be hastened, or even started, by the use of the imagination; and that an individual who entertains a profound dread of a given disease, and is constantly indulging his thoughts and fears with regard to his chances of becoming a victim, is more liable to acquire the disease than would have been otherwise the case. In accordance with this idea some are inclined to attribute the frequency of cancer of the womb to the general dread of the disease entertained by women whose fears lead them to attribute the symptoms of even the simplest uterine difficulties to a supposed cancer. It is not necessary to discuss here just how much value may be attached to this belief, but it is certain that the general health of many a woman has suffered seriously from her groundless anxiety as to the existence of cancer in her own person.

Causes.—Imagination always riots in the attempt to explain the mysterious and unknown; a principle of which no better illustration could be found than in the popular ideas concerning the nature of cancer. Until recently the popular explanation of cancer —as well as of all other diseases, in fact — has been that the "blood is impure." It is scarcely necessary to say at this latter day that cancer is not a disease of the constitution, not an impurity of the blood, but a local affection entirely. Another popular belief, which is shared by some medical men even to the present day, is that cancer is hereditary; that children of parents who have had cancer are more liable than other individuals to the disease. This, too, must be classed among the exploded, or at least the unproven, beliefs with regard to this affection. It is, doubtless, true that cancer does frequently occur in individuals some of whose relatives have been also afflicted in the same way, but it is ascertained that in the majority of cases — about nine out of ten — it is impossible to discover any previous history of the disease in the family. The facts as at present known all indicate that cancer is a local disease, developed without any constitutional tendency of the individual or hereditary disposition in the family.

Now, it may be asked, what is the cause? To this it may be replied that two influences are known which certainly exert a powerful effect in inducing the disease. One of these is local irritation, the other a defect in the organization of the fœtus. With regard to the latter — the discussion of which would be a strictly physiological matter — nothing need be said here ; as to the former — the local irritation — it seems unquestionable that the development of cancer is favored, if not induced, in this way. It is a familiar fact that those parts of the body which in both sexes are especially prone to the development of cancer, are also in nearly all cases especially exposed to mechanical irritation. Thus a common seat of cancer in man is the lower lip ; and it is the experience of every surgeon that these cancers occur with especial frequency in those addicted to the excessive enjoyment of clay pipes — the usual picture presented being a cancer on the lip corresponding in position to the hollow which has been worn into the teeth by which the pipe has been habitually held. Among women the most frequent seats of cancer are the mouth of the womb and the breast — two organs which are in the natural course of events especially exposed to local injury ; among unmarried women cancer of the womb is a rarity. Yet it must be acknowledged that in a considerable number of cases of cancer this cause cannot be fairly assumed as the starting point of the disease. It seems, too, that no cause is capable of developing cancer during the earlier years of life. Cancer is extremely rare in individuals under 30 years of age, and occurs with greatest frequency between 40 and 60 years. This is true of cancer affecting the womb as well as other organs. It is also established that the disease is most frequent among women who have borne many children. Hence, every woman under 40 years of age, especially if she has not been often pregnant, should in justice to herself feel assured that she is safe from this terrible malady ; even if she have some of the symptoms which will be presently described as those of cancer ; even though there may be a tradition in her family that her grandmother's aunt had a cancer, let her dismiss at once all fears and anxiety upon this score.

Symptoms. — As a general rule, it is impossible even for the trained physician to recognize at the very onset of the difficulty a cancer of the womb, for the disease begins with the same symptoms and presents to the eye the same appearances as other affec-

tions which are not cancer. It is possible, indeed, that some of these other affections become transformed into cancer after months of existence. The first manifestations have been, indeed, already mentioned as those of other uterine complaints — pain in the back and pelvis, leucorrhœa, profuse and frequent menstruation. Thus far there is nothing characteristic of cancer; but in a short time the patient and her friends will notice that the discharge is peculiarly offensive; that the leucorrhœa is replaced by a bloody, fetid discharge, which often contains clots and shreds of flesh. In some cases the pain becomes a marked feature; it is usually intermittent, being sharp and obstinate during one day for example, and then almost unnoticed on succeeding days. Pain is not, however, necessarily present in these cases. The general health of the patient always suffers and may, indeed, attract attention before the local symptoms are especially noticeable. The patient becomes weak, appetite is impaired, and indeed all the functions are performed in a way which indicate a vital failure. A usual, though not invariable characteristic of this affection is a peculiar hue of the skin, which may be best described as straw color.

The patient's suspicions as to the cancerous nature of the complaint are usually first aroused by this group of symptoms — profuse menstruation, fetid discharge and beginning failure of health. In the majority of cases the physician is not consulted until these symptoms appear in other words, until ulceration has already begun. Yet it must be admitted that previous to this time it is not always possible to establish certainly the nature of the disease, and even then cases arise in which there is a possibility of doubt. Yet an examination with the finger usually decides the question. The mouth of the womb is hard, unyielding and rough, and bleeds readily upon the lightest touch. Indeed without this examination a positive decision is usually impossible, since there are several other conditions which may give rise to the group of symptoms above mentioned, including even the fetid discharge and failure of health. Among these are fibroid tumors in the cavity of the womb, polyps and severe ulcerations from other causes. Not the least common of these is the ulceration in the vagina and rectum, which occurs from syphilis. This mistake has been often made, especially since this disease may occur in women who, conscious of their own rectitude, do not conceive the possibility that they have contracted this affection.

Treatment.—The only possible hope of recovery from a genuine cancer of the womb — or of any other organ for that matter — consists in the complete removal of the diseased tissue and of the healthy flesh in its immediate vicinity. It cannot be too often nor too emphatically stated that the time spent in employing less radical measures, in applying salves and pastes and plasters, is merely affording the cancer a better chance for spreading further into the body, and thus becoming utterly incurable. The history of medicine records not a single instance in which a cancer, properly so-called, was cured unless removed. There are, it is true, numerous cases in which different ulcers, falsely styled cancers by individuals who profess to cure this malignant affection, have been healed by treatment. Yet these are not cancers. The choice of means for removal must depend upon the location of the tumor and upon the extent of its ravages. Could we be sure of removing all the diseased structures, we might be confident of our power to heal the disease. In some locations — of the lip for example — the early removal of the growth is followed in most instances by entire freedom from the affection subsequently; but in cancerous diseases of the womb an operation is not accompanied by the same assurances of success, for in consequence of the anatomical position of this organ, the disease is not detected so readily nor so early as in the former instance, and for the same reason its removal presents so many difficulties as to be but seldom followed by entire success. Yet whatever hope exists must be based upon the attempt at removal. It is not necessary to detail the measures and methods employed for this purpose; it may suffice to say that at an early stage of the disease the necessary operation does not imperil the life of the patient, and should be always performed, since many cases are recorded in which life has been saved, or at least prolonged in comfort. In the more advanced cases the disease has usually invaded the deeper parts of the uterus as well as surrounding organs. Even in these instances a complete cure has been effected by the removal of the entire womb, though this operation has not as yet been employed with sufficient frequency to determine the chances of success offered by it.

If the disease be too far advanced to warrant an operation, the treatment resolves itself into an effort to make the patient as comfortable as possible. To accomplish this, two measures are necessary: first, the use of opium to such an extent as to render the

patient insensible to pain; indeed, it may be desirable for her to become an habitual opium-eater, since thereby she secures freedom from pain and runs no danger of shortening her life. Should the patient be incapable, as some women are, of tolerating opium, some other narcotic, such as hydrate of chloral, may be substituted. It is evident that the objections which are properly urged against the use of opium in large quantities are not valid in these cases, since the patient's lease of life is at best a brief one. The other object of treatment is simply to secure cleanliness, the avoidance of odor and the repression of hemorrhage. First of all are copious injections with warm water alternating with a solution like the following:

Carbolic acid, - - - -	One teaspoonful.
Alum, - - - - -	Half a pound.
Glycerine and water, - - -	Each one pint.

Two tablespoonfuls of this may be put into a quart of warm water and used for vaginal injections three or four times a day. In addition the patient may take a warm hip-bath morning and night if the injections alone fail to secure perfect cleanliness. If the bleeding be not checked by these measures, the tampon of alum previously described may be employed to advantage.

There is no hope of cure by means of medicine. The patient may, it is true, take with advantage tonics, iron and wine, merely for the purpose of increasing her strength and improving her digestion. Her diet should be bland and unirritating, though nourishing; milk would be found of great benefit because combining all these qualities. Before the inevitable fatal termination of the case it will be found necessary to exercise tact and ingenuity in inventing measures both for the physical comfort of the patient and for sustaining her flagging strength. These must be met as emergencies arise, and cannot be described in detail.

Diseases of the Ovaries.

The ovaries are rarely the seat of inflammation except as a complication of other diseases. Thus peri-uterine inflammation, involving the tissue around the womb, not infrequently includes the ovaries, one or both, in the inflammatory process. This peri-uterine inflammation may result as the extension of the inflammatory pro-

cess from the womb, or even from the vagina. It occurs with especial frequency as a result of the contagious disease of the vagina known as gonorrhœa. Except in connection with other diseases, acute inflammation of the ovaries rarely or never occurs, though it is possible that some of the symptoms attendant upon derangements of menstruation are due to inflammation of the ovaries.

The more frequent occurrence is a chronic inflammation of the organs. This, too, is commonly associated with or results from inflammation of other tissues, especially of the womb; yet it does seem to occur as a primary affection, causing a certain group of symptoms without involving the other sexual organs. It seems certain that many of the puzzling causes of so-called womb disease — cases in which the symptoms are entirely too severe to be explained by the slight derangement of the womb — are really instances of ovarian and not uterine disease.

Among the symptoms of a chronic inflammation of the ovaries are pain and tenderness over these organs (on either side of the womb in the groin); sometimes derangement of menstruation, but more frequently interference with locomotion, so that such patients are often unable to walk across the room; hysteria is a not infrequent complication. In these instances, the tendency to hysteria is especially manifested during and previous to the menstrual epoch, at which time, too, the pain and weight in the pelvis are greatly aggravated. All sources of sexual excitement increase the difficulty, so that intercourse is sometimes impossible. If both ovaries are diseased the woman is usually sterile.

Treatment.— The best hope of restoration to health lies in the avoidance of everything which can induce a flow of blood to the ovaries; hence all sexual excitement should be avoided and the patient should rest before and during the monthly flow. Frequent and copious vaginal injections of warm water and the use of hot hip-baths will also tend to subdue the inflammation. A constantly used, though not very efficient remedy, consists in applying fly-blisters or the tincture of iodine to the abdomen over the location of the ovaries. Instances have been known in which this condition has entirely disappeared after conception had occurred — presumably because during pregnancy the ovaries escape the usual monthly congestion with blood.

Ovarian Tumors.

The ovaries are subject to tumors of several varieties which it is not necessary to specify here; they may exhibit among other kinds fibroid and cancerous tumors, though with far less frequency than others. The two most common varieties are the so-called ovarian cysts and the dermoid cysts. The latter though less frequent, may be described first. They consist each of a sac with fluid contents, in which are contained skin, fat, hair, teeth, bone, cartilage and other tissues. These sacs are not peculiar to the ovary, since they may be found in other organs of the body. The interesting feature with regard to these dermoid cysts, is the fact that they may be present in childhood, or even well-developed at birth. An instance is recorded in which delivery was impossible because of some unknown obstruction; the physician destroyed the child and removed it in pieces, when he discovered that the unknown obstacle was simply an enormous dermoid cyst, which rendered natural delivery of the fœtus impossible. The contents of these cysts may vary as to the quantity and kind of human tissues contained therein; they are rarely larger than an adult head, though they have been known to contain over a hundred teeth. These tumors, since they do not grow beyond a certain size, do not threaten the existence of the patient's life directly; yet, on the other hand, they are especially liable to excite inflammation of the surrounding tissues, which may result fatally. So long as they remain of their usual small size, they require no treatment; indeed it is not unusual to find after death such a tumor, whose existence was never suspected during life.

The majority of ovarian tumors are the so-called cysts which seem to result from the imperfect performance of menstruation. It will be remembered that the egg is contained in a minute sac, which lies in the substance of the ovary; and that at the menstrual periods this sac swells, bursts and permits the escape of the egg. Now if this minute sac fails to burst, but continue increasing in size by the addition of a watery liquid, the result is a so-called cyst, that is a membranous sac full of fluid; such seems to be the origin of ovarian tumors. It is not infrequent to find that the cyst is subdivided into compartments by partitions running through it, that it is indeed a collection of cysts, and not a single sac.

The size which these cysts may attain seems to be limited only by the strength and endurance of the patient, since instances are on record in which the sacs have contained over 100 pounds of liquid. The contents are usually clear fluid, containing more or less albuminous material, and sometimes a jelly-like matter. The right ovary is more frequently affected than the left.

Causes.—We have no definite information as to the causes of ovarian cysts, that is why these little sacs should fail to rupture, and continue their growth. Certainly it occurs only during a period of ovarian activity, as a rule, since the formation of an ovarian cyst before puberty is a rare occurrence. It is, however, possible even for a child to have a true ovarian cyst. These tumors have been discovered and removed from girls six years of age. These cysts may last a considerable time without causing noticeable symptoms, and even after their presence has been discovered they may grow so slowly as to occasion no serious difficulty for five, ten or even twenty years. Sometimes, indeed, nature effects a spontaneous cure, the fluid is absorbed, and the tumor disappears as quietly as it came. These are, however, the exceptional cases. It may not be expected that such a favorable issue will occur. The usual course is a gradual but uninterrupted increase in size, until the pressure upon surrounding organs occasions serious interference with the functions of life. Sometimes an even less favorable course occurs. The cyst may rupture, discharge its contents into the abdominal cavity, and occasion a serious, even fatal inflammation; or the wall of the cyst may undergo spontaneous inflammation, resulting in high fever and, perhaps, blood-poisoning.

If none of these accidents happen, and if the growth of the tumor is not so rapid as to impair the performance of other functions, no operative interference will be necessary until the usual complications occur. These consist of derangements of the bowels and bladder, dropsy, interference with digestion. Relief from the immediate symptoms can be obtained by tapping the cyst, since the patient obtains a temporary respite by the withdrawal of the fluid.

Symptoms.—During the earlier development of the tumor but few symptoms are ordinarily manifested, and even after it has attained the size sufficient to attract attention it becomes difficult to decide definitely upon the nature of the growth. This is especially

the case if, as sometimes happens, the menses are suppressed, for if the woman be a wife she naturally suspects pregnancy. Later there may occur some of the ordinary symptoms of pregnancy, due to the pressure upon different organs by the increasing tumor; nausea and vomiting and even unusual sensations in the breasts have been known to accompany the growth of ovarian cysts. So, too, the tumor may occasion the same derangements of the bowels and bladder which result from the presence of the pregnant uterus. On the other hand there are various affections—fibroid tumors of the womb especially—which can be with difficulty distinguished from ovarian tumors even by the physician. It is not our purpose to discuss the various means for distinguishing a tumor of the ovary from the various other enlargements which the abdomen may present; the matter must be entrusted to the medical adviser in each case.

Treatment.—Medicines are utterly unable to effect a cure of this complaint; they may of course be useful in supporting the strength of the patient, and thus enabling her to bear the different surgical measures necessary for her relief. The first and less formidable of these consists in tapping, whereby the greater part of the fluid can be withdrawn; although this measure is not entirely devoid of danger, it is far safer than the attempt at radical cure by operation.

In some cases, too, repeated tappings, as they became necessary after intervals of several months, have been followed by complete relief, the tumor having failed to reappear after the last tapping. This, however, cannot be regularly nor even usually expected; in the majority of instances tappings accomplish merely temporary relief and the postponement of the operation for cure. In the last decade this operation — technically called ovariotomy — has become so devoid of danger that surgeons now strongly advise against tapping, since the final operation is thereby rendered more complicated and less certain of a good result.

As for the operation itself — the removal of the ovaries with the tumor in question — it is unnecessary to say anything except that nowhere has a greater advance in surgical procedures been manifest than in this very operation. By improvements in methods the mortality following the operation has been so reduced that ovariotomy has lost much of the terror that the word formerly inspired.

In the latter years the death rate after this operation has been reduced to one case in ten, fifteen or even twenty.

Sterility.

To comprehend the nature of sterility, one must bear in mind the different factors necessary for conception. In the first place, the male fluid must be capable of fecundating the ovum; second, it must have access to the cavity of the womb; and, third, the lining membrane of this cavity must be in a healthy condition for receiving and nourishing the fecundated ovum. In view of these facts, it is evident that any one of several conditions may prevent the accomplishment of conception.

And first of all, let it not be forgotten that the husband may be and often is responsible for the failure to procreate. In about one case out of six unfruitful marriages, the fault lies in the fact that the male fluid is either incapable of fecundating the ovum, or is prevented by some fault or disease of the male sexual organs from escaping into the vagina. This is peculiarly often the case with men who have, in their earlier years, been unfortunate in their indiscretions. In the majority of instances, however, the difficulty lies in the female. Evidently any one of four causes may prevent conception, even though the male element be of proper quality: first, any obstacle to the entrance of the seminal fluid into the womb; second, any condition which prevents the formation in the ovaries of perfect ova; third, any obstacle to the escape of those ova into the womb; fourth, any condition which prevents the fecundated ova from lodging and receiving nourishment from the lining membrane of the womb. Among the obstacles to the entrance of the seminal fluid into the womb are displacements of this organ, extreme minuteness of the opening into its cavity, fibroid or other tumors, and vaginismus (the condition of unnatural sensitiveness which renders intercourse impossible). Among the causes which may prevent the formation of perfect ova are inflammation and tumors of the ovaries. Among the obstacles to the proper lodgment and proper growth of the ovum are the various forms of uterine inflammation, menorrhagia and metrorrhagia. It is scarcely necessar to refer in detail to the different ways in which

these various conditions prevent conception; nor is it possible to point out the means for ascertaining what the particular difficulty is in every case. In justice to wives, however, who, in the popular mind, are usually held responsible for sterility, and who keenly feel the reproach attaching to this condition, it should be said that the first step in ascertaining the cause for the sterility of a married pair should be an examination as to the capabilities of the husband. By a microscopic examination it can readily be determined which party is responsible for the failure to produce children. Whether or not the condition can be remedied depends, of course, upon the source of the difficulty. Many of the causes above enumerated as preventing conception can be readily removed. In every case the matter must be placed in the hands of the medical adviser, who alone can determine the cause of and responsibility for the difficulty.

DISEASES OF INFANTS.

While infants may be afflicted with the ordinary contagious diseases by which older persons are attacked, yet there is a certain number peculiar to infancy because dependent upon the relations which exist during that period. The majority of these are affections of the digestive organs — indigestion and its consequences — which may be in nearly all instances traced to improper feeding. These may occur not only by the administration of improper articles of food, but also in consequence of errors in diet or in personal care on the part of the mother.

Indigestion.

The occurrence of indigestion is a common incident in the life of nearly all infants. In most cases it is but temporary and subsides without serious interference with the general health; at other times it becomes obstinate, induces derangement of the bowels, and results in marked emaciation and even in death. Indigestion is indicated first by vomiting; by this we must not understand the usual act whereby a certain amount of curdled milk is rejected by

the infant, as usually happens after hearty nursing; this is a harmless procedure which occasions the baby no effort, no pain nor exhaustion, and is consistent with good digestion. If, however, there be introduced into the stomach substances unfit for digestion, or if there be persistent over-feeding of even good materials, vomiting occurs; the child makes violent efforts, becomes pale and languid. If this continue for a few days there ensues a looseness of the bowels, the stools being ordinarily green and offensive. In many cases the appetite seems unimpaired; the child takes the breast eagerly, but is unable to retain the nourishment. This condition often supervenes also upon sudden weaning or upon an abrupt change of diet; it may even occur when a wet-nurse is substituted for the mother, and is especially liable to happen if this change be made in the early months. In not a few cases it is to be attributed to the habit of giving the child the breast at very short intervals, especially when this plan is employed as the sovereign remedy for fretfulness. The *treatment* must consist first in ascertaining the cause; sometimes it is simply necessary to lengthen the periods between nursing; at other times it will be found that the trouble depends upon some error of diet on the part of the mother. *In every instance the nature of the child's food and the manner of giving it should be carefully investigated before resort is had to medicine.* During the time of indigestion the stomach should be allowed to rest by withholding all except small quantities of food; if the vomited matters emit a sour odor benefit will be obtained by mixing half a teaspoonful of lime-water with a teaspoonful of milk —the latter being obtained from the mother's breast if the child is still nursing; this may be repeated three or four times a day. If the difficulty persist more than two or three days, medical attendance should be secured; since it cannot be too much emphasized that the *foundation for the stomach and bowel troubles of infancy is usually laid in some, at first trifling, error in digestion.*

Thrush.—One of the incidents of indigestion, though sometimes occurring independently of it, is the condition known as thrush, wherein the tongue, inner surfaces of the cheeks, in fact almost the entire cavity of the mouth, is covered with a thick white coat, that first appears in minute dots and small patches, and subsequently extends. This white material is a mass of vegetable matter—in fact a fungus similar to that which forms the mould on jelly and bread. The result of this presence is extreme irritation

of the mucous membrane lining the mouth; and it may grow into the throat and gullet. When these patches are removed there appears a red, perhaps bleeding, surface underneath. The *treatment* consists in applying a saturated solution of borax—say one part in thirty—to these white patches by means of a soft cloth, which may be gently rubbed over the surface in question. The repetition of this application after every act of nursing will usually be followed by a disappearance of this symptom. If the child is using a bottle, especial care should be directed again to the cleansing of the rubber nipple, tube, and everything with which the food can come in contact. If this be unsuccessful, as is sometimes the case, relief may be obtained by using in the same way a saturated solution of the sulphite of sodium, which may be obtained at the druggist's.

Disorders of the Bowels.

The bowel complaints of infancy constitute a large part of the disorders requiring the attention of a medical adviser. Indeed, the alimentary canal of the child may be regarded in general as an index to its general condition, since any departure from health is soon signalized by the derangement of this most susceptible portion of the individual. It should be understood that a certain amount of latitude in the frequency and character of the intestinal evacuations is consistent with a healthy condition. It may be stated in general terms that during the first year of life the child should have two movements of the bowels in twenty-four hours, and during the second and subsequent years at least one during the same period. Yet just as certain variations and peculiarities are observed among different individuals in adult life, so a certain amount of departure from the usual rule is not inconsistent with the natural condition of the infant, and it should be always remembered, and cannot be too emphatically insisted upon, that a derangement of the bowels is, in the majority of cases in infancy, not a disease of the intestine, but a symptom of an unnatural condition elsewhere; and the first indication is always to seek the cause of the difficulty—to ascertain the unnatural conditions to which the child may have been in any way exposed. The indiscriminate use of drugs in the treatment of bowel complaints is

often productive of harm; first, because the attention is thereby directed and confined exclusively to the bowels, while the true cause of the difficulty often lies elsewhere; and, second, because the disordered action of the bowels is often merely a safety-valve for the relief of some other condition, and the effort to check that disorder may favor the continuance of the primary difficulty.

Diarrhea.

A simple looseness of the bowels, unaccompanied by pain, straining or notable change in the character of the discharges, is a frequent occurrence in the life of an infant, especially during the warmer months. This condition often occurs as the result and accompaniment of indigestion; it is therefore commonly accompanied by vomiting. In many instances it seems to result from simple exposure to cold, and can often be traced to improper clothing. In all these instances there is rarely any occasion for the administration of drugs; the detection of the cause—the needed change in the diet or in the clothing; the exercise of ordinary care in avoiding exposure to draughts—is usually sufficient to restore the natural condition of the bowels.

A second form of diarrhea is often accompanied by considerable fever, indisposition for the breast and general restlessness; not infrequently vomiting occurs both at the beginning of the attack and repeatedly after attempts at nursing. While such symptoms often usher in a serious illness, yet in numerous instances a little careful management completely restores the health of the child within a few days. The first requirement is to afford the stomach and bowels an opportunity for repose, as a preparation for their return to the natural condition. Hence the breast should be withheld for half a day, during which time the child may be either entirely deprived of nourishment or fed with a little thin barley water; a warm bath, followed by the application of clean warm flannel clothing, will usually suffice to accomplish the desired object. In some of these cases it may be necessary to administer four or five drops of castor oil with a single drop of laudanum or five to ten of paregoric if the child be a *year old*; the latter agents, however, indeed all forms of opium, should be withheld from infants under three

months of age, except when given by the direction of the physician; for children are peculiarly susceptible to the action of this drug, which may therefore have unexpected and serious effects.

While, then, the simple diarrhea of infancy already described need rarely occasion anxiety or interference by the use of medicine, yet there are circumstances which may modify this general statement. First of all is the occurrence of these troubles during the process of teething; for at this time there may occur, in consequence of the nervous excitability which results from the irritation in the gums, more serious and obstinate difficulty than would otherwise result. During teething, then, even the slight and simple diarrhea should not be ignored. It is often asserted and generally believed by mothers that teething is in itself sufficient to induce diarrhea; this is, indeed, possible, but in fact the frequent occurrence of diarrhea during teething is to be ascribed not to this process, but to some of the usual causes which exert at this time more than the usual effect. Let not the mother, therefore, delude herself into the belief that the diarrhea is unavoidable and requires no attention; it is extremely important that these diarrheas of teething be at once controlled, in order that the child be not compelled to endure this additional irritation and drain upon its strength. In these cases a simple change of air, especially from the city to the country, will often restore the bowels at once to their natural condition.

Summer Complaint.

The dreaded "summer complaint" of children enrolls upon its list of victims a much larger number than are destroyed by all the other diseases of infancy combined during the hot summer months; during one week in July, 1866, more than 1,200 babies died of this complaint in New York City

The condition generally begins, or rather is preceded for some days, by diarrhea; this is soon followed by violent vomiting, and for a time the vomiting and purging constitute the prominent features of the complaint. After two or three days, sometimes only hours, the vomiting ceases, while the looseness of the bowels persists. The child loses all inclination for the breast; is peevish, fretful, and subsequently listless and apathetic; the head is hot,

the abdomen usually swollen and often tender. In severe cases the stools, at first green and frothy, become quite watery and almost devoid of all the usual characteristics. Such cases often terminate fatally within four or five days or sooner; during the latter part of the attack the infant becomes cold, its features pallid and sunken, the abdomen retracted; the general appearance suggests an emaciation such as follows a long and wasting sickness.

Such is the rapid course of this complaint during the very hot weather and in the more closely settled parts of our cities. If the heat be not so intense the affection is usually of longer duration or of less immediate severity; for weeks and months, indeed, throughout the entire summer, the child is tormented with diarrhea; vomiting is frequent; the stools are usually green and very offensive; there is but little inclination for food, and whatever is swallowed usually re-appears within an hour, so that it seems impossible for the child to subsist upon the small quantity of nourishment retained. The infant emaciates rapidly and often becomes a really painful object to look upon. All the symptoms are aggravated during the unusually hot days, and improve correspondingly when the temperature falls; indeed, if the child be kept at home the result seems to depend largely upon the weather. This affection is especially apt to attack the child during the teething process, and rarely occurs after all the teeth have been cut.

So far as the home management is concerned, the treatment must be simply an attempt at prevention; and if certain measures can be adopted, it will be usually possible either to avert this trouble entirely or to cut it short upon the manifestations of the first symptoms. The mother of every child born during the warmer season should anticipate and prepare for this trouble during the following summer. The first measure for prevention consists in the precautions already mentioned for the avoidance of intestinal derangements in general; precautions as to the quality and quantity of the diet, as to the regularity in the times of nursing, and as to the observance of proper intervals between these times; care in the arrangement of clothing, etc. If, in spite of all precaution, the symptoms of the disease manifest themselves, there remains one, and but one, sovereign remedy— removal of the child into the country. This change, made of course with all due precaution, will almost certainly save any child in the early stage of the disease, and will often even restore the emaciated infant that has been for weeks

wavering between life and death. The unfortunate thing about this is, that summer complaint affects with especial frequency and malignancy the children of those who are pecuniarily unable to secure the advantages of country air for their infants. For them there remains merely the effort to secure as much of these advantages as their means afford; the child may be not only carried in the parks and on the shores of neighboring streams, but should be taken out for the day, at least, away from the debilitating influences of the city. It is often surprising to observe how much good results from these simple daily excursions out of the city, even though the child must be brought back every evening. The value of this principle has been well illustrated in the floating hospitals in operation in several of our larger cities.

These are charitable organizations whereby infants with their mothers or nurses are transported upon the water, and receive the benefits of fresh air and cooler temperature for several hours during the hot days of summer. The marked improvement resulting, even in desperate cases of summer complaint, should encourage all parents to repeat in a small and private way, if necessary, this plan of securing a change of surroundings for the sick child during the day, even if a sojourn of several weeks in the country be impossible.

As for the employment of drugs in this affection it is unadvisable for any but a medical man to attempt their use.

Constipation

Is an occasional difficulty in infancy as well as in later childhood. It is advisable to check this disposition of the infant, since after it has become habitual considerable difficulty may be experienced. The favorite remedy of nurses, manna, is always effectual but not desirable, since the habitual administration of laxatives will in the course of time render them necessary. Hence it is advisable, in case the bowels fail to move with the usual regularity, to employ a small injection of warm salted water in the lower bowel, or a small piece of soap may be introduced for the same purpose. Yet even these measures are not called for by a simple delay of a day or two unless some indisposition, such as slight fever

and restlessness, be manifested. The majority of these cases are over-treated, a plan which often results in the production of the very evil which it is intended to avoid, habitual constipation. If a laxative must be used, five or ten drops of "cascara cordial," once a day, will be the best remedy.

Croup.

Genuine croup, which means an inflammation in the upper part of the air passages accompanied by the formation of a false membrane, is a most serious and justly dreaded affection. But the greater number of cases commonly termed croup are not of an inflammatory nature, and do not expose the life of the infant to serious danger. The former — true croup — taxes the utmost skill of the physician, and often **requires** surgical interference; the latter — false croup — is usually relieved by simple household measures. It is therefore important to note the points of difference between the two, as indicating corresponding differences in the treatment required.

False croup is one of the most frequent troubles of infancy. The attacks occur usually at night; the child goes to bed well, at least so far as its breathing is concerned; though these attacks occur with especial frequency in children suffering from some of the usual indispositions, especially the bowel complaints so frequent during teething. Sometimes there is a slight degree of fever during the afternoon before the attack occurs. The mother is awakened by the child's violent coughing; the infant is usually in a state of great agitation, gasping for breath in the intervals between a loud, hoarse, ringing cough. The effects of imperfect breathing are seen in the flushed, often bluish color of the skin, as well as in the child's violent efforts at respiration; if the chest be exposed, it may often be observed that the spaces between the ribs are markedly depressed during the effort to take breath, indicating that there is an obstruction to the entrance of air into the lungs. After the attack has subsided spontaneously, or under the influence of domestic remedies, the trouble often recurs within an hour; indeed, the entire night may be passed in a state of alarm and anxiety, caused by the rapid recurrence of successive attacks.

If the affection be simply false croup there need be no anxiety as to the ultimate recovery of the patient. That the disorder is false croup may be recognized by its sudden occurrence in a previously healthy child; by the absence of fever, which, if present at all, is observed in only slight degree, and is rarely noticeable until the attack has begun; by the sudden development of the sharp barking, "croupy" cough, which when once heard is never forgotten. This cough, it is true, may also occur in true croup, but in that case is not developed so suddenly. After one attack sometimes, or more frequently after several, the child recovers its usual condition, except that it betrays a certain amount of exhaustion, and usually continues to cough hoarsely at intervals during the following day. In true croup the fever continues, and the child's condition in the morning is usually worse than during the previous night.

The chief element in the production of false croup is a spasm of the upper part of the air passages — technically known as the *glottis*. This affection is doubtless also the feature in true inflammatory croup, though but one of several phenomena which constitute the latter disease.

Treatment.—The object of treatment in false croup is to relieve the spasmodic condition of the glottis, an object best attained by the application of warmth and moisture to the throat, both internally and externally. The first measure is, therefore, to procure a warm and moist atmosphere; all windows should be closed and other draughts avoided; the room should be heated to, and maintained at a temperature of 80 or 90 degrees Fahr., and filled with steam most readily and quickly obtained from a kettle. Meanwhile hot and moist applications should be made to the throat; either pieces of flannel wrung out in hot water or poultices of flaxseed, bread and water, or other convenient material should be applied to the throat and renewed at intervals of fifteen or twenty minutes. If the young mother have a preference for an onion poultice — as most have — that may be employed instead. The object is simply to apply heat and moisture as quickly and effectually as possible; the benefit of the poultice lies in this quality and not in any virtue of flaxseed or onions. The desired result may be hastened by the application of mustard plasters to the feet or by the immersion of the feet and legs in hot water with or without the addition of a little mustard. The most effectual means for avoiding the recurrence of these attacks is to maintain the high temperature

and moist condition of the air for several hours. In the milder cases some of these measures may be unnecessary, but they will never be out of place.

True Croup, also called fibrinous, membranous and inflammatory croup, differs from the preceding, in that there is not only a spasm of the glottis, but also the formation of a false membrane in the upper portion of the air passages. This membrane, together with the swelling of the inflamed surfaces, obstructs the entrance of the air into the lungs; the immediate danger to the child is measured by the amount of this obstruction, and one of the aims of treatment, as will be presently mentioned, consists in the effort to remove this obstruction.

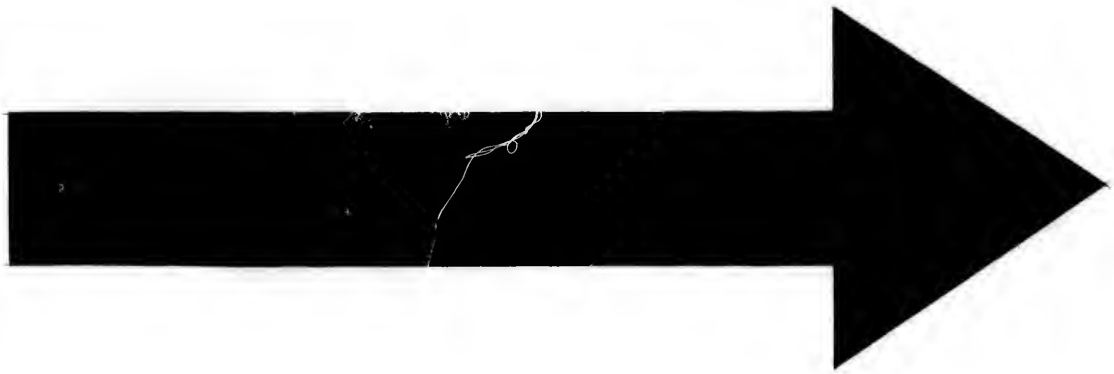
True croup is distinguished from false croup by distinctive features at the commencement, during the course, and at the decline of the disease; for our purpose it is, of course, especially important to note the differences at the commencement. It may be said in general that the onset of true croup is more gradual and of longer duration than that of spasmodic croup; the latter may affect a child which was at bed-time apparently well, or at least devoid of fever; in cases of true croup, the child is usually evidently indisposed, often feverish, and not infrequently suffering from a cough for two or three days prior to the occurrence of the first spasm of breathing. In true croup the child is unmistakably ill; the skin is hot and dry, the mouth parched in addition to the interference in breathing; after the first paroxysm subsides, the fever and general indisposition persist; and the breathing never becomes so free as is usually the case after the first spasm of false croup.

Symptoms. — Most of the symptoms of spasmodic croup are found also in the membranous disease — as would be expected since the same feature, the spasm of the glottis, is common to both. The same harsh breathing and brazen cough, the same change in the voice and difficult breathing as occur in false croup, though it is to be remembered that these symptoms do not appear usually until after one or two days of warning in the shape of general indisposition and fever. At this time there is intense thirst, and swallowing is usually accomplished without difficulty.

The first spasm often occurs in true as in false croup during the night, and this may be followed in one case as in the other by successive spasms before morning. Yet in the morning if the child

have membranous croup, there will be present as much or more fever than on the previous day, the breathing will still be difficult, the cough croupy and the child evidently indisposed. During the succeeding day the condition usually becomes worse; by the end of the second or third day the disease has attained its height; the fever is now intense, the face and lips often purple, the veins distended, the voice often not more than a whisper, the child lies with its head thrown back, tossing from side to side, and evidently struggling for breath — its condition becoming more distressing during and subsequent to every fit of coughing, which usually occurs now at short intervals. At this time, although the thirst persists it can be but imperfectly quenched because swallowing is difficult. If the disease approach a fatal termination, the cough usually diminishes in force and frequency or even stops altogether; the breathing is still more labored, the blueness increases, the hands and feet become cold, and death occurs from exhaustion or from suffocation or both.

Treatment.—The appearance of any symptoms which justify a suspicion that an attack of membranous croup is impending should be a signal for calling in the services of the medical attendant; for croup is justly dreaded — by physicians as well as by others — as one of the most serious and intractable diseases. Yet it is often possible to accomplish much good during the interval that must elapse before professional aid can be obtained. The same measures recommended for relieving an attack of spasmodic croup are essential. It is especially important that the room should be kept hot, filled with steam, and all draughts avoided. One should be careful not to gratify an almost natural instinct at such a time: the struggles of the child for breath usually suggest to some one that a window should be opened to give it air. This measure, however, would defeat its own object, since the cold would simply increase the spasm in the air passage already existing. Hot applications—cloths or poultices — should be at once made to the throat. Another measure is important as soon as the signs of impaired breathing become apparent, namely, that vomiting should be provoked. A favorite and often effectual mode for inducing vomiting is the administration of warm water containing a little salt or mustard or both, yet it is often impossible to get anything into the child's stomach because of the difficulty in breathing and its consequent struggles. The quickest and most effectual way for inducing vomiting at this



2.8
3.2
2.5
2.2
2.0
1.8
1.0

time is by tickling the child's throat either with a feather or with the finger. The object in promoting vomiting at this time is to secure the detachment and expulsion of the false membrane formed in the throat, and constituting the part of the impediment to the entrance of air and in securing free prespiration to lessen fever.

While these measures are being taken a hot bath should be prepared, into which the child is to be placed as soon as possible. After remaining for ten minutes the patient may be rubbed briskly with a coarse towel and then warmly wrapped in flannel. These measures usually secure relief from the more pressing symptoms, the breathing becomes easier, and the child often drops off to sleep. The heat and moisture in the room and the hot applications to the throat should be continued without intermission, for repetitions of the attacks may be expected at any time. It should also be remembered that an attack of false or spasmodic croup may be merely the forerunner of the onset of membranous croup.

Causes.—The cause of false croup is usually to be found in exposure to cold draughts of air, sudden checking of perspiration. True croup often appears to be the result of the same causes. Yet it is established that membranous croup is a highly communicable disease; not that every case results from contact with a previous case of the same affection, but that every case is capable of communicating the disease to other children. Hence the necessity for care in avoiding possibilities of such exposure.

Influenza.

Under this name is commonly known a catarrh of the nose or "cold in the head," an affection to which infants are especially susceptible. The condition may occur from any exposure to cold, and is indicated first by the tendency of the child to take in breath through the mouth rather than through the nose, and later by the appearance of a watery discharge from the nostrils. There is often considerable indisposition and even some fever, while the local symptoms in the nose occasion both child and attendant considerable annoyance. It not infrequently happens that influenza will appear almost epidemic, a considerable number of cases being affected in the same neighborhood at once.

Treatment—Should consist merely in a warm bath at night, careful though not excessive clothing, and the application of some oily material to the nostrils if the discharge be excessive and have provoked soreness of the skin, and a drop of ipecac syrup, in water, every hour or two.

Convulsions.

Children are generally said to be especially susceptible to fits, by which it is intended that a less degree of irritation suffices to induce convulsions in infancy than is required in later years. For a fit can generally be taken as an indication that there is somewhere in the body an unnatural source of irritation. In the child this irritation is frequently occasioned by growth of a tooth through the gums, by the presence in the stomach of improper food which cannot be digested, by the distension of the bowels in constipation, and sometimes (though not so often as mothers would have us believe) by the presence of worms in the lower bowel. Many of the diseases of infancy—scarlet-fever, measles, whooping-cough, meningitis among others—are not infrequently accompanied at some period of their course by convulsions. Then again, extreme emotional excitement, either of the child or of the nursing mother, may be followed immediately by convulsions.

The appearance of the child during a fit varies with the cause and with the condition. In many cases a certain premonitory condition is observed; the child is fretful, restless, perhaps grinds the teeth while asleep. The fit often begins by a twitching of the muscles of the face, which soon extends through the body and the limbs; the arms and legs are violently bent and straightened, the head often thrown back, the eyes widely open. In many instances the breathing is temporarily arrested, causing a blueness of the face and lips. Meanwhile the child may scream violently or seem simply bewildered. In another class of cases—called by nurses "inward fits"—the limbs are rigid, the body undergoes but little movement, the eyes roll unnaturally, the consciousness is lost. Whatever be the nature of the convulsion, it usually lasts but a minute or two, after which time the child falls into a deep sleep; at other times, especially during some of the diseases already mentioned, a series

of convulsions occur in rapid succession leaving the child exhausted and half unconscious.

Treatment. — It is to be remembered that a convulsion is not a disease, but merely an indication of disease; and that the first step in treatment consists in finding out if possible what the source of the irritation is. In many cases such source can be readily detected by a little care and patience; at other times it seems impossible to ascribe the fits to anything else than a nervous condition of the child; indeed there are many infants which seem to inherit a predisposition to convulsions; in such children fits occur without apparent cause. These infants are usually the offspring of unhealthy parents, and are themselves sickly and ill-nourished. During the fit it may be well to loosen the child's clothing and dash cold water from the hand into its face; the child should be laid flat without a pillow and fresh air admitted; if a hot bath be convenient the child may be placed in it.

If the infant be teething, and it be found that one or more teeth are just on the point of coming through the gum, subsequent fits can usually be averted by a judicious use of a lancet; and in every instance the treatment consists not in curing the convulsion, but in removing the cause whenever that can be discovered. If there be constipation and the abdomen be swollen, an injection of soapy water or of the milk of asafœtida (one tablespoonful) may be given at once. If irritating food has been taken, an emetic of mustard and water may be given. If the head be hot and the face flushed, applications of cold cloths may be beneficial.

ANATOMY AND PHYSIOLOGY.

In order to appreciate many of the facts of disease, it is necessary to understand the elements at least of the structure and functions of the body. The essential facts will be presented in the following pages.

The following extracts are taken from a "Brief View of the Human Body," by Dr. Beard:

"That we may understand for what purpose the human body is made to consist of such a variety of parts, why it possesses such a complication of nice and tender machinery, and why there was not a more simple, less delicate and less expensive frame, it is necessary that we in our imagination make a man; in other words, let us suppose that the mind, or immaterial part, is to be placed in a corporeal fabric in order to hold intercourse with other material beings by the intervention of the body, and then consider what will be wanted for its accommodation. In this enquiry we shall plainly see the necessity, advantage and wonderful adaptation of most of the parts which we actually find in the human body; and if we consider that in order to answer some of the requisites, human wit and invention would be very insufficient, we need not be surprised if we meet with some parts of the body whose use we cannot yet perceive, and with some operations and functions which we cannot explain.

"First, then, the mind, the thinking, immaterial agent, must be provided with a place of immediate residence, which shall have all the requisites for the union of spirit and body; accordingly it is provided with the brain, and is governor and superintendent of the whole fabric.

"In the next place, as it is to hold a correspondence with all external material beings, it must be supplied with organs fitted to receive the different kinds of impressions which they will make.

In fact, we see that it is provided with the organs of sense, as we call them; the eye is adapted to light; the ear to sound; the nose to smell; the mouth to taste, and the skin to touch.

"Furthermore, it must be furnished with organs of communication between itself in the brain and those organs of sense, to receive information of all the impressions that are made upon them, and it must also have organs between itself in the brain, and every other part of the body, fitted to convey its commands and to influence the whole.

"For these purposes the nerves are actually given. They are soft white cords which rise from the brain, the immediate residence of the mind, and disperse themselves in branches through all parts of the body. They convey all the different kinds of sensations to the mind in the brain, and likewise carry out thence all its commands to the other parts of the body. They are intended to be occasional monitors against all such impressions as might endanger the well-being of the whole or of any particular part.

"Moreover, the mind in this corporeal system must be endowed with the power of moving from place to place for the sake of intercourse with a variety of objects, of escape from such as are disagreeable, dangerous or hurtful, and for the pursuit of such as are pleasant or useful. Accordingly it is furnished with limbs, muscles and tendons, the instruments of motion, which are found in every part of the fabric where motion is necessary.

"But to support, to give firmness and shape to the fabric; to keep the softer parts in their proper places; to give fixed points for and the proper directions to its motions, as well as to protect some of the more important and tender organs from external injuries, there must be some firm prop-work interwoven through the whole, and in fact for such work the bones are given.

"This prop-work is not made with one rigid fabric, for that would prevent motion. Therefore there are a number of bones.

"These pieces must all be firmly bound together to prevent their dislocation, and this end is perfectly answered by the ligaments.

"The spaces between these different organs must be filled up with some soft matter, which shall keep them in their places, unite them, and at the same time allow them to move a little upon one another. These purposes are answered by the cellular membrane or fatty substance.

"Lastly the mind, being formed for society and intercourse with beings of its own kind, must be endowed with powers of expressing and communicating its thoughts by some sensible marks or signs, which shall be both easy to itself, and admit of great variety, accordingly it is provided with the organs and faculty of speech, by which it can throw out signs with amazing facility and vary them without end.

"Thus we have built up an animal body which would seem to be pretty complete; but as it is the nature of matter to be altered and worked upon by matter, so in a very little time such a living creature must be destroyed. If there is no provision for repairing the injuries which it must commit upon itself, and those to which it must be exposed to from without, therefore a treasury of blood is actually provided in the heart and vascular system, full of nutritious and healing particles, fluid enough to penetrate into the minutest parts of the animal; impelled by the heart and conveyed by the arteries it washes every part, builds up what was broken down, and sweeps away the old and useless materials; hence the necessity or advantage of the heart and arterial system.

"What more there is of the blood than enough to repair the present damages of the machine, must not be lost, but should be returned again to the heart; and for this purpose the venous system is provided. These requisites in the animal explain the circulation of the blood.

"The old materials which have become useless, and are swept off by the current of blood, must be separated and thrown out of the system. Therefore glands, the organs of secretion, are given for straining whatever is redundant, vapid or noxious, from the mass of blood, and when strained, they are thrown out by organs of excretion.

"But as the machine is constantly in action, the reparation must be carried on without intermission, and the strainers must always be employed. Therefore, there is actually a perpetual circulation of the blood, and the secretions are always going on

"All this provision, however, would not be sufficient, for that store of blood would soon be consumed, and the fabric would break down if there was not a provision made for fresh supplies. These, we observe, are profusely scattered around us in the animal and vegetable kingdoms, and hands, the fittest instruments that could

be contrived, are furnished for gathering them, and for preparing them in a variety of ways for the mouth.

"But these supplies which we call food, must be considerably changed — they must be converted into blood. Therefor are provided teeth for cutting and bruising the food, and a stomach for melting it down. In short, all the organs subservient to digestion. The finer parts of the aliment only can be useful in the constitution. These must be taken up and conveyed into the blood, and the dregs must be thrown off. With this view the intestinal canal is provided. It separates the nutritious part, which we call chyle, to be conveyed into the blood by the system of absorbent vessels, and the coarser parts pass downward to be ejected.

"We have now got our animal not only furnished with what is wanting for its immediate existence, but also with powers for protracting that existence to an indefinite length of time. But its duration, we may presume, must necessarily be limited, for as it is nourished, grows, and is raised up to its full strength and perfection, so it must in time, in common with all material beings, begin to decay and then hurry on to final ruin. Hence we see the necessity for a scheme for its renovation. Accordingly a wise Providence, to perpetuate as well as to preserve His work, besides giving a strong appetite for life and self-preservation, has made animals male and female, to continue the propagation of the species to the end of time.

"Thus we see that by the very imperfect survey which human reason is able to take of this subject, the animal man must necessarily be complete in his corporeal system and in its operations.

"If we consider the whole animal structure in this light, and compare it with any machine in which human art has exerted its utmost skill, we shall be convinced beyond the possibility of doubt, that intelligence and power have been exerted in its formation far surpassing anything of which men can boast.

"One superiority in the animal economy is peculiarly striking. In machines of human contrivance there is no internal power, no principle in the machine itself by which it can alter and accommodate itself to any injury which it may suffer or remedy any mischief which admits of repair. But in the animal body this is most wonderfully provided for by the internal powers of the system, many of which are not more certain and obvious in their effects than they are above all human comprehension as to the manner and means of

their operation. Thus a wound heals by a natural process; a broken bone is made firm again by a deposit of new bony matter; a dead part is separated and thrown off; noxious juices are driven out; a bleeding naturally stops of itself; a great loss of blood from any cause is in some measure compensated by a contracting power in the vascular system, which accommodates the capacity of the vessels to the quantity contained. The stomach given information when the supplies have been exhausted; gives intimations with great exactness of the quantity and quality of what is wanted in the present state of the machine; and in proportion as it meets with neglect, rises in its demands and urges its petition in a louder tone and with more forcible arguments.

"For the protection of the animal amidst the fluctuations in the heat of external bodies, a power of generating warmth has been provided; and to prevent its undue accumulation in a heated atmosphere, or its excessive loss in a cold one, the quantity carried away is regulated with wonderful nicety to its wants; so that an equal temperature is preserved in all the range of climates, from the extreme point of habitable existence near the poles to the intense heat of the equatorial regions.

"A farther excellence in the natural machine, and, if possible, a still more astonishing and more beyond all human comprehension than that of which we have been speaking, is the capability individuals possess of reproducing beings like themselves, which are again endowed with similar powers for producing others, and so of multiplying the species without end.

"These are powers which mock all human invention or imitation. They are characteristics of the Divine Architect."

The Skeleton.

The human skeleton, when fully developed, contains two hundred and six bones. These vary in their chemical composition as well as in their size and shape. In general the bones consist of lime and magnesium salts deposited in the meshes formed by a hard glue-like substance.

The bone in the living animal is furnished with blood vessels and nerves, and is just as much a living tissue as the skin or any other organ. The long bones are hollow on the inside to contain

the marrow which has a certain function to perform in the nourishment of the bone. The greater part of the nutrition of the bone comes, however, from a membrane which covers its outside, called the periosteum. When this membrane is torn off, the bone suffers and often dies; this is what happens in many cases of felons.

In early life the bones consist chiefly of gristle or cartilage; the salts of lime and magnesium are deposited in this gristly matter during childhood and youth. Some of the bones remain in this cartilaginous condition for years after birth; the thigh-bone, indeed, becomes completely converted into bone only about the twentieth year of life. Hence it happens that the bones of children are less liable to fracture than those of adults.

The Spine.—The spine consists of twenty-six pieces called vertebræ. Each of these is a ring of bone surrounding a central canal which contains the spinal cord. The lower vertebræ comprise also a thickened part called the *body*, which rests upon the corresponding part of the vertebræ below, and serves to transmit the weight of the body to the lower limbs.

The vertebræ are provided with numerous bony projections which serve for the attachment of muscles and ligaments.

The first vertebra, the one just below the skull, is called the *atlas*. It is so arranged as to permit a movement of the skull, which rests upon it, forward and backward. The movement of the head from side to side is accomplished by the rotation of this vertebra around a pivot which projects from the second vertebra.

The Head.—The head comprises twenty-two bones, eight of which are included in the cranium, fourteen in the face.

The cranial-bones are thin curved plates, united to each other by serrated edges known as *sutures*. Each of the bones forming the vault of the skull is composed of two plates, between which there is a layer of spongy, bony tissue. The outer one of these plates is somewhat elastic, while the inner one is very brittle and inelastic. It sometimes happens that a blow upon the head fractures the internal brittle plate, while the external escapes by virtue of its elasticity.

The *occipital* bone constitutes the back part of the head and the base of the skull.

The sides of the cranium are the *parietal* bones.

The forehead is made of the *frontal* bone.

The lower part of the side of the skull is made up of the *temporal* bone. The structures composing the internal ear are contained in this bone.

The bridge of the nose is formed by the *nasal* bones.

The upper jaw is made up of the two *superior maxillary* bones. This bone is hollowed out so as to constitute a cavity which communicates with the mouth.

The prominence of the cheek is formed by the malar bone.

The turbinated bones are contained in the nostrils.

The partition between the nostrils is made up in part of a bone called the *vomer*.

The lower jaw is a semicircle of bone, its ends terminating in an upright piece, the whole being shaped much like an inverted horse-shoe. The upright pieces lie in contact with the lower surface of the temporal bone, making the joint of the jaw.

The tongue is attached at its base to a small bone shaped like a letter U, and hence called the hyoid bone.

The Chest.—The chest is a space bounded by the spinal column behind, the breast bone in front, and the ribs on the side. The *breast bone* is composed of three pieces, and terminates in a projection of gristle or cartilage, which is situated just above the pit of the stomach.

The ribs are twenty-four in number, twelve on each side. They are all connected with the spinal column at the back. The upper seven on each side are joined by means of cartilages to the breast bone. The next three ribs are joined by their cartilages to the cartilages of the ribs above; the lowest two ribs are connected with the backbone only. The seven upper ribs are called the *true*, the remaining five the *false* ribs. The direction of the ribs is obliquely downward and forward from the backbone. By means of the cartilaginous attachments to the breast bone, the ribs are capable of considerable motion, whereby the size of the chest can be increased and diminished, as in the acts of breathing.

The Upper Extremity.—This consists of the shoulder, the arm, the forearm and the hand; the bones included are the shoulder-blade, the collar-bone, the arm-bone (humerus), the two bones of

the forearm (ulna and radius), the eight bones of the wrist, five of the hand, and fourteen in the fingers.

The only bones of the upper extremity requiring special notice are those whereby the rotary movements of the hands are effected. The ulna is firmly fixed at the elbow joint, where it is attached to the bone of the arm. At the wrist, on the other hand, it constitutes but a small part of the joint. The radius is scattered to the arm-bone, as to enjoy free rotary movement, while it is fixed firmly to the bones of the wrist, which, therefore, accompany its movements. The rotation of the hand is effected by the movement of the radius around the ulna. When the hand is held with the palm upward, the two bones of the forearm are almost parallel; when the hand is turned over, so that the back is upward, the radius lies obliquely across the ulna, the latter bone not having changed its position.

The Lower Extremity.—This includes the hip, the thigh, the leg and the foot. The projection called the hip is the upper margin of the bony ring called the *pelvis*. This bony basin contains some of the important organs of the body. On either side is a deep socket, which receives the head of the thigh-bone.

The thigh-bone (femur) is the largest, the longest and the strongest bone in the entire skeleton. The part which fits into the socket in the pelvis is connected with the shaft of the bone at an obtuse angle. The lower extremity of the thigh-bone is very broad and thick, so as to afford a large surface for the transmission of the weight of the body to the leg.

The front of the knee-joint is covered with a disk-shaped bone —the knee-pan or *patella*. This bone is contained in the sinew or tendon of the large muscle which constitutes the front of the mass of the thigh.

The back part of the foot is composed of seven bones, which together are called the *tarsus*. The largest of these is the bone which forms the projection of the heel. To this bone is attached the tendon of the muscles forming the calf of the leg.

The Joints.

The joints are of various kinds. Some permit an extensive range of movement, like the ball and socket-joint of the shoulder and hip; others permit movement in one direction only, such as

the hinge-joints of the elbow and knee. In some cases but a limited movement is required, as occurs between the vertebræ constituting the spinal column.

The contiguous ends of the bones constituting the joints are covered with thin layers of cartilage or gristle; this substance serves the purpose of a cushion in transmitting pressure from one bone to another.

The cartilages are covered by a thin delicate membrane, called the *synovial membrane*. This is arranged in the shape of a closed sac which is interposed between the adjacent ends of the bones. The object of this membrane is to diminish the friction occasioned by the movements of the bone; for this purpose the membrane secretes a fluid resembling the white of an egg.

The joints also comprise strong bands of inelastic tissue, called *ligaments*, which bind the ends of the bones together.

The Muscles.

The muscles are divided into two general classes, *voluntary* and *involuntary*. The former are under the control of the will, and contract quickly. The involuntary muscles are contained in the digestive organs, and in the walls of the blood vessels. They are stimulated to action, not by the will, but by other nervous influences; they do not contract quickly, for a certain appreciable interval elapses between the application of a stimulus and the contraction of the muscle.

The voluntary muscles are in most cases attached to two or more different bones; when they contract or shorten, these bones are brought closer together. Thus the act of bending the forearm is accomplished chiefly by the contraction or shortening of a muscle which is attached above to the shoulder, and below to the radius.

Muscles of the Head.—The forehead is wrinkled and the eyebrows drawn upward by a thin muscular sheet which is attached to the top of the head.

The eyes are closed by a muscular ring which passes around the opening of the eye and is attached at its inner angle.

The eyeballs are moved by six small muscles, which are attached at the bottom of the cavity in which the eye rests, and are

inserted into the outer coat of the eyeball at different points around its circumference.

The lower jaw is pulled upward by four pairs of muscles, two of which can be seen and felt on the outside of the face when the teeth are firmly pressed together. The jaw is pulled downward by muscles which are attached to the bone of the tongue in the neck.

Muscles of the Trunk.—Some of the largest and most powerful muscles of the body are attached along the backbone and ribs. These extend in different directions, some onto the limbs, some upward to the back of the skull.

The cavity of the abdomen is enclosed in front and at the sides by broad muscles which pass around from the side of the spinal column and ribs.

The muscles of the breast are few but powerful; two of them extend from the side of the chest to the arm, and by their contraction draw the arm forward over the chest.

Muscles inside of the body.—One of the most important of these is the *diaphragm*. This is a broad sheet which separates the chest from the abdomen. It is attached to the lower end of the breast-bone, to the ribs, and to the spinal column. During the act of expiration, the center of the diaphragm is raised above the edges where it is attached to the ribs, so that the muscle has the shape of an inverted wash-basin. When breath is taken into the lungs, the muscle contracts, pulling its central part downward, so that the cavity of the chest is enlarged. The diaphragm therefore is an important agent in breathing; in fact breathing can be carried on by the action of this muscle alone.

Movements in walking and running.—"The movements of walking, running, leaping, etc., are performed as follows: When the body stands upright, the feet are planted flat upon the ground, bearing at once upon the heels behind and the ball of the toes in front, the weight of the body resting between the two upon the arch of the foot. The body is maintained in this position, as we have seen, by the various muscles which act in such a way as to keep its different parts carefully balanced, and to retain the weight of the whole suspended exactly over the ankle-joint.

"Now, in walking, when a movement is to be executed in advance, the body is first made to lean a little forward, so that its

weight no longer remains above the ankle but is thrown forward so as to rest entirely upon the toes ; the heel is then lifted from the ground by the action of the very strong muscles situated on the back part of the leg ; these muscles, which come down from above, form the fleshy mass which is known as the " calf of the leg." They terminate in the strong, cord-like tendon, called the " tendon of Achilles,' which is easily felt at the back part of the ankle-joint and which is attached to the projecting bone of the heel. When these muscles contract, they draw the heel upward by means of the tendon inserted into it, and lift in this way the ankle-joint and the whole body, carrying it upward and forward, its principal weight resting, as already mentioned, over the ball of the toes.

" The action of the leg and foot in this movement is the same as that by which we might lift a weight from the ground with the aid of a lever. Suppose one end of a strong stick to rest upon the ground, and that this stick bears upon its middle a heavy weight. Then by taking in the hand the other end of the stick, we may lift the weight exactly as the body is lifted in walking by the muscles of the leg and the ankle-bones.

" At the moment that the body is raised and tilted forward in this way, the other foot is lifted entirely from the ground and swung forward so as to take a step in advance. As soon as the body has been carried far enough in an onward direction, the second foot is also raised in the same manner as before, while the first is swung forward in its turn to take another step. In this way the two legs act alternately, the weight of the body being carried forward first by one and then by the other; all the muscles, however, upon the two sides combining harmoniously in their action, so as to produce an easy, graceful and continuous movement.

" In the act of walking as above described, one foot is always upon the ground, and the weight of the body is mainly supported in this way by bearing upon the toes; it is only lifted forward alternately on the two sides by the leverage of the bones of the foot. Consequently no violent muscular exertion is required, and the movement can be kept up for a long time without fatigue.

" The act of running, however, instead of being a series of steps, is performed by a succession of leaps or springs, in each of which the whole body is thrown clear of the ground, and carried forward by the impetus which it has received. In order to accomplish this, at the moment the heel is about to be raised by the action of the

muscles above described, the knee and hip-joints are first bent, and then instantly straightened by the sudden contraction of their extensor muscles. The whole limb thus acts like a powerful spring, which by a sudden extension throws the entire body off the ground and carries it through the air in an onward direction. The opposite limb is at the same time thrown forward to receive the weight of the body, and to perform in its turn, and with similar rapidity, the same movements. The speed of the runner depends on the vigor of the muscular contractions, and the swiftness with which the successive motions are performed.

The act of jumping is accomplished in a similar way with that of running, except the same motions are executed by both limbs together, so that each leap is performed by itself, and is not combined with the others in a continuous movement."—*Dalton.*

The Nervous System.

The nervous system comprises the brain, spinal cord and nerves.

The brain includes a number of different nervous centers which it is not necessary for us to name. It is composed of two halves or *hemispheres*, which are separated from each other by a deep fissure running from before backward. The outer part of these hemispheres is arranged in the shape of *convolutions;* the inner part of the brain is composed largely of nerve fibres, which conduct nervous force from the brain to different parts of the body.

The hemispheres are the seat of mental activity; there is a general relation between the size and depth of the convolutions on the one hand and the intellectual power of the individual on the other. Certain functions are localized in different parts of the brain; that is, these parts are known to originate the nervous force by which certain functions are performed. Thus it is known that the nervous power whereby the limbs are moved is produced in the front part of the upper surface of the brain; and it is well established that the faculty of speech is a function of a certain convolution (the third frontal) on the left side of the brain. When this convolution is destroyed by disease, the individual loses the

power of articulating words, though the vocal organs remain unaffected. Beyond this we have no reason for assuming that different mental faculties are located in different parts of the brain; there is, in other words, no physiological basis for the assertions of phrenologists. The skill which many of these gentlemen exhibit is the result of close observation of faces, rather than of knowledge derived from "bumps on the head."

The part of the brain which lies at the back part of the base of the skull and constitutes the beginning of the spinal cord, the *medulla oblongata*, is an extremely important portion of the nervous system; among its various functions is the important duty of presiding over the act of breathing. If this part of the nervous system be injured, breathing ceases; this is often shown as a physiological experiment; if an instrument, such as a shoemaker's awl, be introduced into the base of the brain so as to break up the medulla, breathing ceases, simply because the animal no longer feels the necessity for air, and makes no effort to breathe.

The spinal cord is composed partly of nerves which pass from the brain to the muscles, and from the skin to the brain. The former nerves transmit the nervous influence which causes the muscles to contract; the latter transmit the impressions made upon the skin to the brain. Aside from these nerves, the spinal cord contains nervous centers which are capable of originating impulses independently of the brain; thus, if a chicken's head be chopped off, separating entirely from the rest of the body, the animal continues to move violently until the nervous centers in the cord are exhausted from lack of blood. Many familiar actions illustrate the fact that the same independent action of the spinal cord takes place in the human animal; thus, if the sole of the foot be tickled, or a pin be inserted into the flesh of the leg, the limb is violently moved without any voluntary action on the part of the individual, in fact, often before the person is aware of the irritation.

The Nerves.—The nerves are white cords which serve as telegraph wires for connecting the brain with the different parts of the body. From every portion of the skin nerves run upward to center in the brain, so that every impression made upon the skin is communicated at once to the organ of the mind; the eye, the ear, and the other organs of special sense, stand in similar communication with the brain.

Every muscle in the body which is controlled by the will is similarly connected with the brain; every muscular action is originated by nervous force, which is generated in the brain and transmitted along the nerves to the muscles. If the nerves be cut or injured, the transmission of the nervous force is interrupted; impressions made upon the skin are not perceived in the brain; and voluntary efforts to move the limbs exert no effect upon the muscles.

The Organs of Circulation.—These are the heart, arteries, veins, and capillaries.

The heart is a mass of muscle so arranged as to surround two cavities which communicate with the arteries and veins of the body. It is shaped somewhat like an inverted cone, and is placed in the chest a little to the left and behind the breast-bone, between the third and the seventh ribs. The greater part of it is covered by the left lung, which intervenes between the heart and the ribs.

The heart is enclosed in a membranous sac called the *pericardium*. The weight of the heart in adults is eight or nine ounces, being usually about an ounce heavier in man than in woman.

The blood is brought to the right cavity of the heart by the veins of the body, and is propelled by the muscular wall of this cavity into the lungs, where it is purified by contact with the air and returned to the left side of the heart. The large and powerful muscle surrounding the left cavity of the heart drives the blood through the arteries into the different parts of the body

This action of the heart in pumping the blood through the body consists of a series of beats, or pulsations, which ordinarily occur from seventy to eighty times per minute; hence the heart beats more than 100,000 times every twenty-four hours.

The Arteries—are strong, elastic tubes or channels which conduct the blood from the heart to all parts of the system. The left side of the heart is continuous with a large artery called the aorta, into which all the blood of the body passes. This artery divides and gives off branches whereby the blood is conducted to all the different organs. These arteries in turn divide into smaller branches, and finally terminate in a series of delicate tubes called *capillaries*, so called because of their small, *hair*-like size. The fact is, that they are far more minute than hairs.

The blood passes through these capillaries into the tubes which are continuations of them, called *veins*. These veins unite to

form larger trunks, and are finally combined into two large veins which empty into the right side of the heart.

Organs of Respiration.—The air passes down the windpipe, or trachea, through its branches—the bronchial tubes—into the air cells. These are little cavities hollowed out in the substance of the lung; the bronchial tube and the air cells in which it terminates have the same general form and arrangement as a bunch of grapes.

The walls of these little air cells contain capillary blood vessels through which the blood circulates in order to be purified. The lung itself is composed of elastic, rubber-like tissue, which is stretched when the chest is expanded, so that the air is forced into the air cells, and which collapses when the chest is contracted, so that the air is forced out of the air cells. In this way provision is made for a constant change of the air in the air cells.

Organs of Digestion.—These are the mouth, teeth, pharynx (throat), gullet, stomach, intestine, liver and pancreas.

The *stomach* is a membranous sac where the first part of the process of digestion is performed. It is placed in the upper left corner of the abdominal cavity, extending somewhat to the right of the middle of the body. The capacity of the stomach can be much varied by distension of its walls; it may be stated on the average as about three pints.

The stomach is provided with a sheet of muscle whereby it can be moved so that its contents are transferred from one part to another, and thoroughly mixed with the gastric juice.

The Intestines.—The portion of the alimentary canal below the stomach consists of the *small* and the *large* intestine. The former is from twenty-five to thirty feet in length, and the latter about five feet.

The upper part of the intestine continues the process of digestion which was begun in the stomach; a large part of the nutritious portion of the food is absorbed from the intestine into the blood and lymph vessels.

The Liver.—This is one of the most important organs of the body, as well as one of the largest, weighing about four pounds. It is located in the upper right-hand portion of the abdominal cavity, situated under the ribs of the right side, and extending over

the left of the middle line. It secretes the bile and serves as a storehouse for the starchy ingredients of the food.

The Pancreas.—This body, which is also known as the *sweet-bread*, is a long, somewhat pointed gland which lies just behind the stomach. It secretes a fluid which is an important agent in the process of digestion.

Organs of Excretion.—The materials which have been used in the animal economy, and are no longer fit to remain in the body, are cast out or *excreted* by various organs, chiefly the kidneys, the lungs, the skin and the intestines.

The *kidneys* are located one on either side of the spinal column at the level of the lowest rib. Each is four or five inches long, and two or three inches wide.

The kidneys cast out from the body a large quantity of matter which has been used; this matter is washed out and escapes in the form of the urine. This fluid, excreted by the kidneys, flows down a membranous tube about the size of a goose quill, called the ureter, which empties it into the bladder.

The *skin* has an important duty to perform in throwing out waste materials from the body. These materials escape in the form of perspiration, the suppression of which causes serious interference with the health.

HYGIENE.

Quartity of Food.—The quantity of food required varies with the individual, with the climate, the season and the habits of life. It is unnecessary to lay down any rules as to the exact quantity required.

It is a generally recognized fact, that in this country, at least, more food is eaten than is required by the wants of the body. This fact is especially impressed upon an American who resides for a time on the continent of Europe, and observes the difference between the habits of eating there and here.

In cold climates and in cold seasons more food is required by the same individual than under other circumstances; one who is engaged in manual labor needs more food than a person of sedentary habits. A sudden change from active habits of life to employments which are sedentary and confining, is apt to be followed by disturbances of digestion. This is often observed in persons who have suffered severe injuries, in consequence of which they are compelled to keep the bed; when the appetite is gratified to its full extent, such persons are usually troubled by indigestion.

Yet while the tendency among us is to excessive eating, there are those who go to the other extreme, and follow some rigid plan of diet. Such a habit is frequently followed by disorders of digestion no less marked and obstinate than those which result from over-eating.

Another cause of digestive disorders is the prevalent habit of eating between meals. There is no harm in regular indulgence in more than the usual three meals a day. In fact, it is customary in many parts of the continent of Europe to take five meals a day. The important point is that food should be taken at the same hours every day. The exact hours selected may vary with the convenience of the individual; he should simply be careful to have his meals with regularity.

One of the most serious errors which are so prevalent with regard to eating, is the habit of eating too fast. The act of chewing is an essential part of the process of digestion; if it be imperfectly done, digestion cannot be complete, and indigestion or ***dyspepsia*** results. This fact is so evident, and is so amply demon-

strated around us on every hand, that further discussion seems superfluous.

Much has been said in popular works upon medicine against the habit of drinking at meal times; it is generally advised that liquids be avoided, on the supposition that, by diluting the gastric juice, they interfere with the process of digestion. It seems certain, however, that the one objection which can properly be urged against taking liquids with the food is the fact that there is, under such circumstances, a tendency to swallow the food prematurely before it has been properly chewed. The result is that the stomach is compelled to perform the work of the teeth as well as its own, and usually shows itself incapable of performing the task; dyspepsia results. If care be taken to masticate the food properly, no harm results from the use of the ordinary table beverages at meal times.

As to the articles of food which are best adapted to the maintenance of health, no exact rules can be given. The general principle should be borne in mind that both animal and vegetable food is absolutely essential to the perfection of the body. It is possible for a man to live upon flesh alone or upon vegetables only; but neither diet conduces to the most perfect performance of the bodily and mental functions.

Foods may be divided into two general classes: Those which contain compounds of nitrogen in considerable quantity, and are hence called *nitrogenous* substances. These are found largely in the flesh of animals. The second class of foods are those which consist largely of sugar or starch, and are called *saccharine* (sugary). These are obtained chiefly from plants. Since both nitrogenous and starchy substances enter largely into the composition of the human body, it is evident that the best diet comprises both animal and vegetable food. There is a third class of substances, the *mineral* constituents of the body, which are just as essential as the nitrogenous and saccharine ingredients; yet, since these mineral substances are contained in both animal and vegetable food, it is not necessary to make special provision in our food for securing these elements.

The nutritious value of food is measured chiefly by the amount of the nitrogenous and saccharine matter which it contains. The following tables indicate the relative values of some of the commoner articles of food:

Quantity Required to Yield 1,220 Grains of Nitrogenous Matter.

Cheese	4 pounds.	Rice	2.8 pounds.
Lean meat	9 "	Milk	4.2 "
Whitefish	1 "	Potatoes	8.3 "
Fat meat	1.3 "	Parsnips	15.9 "
Bread	2.1 "	Beer	158.6 "

The following table shows the relative amounts of nitrogen in the dry substances, human milk being regarded as 100:

Animal Substances.

Cow's milk	237	Cheese	331
Yolk of egg	305	Eel	434
Oysters	302	Mussel	528
Pigeon	756	Ox-liver	570
Mutton	773	Veal	873
Salmon	776	Beef	880
Lamb	833	Pork	893
White of egg	845	Turbot	898
Lobster	859	Ham	910
Skate	856	Herring	914

Vegetable Substances.

Rice	81	Oats	138
Potatoes	84	White bread	142
Maize	100	Black bread	166
Rye	106	Peas	239
Radish	106	Haricots	283
Wheat	119	Beans	320
Barley	125		

While the fats used as food are largely derived from animal substances, a certain amount is furnished also by vegetables.

The following table shows the percentage of fat in some of the familiar vegetable substances:

Wheat flour	2.0	Potatoes	2
Oatmeal	5.6	Turnips	2
Indian meal	8.1	Parsnips	.5
Rye flour	2.0	Peas	2.1
Barley meal	2.4	Tea	4.0
Buckwheat	1.0	Coffee	13.0
Rice	.7	Cocoa	50.0

Most of the vegetable substances used as food contain a large quantity of starch. It exists in large proportion in potatoes, arrow root, sago and tapioca. The starch contained in these substances

is largely converted into sugar by the action of the gastric juice and of the intestinal fluids. After being thus changed into sugar, it is readily soluble, and can be absorbed into the blood. Many plants contain sugar also. This can be absorbed without being acted upon by the digestive organs, and is hence better adapted to the feeding of children whose digestive apparatus is not yet fully developed.

While plants contain a large amount of material which cannot be digested, and is hence worthless as food, yet because of the starch and sugar which they contain, vegetables are fattening food. This was well understood by Mr. Banting, who devised the famous method which bears his name, for reducing the flesh

"His original dietary table," Mr. Banting tells us, "consisted of bread and milk for breakfast, or a pint of tea with plenty of milk, sugar and buttered toast; meat, beer, much bread and pastry for dinner; the usual meal of tea similar to that of breakfast, and generally a fruit tart or bread and milk for supper." For this he substituted: *Breakfast* at 9 a. m.; five to six ounces of either beef, mutton, kidneys, broiled fish, bacon or cold meat of any kind, except pork or veal, a large cup of tea or coffee without milk or sugar, a little biscuit, or one ounce of dry toast, making together six ounces of solids and nine of liquids. *Dinner* at 2 p. m.; five or six ounces of any fish, except salmon, herrings or eels, any meat except pork or veal, any vegetable except potato, parsnip, beet root, turnip or carrot, one ounce of dry toast, fruit out of a pudding not sweetened, any kind of poultry or game, and two or three glasses of good claret, sherry or madeira—champagne, port and beer forbidden—making together ten to twelve ounces of solids and ten of liquids. *Tea* at 6 p. m.; two or three ounces of cooked fruit, a rusk or two and a cup of tea without milk or sugar, making two to four ounces of solids and nine of liquids. *Supper* at 9 p. m.; three or four ounces of meat or fish, similar to dinner, with a glass or two of claret or sherry and water, making four ounces of solids and seven of liquids. With this change of diet, Mr. Banting states that he fell in weight from fourteen stone six pounds to eleven stone two pounds in about a year.—*Pavy*.

Milk is a typical food containing all of the elements required for nutrition during the early part of life. The nitrogenous material is a form of casein; the saccharine ingredient is the sugar of milk, and there is present, in addition, a quantity of fat and

of mineral salts. The average composition of cow's milk is as follows:

Casein,	4.48
Butter,	3.13
Sugar,	4.77
Salts,	.60
Water,	87.02

Human milk differs from that of the cow, in that it contains a larger amount of sugar and a smaller amount of casein and fat.

Butter is the fat of milk, which is separated from this fluid by the process of churning. It contains only the fatty elements of the milk, and lacks, therefore, many of the ingredients necessary for a perfect food.

An artificial butter is now extensively manufactured from beef fat. This is obtained by cutting and melting the suet; after cooling and becoming solid, the oily part is pressed out from the mass. This oil is called *oleomargarine;* by churning it with a small quantity of milk, a substance is produced which much resembles butter in appearance. There is nothing objectionable in the article, though it lacks some of the qualities found in the best butter; it is preferable in every way to the cheaper grades of butter.

Cheese is the nitrogenous part of milk—the *casein*. If it be made from unskimmed milk, the cream or fatty portion is also contained in it. Cheese is therefore a highly concentrated nitrogenous food, and should be eaten only in small quantities. It constitutes a fair substitute for lean meat.

Cheese, also, is now made by substituting oleomargarine for the cream of the milk.

Eggs contain nitrogenous material in large quantity, but no starch nor sugar; hence they do not constitute a complete diet.

Meat contains all the elements necessary for food, though not in the proportions required by the animal body; hence the necessity for supplying certain elements by vegetables. Meat is especially rich in the nitrogenous and fatty elements of food, but lacks the starchy matter.

Fish contain less nutritious material than the warm-blooded animals; the flesh is lacking in nitrogenous and fatty matters.

Wheat contains about ten per cent. of nitrogenous matter, over sixty per cent. of starchy substances, and a large amount of

salts. The innermost part of the wheat kernel consists largely of starch; around this is a layer which contains the nitrogenous material, gluten; and on the outside is the shell which consists partly of mineral substances. In grinding wheat the outermost portions are separated during the process of bolting from the starchy ingredients. The latter constitute the finest flour, while the outer portions of the wheat are separated as bran. The coarser flours, therefore, contain the nitrogenous and mineral constituents of the grain to a greater extent than the fine flour.

Rye contains less nutritious material than wheat. Its average composition is stated as follows:

Starch,	70 per cent.	Nitrogenous matter,	8.0 per ct.
Sugar,	3.5 per cent.	Fat,	2.0 per ct.
Salts,	1.8 per cent.	Water,	45.0 per ct.

Indian corn has a composition somewhat similar to that of rye; it contains more nitrogenous matter and fat, and less sugar.

Oatmeal contains less starch than the other ordinary grains, but more nitrogenous matter and fat.

Rice is stated to have the following composition:

Nitrogenous matter,	6.3	Fat,	7.0
Starch,	79.1	Salts,	5.0
Sugar,	4.0	Water,	13.0

Its chief value is, therefore, as a source of starch; for the remaining elements of the food we must employ other articles.

Potatoes contain much less nutritious matter than the other common vegetables. Their average composition is as follows:

Starch,	18.8	Salts,	7.0
Nitrogenous matter,	2.1	Fat,	2.0
Sugar,	3.2	Water,	75.0

Fruits—Contain, as a rule, but little nitrogenous matter, though many of them furnish a large quantity of sugar and salts.

Clothing.

The primary object of clothing is to retard the escape of heat from the body, though this object has become subordinate to purposes of ornamentation and display. Different fabrics possess various qualities which render them more or less adapted for the

purposes of clothing at different seasons and under different circumstances.

Cotton—Possesses to an unusual degree the power of absorbing the moisture; hence it is especially adapted for use as underclothing under circumstances which result in excessive perspiration. It is largely used as underwear in tropical regions.

Linen—Is softer and less irritating to the skin than cotton. It is, however, a good conductor of heat, and hence less adapted for preserving the warmth of the body.

Wool—Is a non-conductor of heat, and hence commonly employed to preserve the warmth of the body. Its roughness and its power of generating electricity by friction, render it unsuited for immediate contact with the skin.

In the selection of materials which are to touch the skin, care must be taken that they contain no injurious coloring material. The dyes which are now extensively employed for coloring underwear often contain arsenic and other poisonous substances, as a result of which severe imflammation of the skin and even constitutional effects have occurred.

A disadvantage in the employment of flannels next to the skin is the fact that they retain moisture, and offer a favorable soil for the development of vegetable parasites. The parasitic growth on the skin popularly known as "liver spots" is observed with especial frequency in those who wear flannel.

Exercise.

As to the particular variety of exercise which should be taken, no rules can be given. It is, however, a general principle that no exercise is especially beneficial which does not interest and amuse the mind as well as exert the muscles.

As to the time for exercise, it may be said that the muscles should not be called into action immediately before or after meals. By exercise at these times the process of digestion is retarded, and the alimentary canal is not permitted the proper degree of repose.

The degree of exercise must vary with the individual; in no case should the bodily activity be so violent or so prolonged as to cause exhaustion. A feeling of languor without exercise on the

other hand is often relieved by brisk muscular effort. This is the proper remedy for the feeling of lassitude which is common in our climate during the spring, and which is often designated "spring fever."

Massage is a process whereby the circulation of blood in the muscles is artificially promoted. The feeble muscles are stroked, rubbed, slapped and kneaded. The result becomes manifest at once in a redness of the skin and increase of temperature; in many cases permanent benefit is secured by the patient employment of these measures.

For invalids who are unable to take exercise in the ordinary form, there remain several substitutes. The best known of these are *Massage* and the *Swedish Movement*.

The Swedish movement consists of a series of movements active and passive, performed sometimes with and sometimes without the will and assistance of the patient. The performance of these movements requires considerable knowledge of anatomy and physiology, and need not be described in detail. The system makes a good substitute for the usual forms of active exercise.

Ventilation.—In no one point perhaps is so much injury done to the health as in the neglect to procure a sufficient quantity of fresh air. Many people have an aversion to admitting air to the house, especially at night; except during the warm weather, it is a comparatively rare thing to find any provision made for the admission of air to bed-rooms at night. While it certainly is desirable to avoid draughts of air which shall strike directly upon the bed while a person is asleep, it is just as certainly desirable to have a free circulation of air through the room. An adult requires about twenty-five cubic feet of oxygen every day. That is about 125 cubic feet of fresh air. When we consider this fact, we can appreciate the lack of proper air which prevails in many of our bed-rooms, where several persons sleep in a small apartment, with windows and doors tightly closed.

Attention to the *skin* is an important item in personal hygiene, not simply for appearance's sake, but also for the maintenance of health. The skin is not alone a covering for the protection of the body; it is one of the most active and extensive channels for the separation from the body of those materials which have been used up in the functions of the animal economy. It is a familiar fact, that if a rabbit be varnished, so as to close the pores of the skin and

arrest the usual function of this organ, the animal dies in a few hours. The effect is just the same as if those important organs of excretion, the kidneys, be removed from the body. The skin separates from the system almost as much waste material as the kidneys, the lungs and the intestines together.

THE CARE OF THE SICK.

One of the first items to be attended to in the management of the sick room is proper *ventilation*. Fresh air is of extreme importance for a healthy person, but doubly so for one who is sick. For the system of the latter requires every possible assistance to regain its natural condition; indeed, medicines and nursing are of no avail if the patient is compelled to breathe the emanations from his own diseased body, and thus to keep up a continual supply of material injurious to the system.

No odors of any kind should ever be perceptible in the sick room; their presence is evidence that the ventilation is imperfect. Care must, of course, be taken not to injure the patient by chilling him while providing for a proper supply of fresh air. By fresh air, we mean not air which has passed through other rooms, but air admitted directly from the outside. If there be a fire-place in the room, a draught of air sufficient for most purposes of ventilation can be secured by lowering the sash of a window a few inches from the top, and by keeping a fire burning in the grate.

The *temperature* is another point of importance in the care of the sick room. There is generally such an anxiety to avoid chilling the patient, that the room is kept at a very high temperature. It should be remembered that there is most danger of taking cold when the room is heated to an improper degree, since under such circumstances, the admission of air from the outside, even during the opening and closing of the door, causes a decided impression upon the patient, which may be sufficient to chill him.

The temperature of the room should, as a general thing, be somewhat higher in the morning than in the afternoon; for this there are two reasons: first, that the outside air is usually warmer in the

afternoon, and second that the patient's vital powers are less vigorous after the night's rest.

It is extremely important that the excrement of the patient be at once removed from the room. If it be necessary to use a vessel at short intervals, it should be kept well covered in an adjoining closet. Such vessels should be frequently emptied and cleansed; a failure to do so results in the formation of noxious gases which escape into the room and exert injurious effects.

While the exact temperature of the room may vary to advantage under different circumstances, the best general average will be found to be about 70 degrees F. A feeble patient, one who is exhausted by some wasting disease, may require a temperature several degrees higher than this; a patient suffering from some inflammation such as "lung fever" may, on the other hand, be benefited by a temperature of 60 or 65 degrees F.

An important auxiliary in the treatment of the sick is *light*. Vigorous plants become pale and sickly in a dark room; and we cannot expect a pale and sickly person to become vigorous under the same conditions. Light is essential, not only to a healthy person, but also to the restoration of health in a sick person. There are, it is true, certain affections of the eyes which can be cured only when no light is admitted to the room; but aside from these a sick room should be well lighted.

The cleanliness of the house, while always a matter of importance, is absolutely essential in the treatment of the sick. By cleanliness is meant not simply the absence of dust and dirt from the floors, but also freedom from noxious gases in and around the dwelling. In the country the most frequent source of these is the collections of water and of refuse in the yard or under the house. A little stagnant water and refuse in the yard or under the house is a frequent cause of disease, and serves to prolong an illness which may have originated from other sources. The premises about the house, as well as underneath it, should always be kept dry and clean.

In cities and towns a frequent source of sickness is defective drainage. It is a familiar experience in city practice to find several cases of typhoid fever in the same family living in a house whose atmosphere is permeated with gases derived from the escape pipes. Inspection often shows that the traps and pipes of the house are so defectively arranged as to permit the sewer gases to escape into the rooms.

"The importance of a good supply of pure air is not nearly so well appreciated generally as is the necessity for free supplies of pure water. Mankind has ever sought to get a clear and sparkling water, and objects to it if its smell be unsavory; but of the finer and subtler contaminations he has remained, until recently, profoundly ignorant. The curious relations of cholera to water supply furnish a case in point. In one outbreak in London thirty-seven per ten thousand of those who drank the water from the Thames above the city died; but one hundred and thirty per ten thousand of those who drank water brought from the Thames below London died. Here is an unquestionable piece of evidence that a constantly impure water supply leaves the system less equal to resist an epidemic form of disease. It is not that water is often the direct source of disease, as diarrhea and typhoid fever, but it is commonly a cause of a gradual steady deterioration of the health, which is revealed by the inability of the system to withstand the strain of some acute intercurrent disease. If temperance, or rather teetotalism, be a good thing, its advocates ought at least to secure their adherents from the dangers to which they are thus exposed, for outbreaks of typhoid fever have been found to seize the water drinkers of a house, while the beer drinkers have been free from attack. In our relations to the public as medical men, we must be impartial, and sentiment must not warp our intelligence; we must be as ready to acknowledge the dangers of water drinking as we are to admit the destructive consequences of excessive indulgence in alcohol. It is not in towns only that the evil effects of a contaminated water supply are felt; indeed they have been too rudely awakened by irrefutable facts to be any longer oblivious to the consequences; but also in the country, where wells lie close to sinks and midden steads; where the village stream furnishes to those at one end of the hamlet as a beverage, the sewage of the houses placed further up. In few villages is the water to be trusted, unless it be the product of some well-cared for spring or some exceptional well. The repeated outbreaks of typhoid fever have accumulated evidence on this matter which is sufficient to convince the most skeptical.

"Closely connected with our water supply is that of our sewage. We know that many outbreaks of disease are occasioned by our water carriage of sewage. Not only is sewer-gas apt to diffuse itself from the water-closet trap, and so to poison the

inhabitants of the house; but leakage from sewer-pipes is apt to penetrate the water supply, and so cause disease. When the water supply its cut off sewer-gas finds its way into the empty tubes, which exercise a suction action as the water runs out of them, and then follows disease. If there be any typhoid fever in the town, the poison will get universal diffusion when the water is again on, and an outbreak will result. The possibilities of water contamination by our sewage are so numerous that it would be simply impossible here to indicate a tithe of them.

"A great source of danger in connection with the water-closet is the liability to so introduce sewer-gas into the house. When the water supply or waste-pipes of closets in the upper part of the house are in communication with those beneath, the rush of water to the lower outlets causes a rush of air to take the place of the vacuum so made, and sewer-gas is often so introduced into a house. At other times, especially in houses, at the summit of each sewage area the pent-up sewer-gases rush up the waste-pipes, and from the water-closets infect the upper rooms of the houses. Especially is this the case if the sewerage opens into a tidal river. The waste water-pipe should be broken in its course, so that sewer-gas may escape without rising into the house; or a shaft should be carried up and out beyond the roof, so that if pent-up sewer-gas should rise in the pipes it would find a ready outlet into a comparatively safe external air."—*Fothoegill.*

Disinfection.—The objects of disinfection are two-fold: first, to destroy noxious odors, that is, to *deodorize;* second, to destroy poisonous principles which are capable of inducing disease—that is, to *disinfect*, in the proper sense of that word. These two processes are not always identical; that is, we may remove all unpleasant odors without destroying the noxious substances which induce disease. Most agents which are used for disinfection, however, are capable of both deodorizing and disinfecting. The following substances are those in common use for purposes of disinfection.

For the cleansing of water closets and vaults, the most convenient disinfectant is the *sulphate of iron* (green vitriol). A pound of this should be thoroughly dissolved in a gallon of water and emptied into the vault. The substance commonly known as "chloride of lime" is another excellent agent for deodorizing. A

pound of this dissolved in a gallon of water is usually sufficient to remove unpleasant odors.

For disinfecting bed-pans and similar vessels and for cleansing water closets, listerine is a most agreeable and effective agent. One part of this to five of water is usually strong enough to remove such odors.

For disinfecting rooms which have been occupied by patients suffering from infectious diseases, it is necessary to have some disinfecting agent which will diffuse itself through the air of the room. The best agents for this purpose are bromine and chlorine. Bromine, which is a liquid, may be placed in a saucer and allowed to stand for twenty-four hours. Chlorine can be best obtained by placing about two tablespoonfuls of chloride of lime in each of several saucers which are to be placed upon the floor and furniture of the room; the formation of gas (chlorine) can be hastened by adding a few ounces of very weak vinegar to the chloride of lime. After such rooms have thus been disinfected the furniture should be removed,—to the open air if possible—the floor should be thoroughly scrubbed with a solution of carbolic acid (one part to twenty-five of water); the walls and ceiling should be washed and freshly calcimined or whitewashed. Articles of clothing which have been used by a patient suffering from an infectious disease should be burned; so should newspapers, journals, books, etc. If such articles are too valuable to destroy they should be exposed to a heat sufficient to disinfect them thoroughly; garments may be boiled for an hour, or kept in an oven at a temperature of at least 200 degrees Fahr. for two or three hours. It is important that these measures be observed, since disease is often spread by the agency of articles of clothing, books, and the like, which may be circulated around from one person to another.

Heaps of dirt and filth should be covered with charcoal, or quick lime, or with dry earth, to a depth of three inches. A mixture of charcoal and quick lime can be obtained under the name of "calx powder."

For disinfecting drains, ditches, sewers and the like, the best method is the use of the chloride of lime.

A most important point in cases of infectious fever is to *isolate* the patient. It is important that no one be allowed to see him except those whose personal attendance is absolutely necessary. The well-meant visits of sympathizing friends usually annoy

and exhaust the patient himself, and spread the disease to others. This latter feature is often neglected; people who have had small-pox or have been repeatedly vaccinated, for instance, seem to think it incumbent upon them, as a religious duty, to visit their friends who may be suffering from the disease. While this may be done with the most benevolent motives, and with perfect impunity so far as the visitor is concerned, it is often the means of disseminating the disease. For an individual who will not take small-pox himself, can nevertheless communicate the poison to others with whom he may come in contact.

Soiled linen should be immersed in a disinfecting solution before being carried out of the room. For this purpose a solution of carbolic acid, one part in twenty of water, or chloride of lime should be used. All slops and excrement from the patient should be thoroughly disinfected in the same way before being removed. A sheet saturated with the carbolic acid solution or some other disinfectant, should be hung across the doorway; this should be frequently moistened with the disinfectant. Saucers containing chloride of lime should be placed in the room.

"As to the patient, the sulphite of soda may be administered in lemon juice; and if the case be small-pox or scarlet fever, the patient may be washed with tar soap or salicylic or carbolic acid soap. At the latter stages, when the dry crusts of small-pox or the scales of scarlet fever constitute special sources of danger, a carbolized oil or ointment should be rubbed over the body, and the patient should be bathed every day or two; then the disinfectant should be smeared over the whole surface again, and at the regular time the bath be resorted to. By such means the infective matter given off from the surface is rendered harmless.

"Such are the measures to be carried out when fever has once entered a house. It is not sufficient merely to see the patient through the fever in scarlatina, small-pox and typhoid; the most infectious period is that of early convalescence. Such convalescents should be kept away from the healthy, in separate rooms, until the last scab has fallen off in small-pox, and until the last particle of skin has exfoliated and come away in scarlatina."

The bed on which the patient lies should receive careful attention. The prevalent habit is to place two or three mattresses on the bed with the idea of making the patient comfortable, and to leave these undisturbed for days or weeks at a time. It is not

sufficient to " shake up " these mattresses occasionally ; they should be well aired every day as certainly as the sheets. There may be, it is true, cases in which the patient's condition absolutely forbids even the slight movement necessary to remove a mattress from beneath him; but a little care and skill can accomplish the required change with but little discomfort to the patient.

The mattress upon which the patient rests — and it is usually sufficient to have one — should be not be too soft, since the emanations from the patient's body are more apt to permeate such soft materials. In hospitals, where especial attention is given to details, the beds are usually provided with a woven wire mattress, upon which one of horse-hair is laid. Whatever material be employed, it is necessary to air the bed frequently, and if possible to permit a circulation of air under the mattress.

Patients are usually burdened with too much covering, under the idea that because the individual is sick he must be kept very warm. The result is bad in different ways; in the first place the patient is practically enveloped in a poultice, a measure which may be beneficial in some exceptional instances, but is certainly undesirable, as a general rule. In the next place the patient is kept so warm that the slightest exposure may cause him to take cold.

An essential item in the care of a patient is attention to his personal cleanliness. This is even more important when an individual is sick than in health, since the system is not so able to endure the presence of the materials which should be thrown out of the body by the skin. Furthermore, there is often an additional reason for frequent cleansing of the skin, because there are certain matters present in the body which must be eliminated by the skin. A patient should be bathed at least twice a week with soap and warm water. If his condition be such as to prevent his removal from the bed, a sponge bath should be given. In bathing a patient it is advisable to uncover only a little of the surface at a time, and to rub this dry before exposing other parts of the skin.

Food for the Sick.

Beef Tea.— This article has sometimes considerable value, though it is not a proper article of food in all cases of illness, as is generally supposed. Beef tea is indeed much overrated, since it possesses but little nutriment. It is rather a stimulant than a food.

It may be made by cutting into small pieces about half a pound of fresh beef from which the fat has been separated; this should be put into a vessel into which a pint of boiling water is then poured. The vessel is then allowed to stand by the fire; after this it may be boiled for five or ten minutes and the contents of the vessel placed upon a sieve, so as to separate the liquid; this may then be seasoned with salt to suit the taste.

Liebig's beef tea is made as follows: One pound of lean beef, free of fat and separated from the bones, in the finely chopped state in which it is used for mince meat, is uniformly mixed with its own weight of cold water slowly heated to boiling; and the liquid, after boiling briskly for a minute or two, is strained through a towel from the coagulated albumen and fibrin. Thus we obtain an equal weight of the most aromatic soup, of such strength as cannot be obtained even by boiling for hours from a piece of flesh.

Chicken Broth.—"Clean half of a chicken and pour on it one quart of cold water; add a little salt and one tablespoonful of rice; cover the vessel closely and boil for two hours; throw in near the end of the boiling, a little parsley chopped fine; skim the broth before using.

"This is one of the most valuable articles of diet at the command of the physician in the low stages of disease, when the patient's system requires support, but his digestive powers will not admit of solid food."—*Ellis.*

Mutton Broth.—A pound of lean mutton may be placed in a quart of water with a little bread and salt; it should be boiled about two hours, and skimmed before using.

Gruels.—The ordinary gruel is made by adding two tablespoonfuls of cornmeal to a teacupful of cold water; it should be well stirred and placed in a suitable vessel; an additional pint of water is added and it is allowed to boil gently for half an hour. If desired, half a pint of milk may be used instead of the same quantity of water. It is to be seasoned before using.

Oatmeal gruel may be made in a similar way, adding four tablespoonfuls of oatmeal to a pint and a half of soft water.

Jellies—A variety of starchy articles can be made into excellent food for invalids.

Iceland Moss can be made into a jelly in the following way: A

pound of the dried moss should be soaked for twenty-four hours in water, and then dried by pressing it in a coarse cloth. It is then placed in water, an ounce of the moss being sufficient for a quart of water. It should be boiled until about half the fluid has evaporated, and then strained through a sieve. The jelly or mucilage may be sweetened or mixed with milk.

Irish Moss makes an excellent jelly. An ounce of it should be boiled with a pint and a half of water until it becomes of moderate consistence upon cooling. It has but little taste, but may be sweetened or mixed with milk.

Tapioca mucilage is made in this way: A tablespoonful of tapioca is put in a pint of water and allowed to stand upon the stove for two hours, after which it is boiled for ten minutes, being stirred briskly at the same time. It should be sweetened with sugar and may be flavored with lemon-juice. It is often served with milk.

Rice may be made into jelly by steeping an ounce of it in a quart of water for three hours upon the stove; it should then be boiled gently for an hour and strained through a sieve. The jelly may be sweetened or assidulated.

These jellies contain but little nutritious matter, and should never constitute the entire diet.

MEDICINAL PLANTS.

Plate 1.

Saffron.—This is a familiar garden flower of a deep orange color. It is used as a *decoction;* an ounce of the leaves is boiled in a pint of water.

This is used as a gargle for sore throat and as a remedy for fevers. It is supposed to favor the eruption in scarlet fever, measles, etc.

Meadow Sweet.—The root, bark and leaves of this plant are used in diarrhea, especially in children. A decoction can be made by boiling an ounce of the root or bark in a pint of water. Two or three tablespoonfuls of this decoction may be taken four times a day.

Mustard.—Powdered mustard seeds, ordinary table mustard, are chiefly used in medicine for two purposes: first, *to promote vomiting.* One or two teaspoonfuls stirred up in a glass of warm water usually suffice to excite vomiting. This quantity may be repeated in five minutes if necessary.

The second use of mustard is in the shape of mustard plasters or poultices, which are used to relieve pain and to promote the circulation.

Nettle.—The juice of the nettle is sometimes valuable in cases of bleeding from the lungs, nose, bowels and urinary organs. A decoction can be made of the seeds or leaves.

Plate 2.

Buckthorn.—The bark is sometimes used as a cathartic, though it is apt to purge violently. This plant is not ordinarily used by physicians.

Fennel.—The seeds of this familiar plant are used to flavor medicines. They are also employed to relieve the griping pains of colic; the drug is usually given as an infusion of the leaves.

Tansy.—This familiar herb is employed in the shape of an infusion. It is popularly supposed to be useful in bringing on the menstrual flow, for which purpose a wineglassful of a strong infusion may be given. An oil is extracted from the plant and used occasionally in medicine. This plant is supposed to be capable of inducing abortion.

Wood Sorrel.—This plant was formerly supposed to have great value in the treatment of cancer, but is now but little employed in medicine.

Plate 3.

Stavesacre.—An ointment made from the seeds of this plant is sometimes used for the purpose of destroying vermin on the head.

Golden Rod.—An infusion made by adding an ounce of the leaves and tops of the sweet golden rod to a pint of water, may be given to relieve the pains of colic. A wineglassful of this infusion is the ordinary dose.

Lime.—The juice of the fruit is mixed with water to make a cooling drink for fever patients. Large quantities of this juice are carried on shipboard as a preventive against scurvy.

Bearberry.—This remedy was formerly much used in the treatment of chronic diseases of the bladder. It renders the urine less irritating, and hence decreases the pain of inflammation of the urinary organs. A decoction (one ounce of the leaves to a pint of boiling water) is the best form for administering this remedy; two tablespoonfuls of this may be given at a dose.

Plate 4.

Henbane.—This plant has an important place in medicine, being used for nearly the same purposes as belladonna.

It is a violent poison, and must be carefully distinguished from the root of the parsnip, which it closely resembles in shape and appearance.

Henbane is used as a narcotic to quiet pains in inflammations. Under such circumstances it has the advantage over opium that it

does not cause any excitement in the patient, but is directly sedative in its action. It is especially valuable as a narcotic in the treatment of children.

Henbane is frequently used in the treatment of delirium, meningitis, and other affections of the brain in which opium cannot well be employed.

Calamus.—An infusion of the root is sometimes used for the the relief of flatulent colic in children.

Sage.—An infusion of this familiar plant is a household remedy for the promotion of perspiration. It is given during the commencement of fevers and inflammation.

Plate 5.

Thorn Apple.—This plant belongs to the same class of remedies as henbane and belladonna. The dried leaves rolled in cigarettes are often effectual in relieving the paroxysms of asthma.

Asparagus.—This plant is sometimes used for the purpose of promoting the secretion of urine.

Marsh Mallow.—A decoction of the root is used as a soothing injection in inflamed conditions of the vagina.

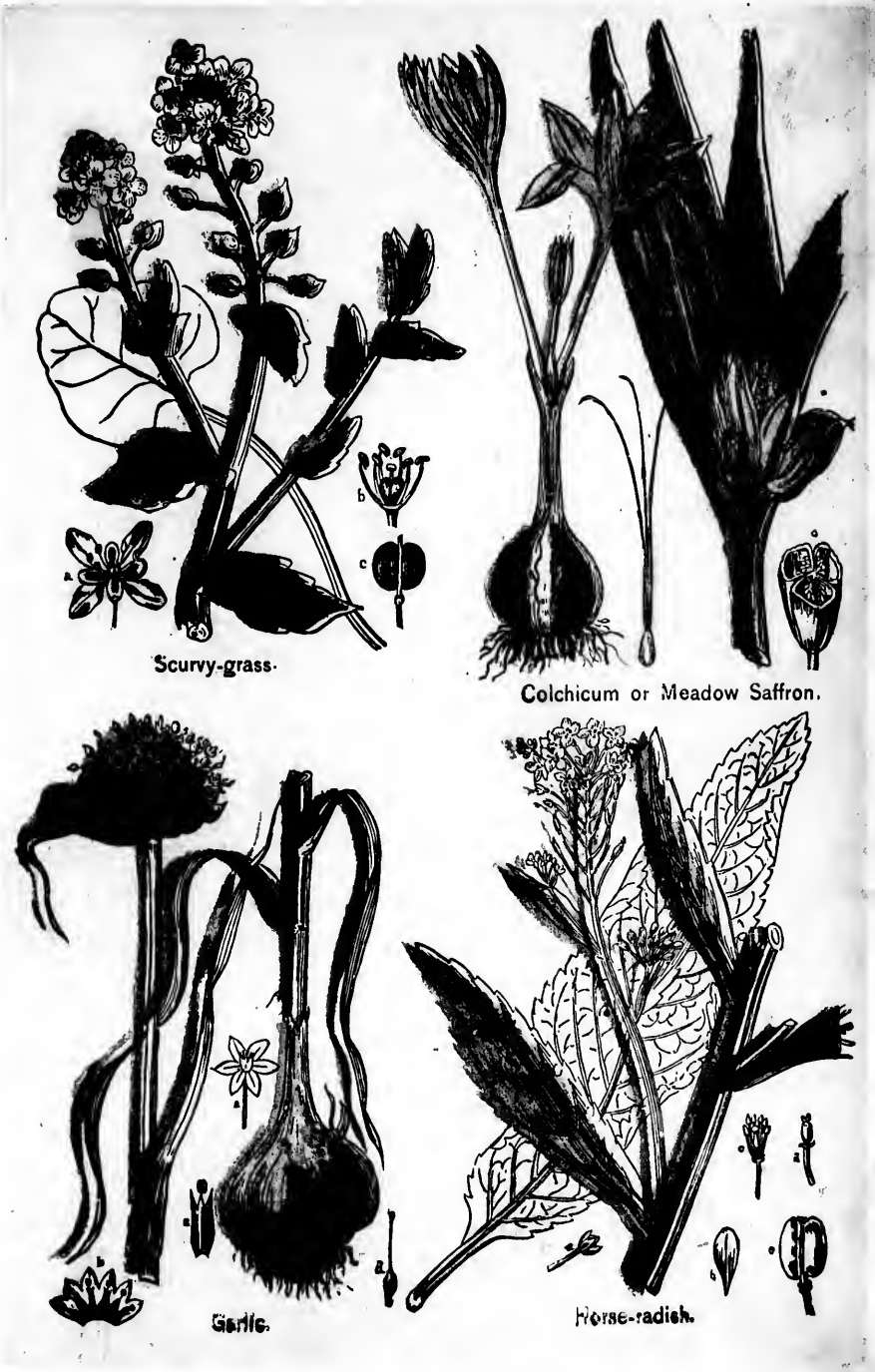
Hop.—The powdered root is employed as a pill to quiet irritability of the urinary organs. It is also employed to relieve the pain of gonorrhœa.

Plate 6.

Scurvy Grass.—This plant is so named because of its supposed efficacy in relieving scurvy.

Meadow Saffron (colchicum).—This plant is chiefly known for its use in the treatment of gout and rheumatism. In employing it care must be taken not to give it in excess, since it causes vomiting and purging.

Garlic.—The garlic, onion and leek are all used for bronchitis and colds in the head. Made into poultices, they are applied to local inflammations.



Scurvy-grass.

Colchicum or Meadow Saffron.

Garlic.

Horse-radish.

Saffron.

Meadow-sweet.

Hedge-Mustard.

Hedge-Nettle.


Mullein.
Rosemary.
Nettle.
Deadly Nightshade.

Stavesacre

Golden Rod.

Lime.

Bear Berry.

Buckth

Fennel.

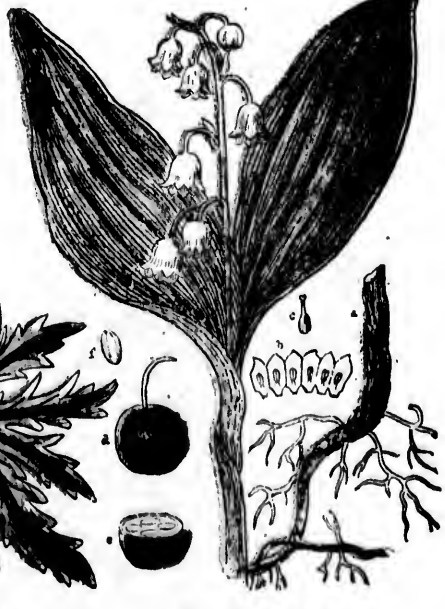
Tansy.

Wood Sorrel.

Peony.

St. John's Wort.

Aconite or Monkshood



Lily of the Valley.

Henbane.

Calamint.

Sage.

Mustard

Juniper.

Black Currant.

White Horehound.

Coltsfoot.

Hemlock.

Barberry.

Elder.

Oak.

Parsley.

Valerian.

Foxglove.

Crowfoot.


I.A.
Flax.
Common.
Purging.


Wormwood.


Carrot.


Horse-Chesnut.

Thorn-apple.

Asparagus.

Marsh Mallow.

Hop.

Plantain.

White Poppy.

Pennyroyal.

Bearsfoot.

Liquorice.

Yellow Flag.

Dandelion.

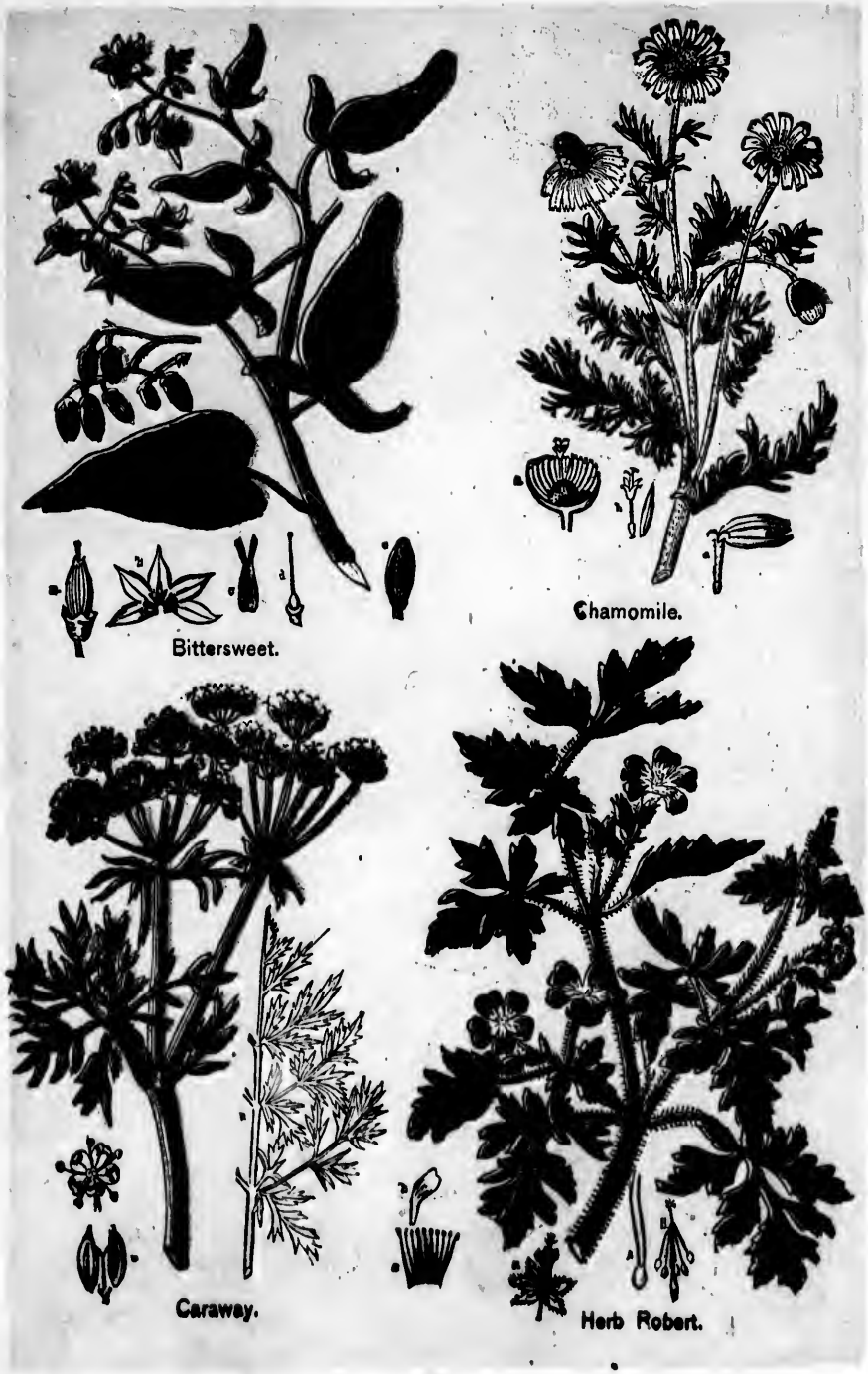
Bramble.

Dill.

Peppermint.

Spurge-laurel.

Black Bryony.



Bittersweet.

Chamomile.

Caraway.

Herb Robert.

Horse Radish.—This is sometimes used as a tonic for the digestion and to promote the secretion of the kidneys.

Plate 7.

Juniper.—An infusion made by boiling an ounce of the bruised berries in a pint of water is frequently used to stimulate the action of the kidneys. Hence this remedy is used in dropsy and in some diseases of the kidney. It is usually combined with cream of tartar.

Black Currant.—The juice of the berries is used as an astringent in diarrhea of children.

White Horehound.—An infusion is given in catarrhal troubles, and sometimes in dyspepsia.

Coltsfoot.—An infusion of the dried leaves of coltsfoot is employed to loosen the phlegm in a chronic cough.

Plate 8.

Plantain.—This was formerly employed to increase the secretion of urine; at present it is rarely used except as a poultice made of the bruised leaves.

Poppy.—The dried juice from incisions made into the capsules holding the seeds of the poppy is familiar to all under the name of opium. This drug is chiefly used for the relief of pain, and is also employed in the treatment of inflammations.

Pennyroyal.—This variety of mint is employed as an infusion for the relief of griping pains in the abdomen. It is popularly supposed to be beneficial in cases of retarded painful menstruation.

Plate 9.

Peony.—An infusion is made b boiling an ounce of the powdered root in a pint of water. Half a teacupful may be given four times a day. It was formerly considered a nerve tonic, and was used in epilepsy and St. Vitus' dance.

St. John's Wort.—This plant was formerly used as a decoction to promote menstruation, but is now seldom employed.

Aconite.—This is one of the most powerful drugs employed. It is useful in the early stages of fevers and of inflammations, such as pneumonia, erysipelas and rheumatism. The tincture of the root may be given in doses of one drop every hour until six doses have been taken; the remedy should not be given in excess, since it will cause weakness of the heart and perhaps fainting.

Plate 10.

Flax.—The ground seeds are much employed in the preparation of poultices; the oily matter which they contain serves to retain the heat and moisture, as well as to make a soft, soothing application.

Wormwood.—An infusion made by adding an ounce of the plant to a pint of boiling water, may be taken for the relief of certain forms of dyspepsia; a wineglassful of this infusion constitutes a dose.

This infusion, mixed with equal parts of vinegar, is employed as an application for sprains and bruises.

A peculiar intoxicating liquor known as *absinthe*, is prepared by distillation from wormwood.

Carrot.—The roots of the ordinary carrot can be made into a very good poultice. Internally the medicine is not used, though it was formerly employed occasionally in cases of dropsy.

Horse-chestnut.—A decoction of the bark has been used in cases of ague and other malarial fevers.

Plate 11.

Licorice.—Powdered licorice is commonly used to cover the taste of other medicines; it is largely employed in the manufacture of pills.

Dandelion.—This plant has long been used as a remedy for torpor of the liver, and dyspepsia associated with some disorder of

the liver. A decoction made of the fresh leaves and roots, and a fluid extract are the best preparations of it. One or two teaspoonfuls of the fluid extract may be given at a dose.

Plate 12.

Mullein.—An infusion of this plant (one ounce of the leaves to a pint of boiling water) is sometimes employed after cooling and straining, in inflammation of the bowels and bladder.

Rosemary.—An infusion of this plant was formerly much employed for hastening delayed menstruation; it is now sometimes used as a tonic for the nervous system.

Deadly Nightshade.—Two varieties of the same family grow in this country; the deadly nightshade (*atropa belladonna*) is the one used in medicine. Its fruit resembles somewhat the cherry, being at first green, then red, and finally purple. The black nightshade resembles it somewhat, but its berries are smaller than those of belladonna, and become quite black when ripe.

The root and the leaves of the nightshade are used in medicine. It is a powerful narcotic, and in large doses a violent poison. It is much used in neuralgia and other painful affections; it is also employed in various diseases of the nervous system, such as epilepsy.

Belladonna is a useful application in the shape of an ointment or liniment; as a plaster it is often valuable in neuralgia, and is used for drying up the milk of nursing women.

In relieving excessive perspiration from consumption or in other condition of debility, belladonna is one of our most valuable agents; it is also used to relieve the incontinence of urine in children.

The active principle of belladonna, *atropia*, is a remedy of extreme importance in the treatment of various affections of the eye.

Plate 13.

Parsley.—A decoction of the parsley root is sometimes used for the relief of pain in passing water; and has been recommended to promote the menstrual flow. The bruised leaves are sometimes applied to nursing breasts, to prevent "caking."

Valerian.—This remedy is used almost exclusively for cases of "nervousness," however it may be manifested. In hysteria, and the hysterical paroxysms which often occur about the time of the menstrual epoch, this remedy is invaluable. It is also useful in cases of nervous headache.

Foxglove.—This remedy is chiefly used to strengthen the action of the heart. It is, therefore, valuable in many cases of heart disease, and, in some instances, of kidney disease. Whenever the disease of the heart causes a rapid and weak pulse, shortness of breath, and dropsy, digitalis (foxglove) is of value.

In many cases of dropsy dependent upon heart disease, digitalis is the most efficient agent in relieving the swelling. In some cases of delirium tremens, digitalis is valuable in stimulating the heart, and thus counteracting the effects of the whisky.

Plate 14.

Hemlock.—This is one of the most violent poisons. It is chiefly used for its sedative and narcotic effects, but because of its unreliability it is not employed with great frequency. It has been used in the treatment of various nervous diseases, such as delirium tremens.

Barberry.—The bark of the root is sometimes used in the shape of an infusion as a cathartic.

Elder.—A decoction of the bark, or of the berries, is useful in promoting the action of the bowels and of the kidneys. The variety used in medicine bears black berries.

Oak.—A decoction of the inner bark is a valuable astringent. It is used as a gargle in sore throat, as an injection in cases of the "whites," and as a medicine in diarrhea and night sweats.

Plate 15.

Bittersweet.—There are two plants popularly known by this name. One of them is a shrubby stem, with blue or purple flowers and red berries.

A decoction is made by boiling an ounce of the leaves with a pint and a half of water, and continuing the boiling until the liquid

is reduced to a pint. The dose of this is two or three tablespoonfuls, taken three or four times a day.

This decoction is often used in eruptions on the skin in which scales are formed.

Chamomile.—This is one of the few household remedies which possess decided value. It is a good tonic in cases of indigestion, with the formation of gas in the stomach. It is best taken in the shape of a cold infusion, which is made by adding half an ounce of chamomile flowers to a pint of cold water. In cases of indigestion and nausea, the chamomile tea can be taken with a little ginger or myrrh.

Caraway.—The seeds of caraway are used to cover the taste of nauseous medicines.

Plate 16.

Peppermint.—A hot infusion of peppermint is a valuable remedy in cases of pain in the bowels from the accumulation of gas in the intestines. The oil of the essence may be used for the same purpose. Two or three drops of the essence are valuable in relieving the colic of infants.

Laurel.—The shrub known as mountain or sheep's laurel is a poisonous plant, the leaves of which are sometimes used in medicine. It has been employed in hemorrhage from the bowels and in dysentery. An ointment made of the leaves stewed in lard is often employed in the household in the treatment of itch.

Black Briony.—Briony root was formerly used in medicine. An infusion of the dried root—half an ounce to a pint of boiling water—may be given in wineglassful doses, three or four times a day. It may be used in treating dropsy, and in inflammations of the joints. It is an active purgative, producing watery stools.

Aloes.—The dried juice of the plant is used in medicine. It is one of the best purgatives which we have for promoting and improving the action of the large intestine. By securing a flow of blood to the organs of the pelvis, aloes is often valuable in promoting the menstrual flow; in these cases it is usually combined with iron and myrrh.

Aloes is of use in habitual constipation, but should not be employed by persons suffering from piles. Because of its tendency to increase the menstrual flow, it should be avoided during the monthly period, especially by women who flow profusely at such times; it should not be employed during pregnancy.

The dose is from five to fifteen grains, usually in pill form, combined with other drugs.

Assafœtida.—The dried juice of this plant is a powerful stimulant in many nervous affections, of females especially. Its most frequent use is in the treatment of hysteria.

The ordinary dose is five to ten grains; fifteen to twenty drops of the tincture may be given at a dose.

Black Cohosh (Black Snake Root).—This plant was extensively used in the treatment of rheumatism before the introduction of salicylic acid. It has also been employed to promote menstruation.

From fifteen to thirty drops of the tincture constitute a dose.

Blood Root.—This is an excellent expectorant, and is frequently employed in bronchitis and other affections of the lungs, as an ingredient in cough mixtures. In large doses it is a powerful emetic, and has even produced death.

The dose of the tincture is twenty to thirty drops.

Buchu.—This remedy is one of the best known agents for relieving irritation of the urinary organs. It has been used in catarrh of the bladder and in cases of painful urination. It is best given in the form of an infusion, made by adding one ounce of the leaves to a pint of boiling water. Two or three tablespoonfuls of this should be taken four or five times a day. A fluid extract is also made, the dose of which is one-half to one teaspoonful.

Calabar Bean.—This is one of the most powerful and poisonous remedies used. The plant grows in Africa, where the bean is said to be used as an ordeal in detecting criminals: The person suspected of having committed a crime is compelled to eat these beans; if vomiting ensue, the individual's life may be saved, and he is then declared innocent; otherwise death occurs, a result which is regarded as a proof of guilt.

Calabar bean has been employed in the treatment of lockjaw, and as an antidote in cases of belladonna poisoning. One-tenth of a grain of the extract is the ordinary dose. This remedy should,

however, never be given except upon the prescription of a physician, since serious results may follow its incautious use.

Camphor.—This is obtained from a tree in the East Indies. Camphor is a sedative for the nervous system in many disorders, especially the hysterical affections of women. It is often useful in quieting the restlessness of fevers. The dose of the tincture is from ten to thirty drops.

Cascara Sagrada.—This remedy, which has been recently introduced, is now recognized by the medical profession as the best known laxative for the relief of habitual constipation. By its constant use the bowels are strengthened rather than weakened. When other laxatives are used habitually, torpidity of the bowels is aggravated, so that constantly increasing doses of the remedy are required to secure the desired effect; the complaint is rendered worse rather than better by the laxative. Cascara, on the other hand, seems to strengthen the bowels, so that the constipation gradually becomes less. By its use the torpidity of the bowels is diminished.

In administering cascara, it is necessary to conceal its objectionable taste in some way, as well as to secure the genuine drug. Both of these objects can be best attained by using the *cascara cordial* manufactured by Parke, Davis & Co.

Catechu.—This is a powerful astringent, which is used largely for the relief of diarrhea. It can also be employed with advantage in discharges, such as the whites. As a gargle, it has been used in relaxed conditions of the throat.

Cinchona Bark.—This familiar drug is now less extensively employed than formerly. It has been replaced by quinine and the other alkaloids obtained from the bark.

These alkaloids are the best of the vegetable tonics, as well as the most reliable remedies for the relief of malarial fevers. Quinine is also extensively employed for reducing temperatures in fevers and inflammations. The prejudice which many persons have against the use of quinine, seems to be based upon the fact that an excessive amount of the drug causes headache, buzzing in the ears and other unpleasant symptoms. These effects are, however, transient, and do not constitute any objection to the *proper* use of the remedy.

Copaiba.—This balsam is obtained from trees found in South America. It is chiefly used to relieve the irritation in inflammations of the urinary passages, especially in gonorrhœa.

Elaterium.—This is a powerful cathartic, which is often used to carry away the water in cases of dropsy.

Ergot of Rye.—This is chiefly used to promote contractions of the womb; hence it is especially valuable to arrest the floodings which occur after delivery, and to check the flow in excessive menstruation. It is also used for the removal of fibroid tumors of the womb.

Ergot is sometimes employed to assist the expulsion of the child in cases of protracted delivery. This should never be attempted, however, except by a physician, since the injudicious use of the drug may result in the death of the child and in serious danger to the mother.

The only reliable preparations of ergot are a fluid extract and the so-called "normal liquid ergot." The dose varies according to the object desired — from ten to forty drops.

Ipecac. — Ipecac is chiefly used as an emetic and expectorant. It is used as an ingredient of cough mixtures in order to loosen the phlegm or mucus. It has also been used in large doses as a remedy for dysentery.

Jaborandi. — This remedy produces profuse perspiration, usually attended with an increased flow of saliva. It is therefore useful when the kidneys are inactive, and is accordingly employed for the relief of dropsy and in cases of *uræmia*. It is generally administered in the shape of pilocarpine, half a grain of which constitutes a dose.

Kousso. — This plant, found in Abyssinia, is one of the most certain remedies for expelling tape-worms. An infusion is made by adding two drachms to four ounces of boiling water. This is allowed to cool and then swallowed.

Mandrake (*Mayapple*). — The active principle of this plant, podophyllin, is an excellent cathartic, especially in cases of torpidity of the liver. It is often employed as a substitute for preparations of mercury. The dose is one-fourth to one-half of a grain.

Male Fern. — This is one of the best remedies for tape-worm. Half a teaspoonful of the oil should be taken in a little mucilage or in capsules.

Nux Vomica. — This is one of the most valuable tonics as well

as dangerous poisons which we possess. These properties depend chiefly upon the alkaloid, strychnia, which it contains.

Nux vomica is a good bitter tonic, and an especially good tonic for the nervous system. It is frequently used in the treatment of constipation and dyspepsia.

Pumpkin Seeds. — These are largely used for the purpose of expelling tape-worms from the bowels. To accomplish this purpose the patient should take no other food for twenty-four hours than pumpkin-seeds and milk, eating the seeds freely whenever hungry. At the end of this time a dose of castor oil should be taken.

Rhubarb. — This is employed as a tonic and purgative. In the latter capacity it is useful in cases of habitual constipation attended with piles, and for the constipation of pregnancy.

Senna. — This is a violent cathartic, producing watery stools; an objection to its use is a tendency to cause griping pains. Hence some aromatic is usually given with it. The most serviceable form for administering this remedy is what is known as the "compound licorice powder."

Turpentine. — This is used largely for controlling bleeding from the nose, stomach, bowels and bladder. It is occasionally employed, in combination with other remedies, in various diseases of the intestine.

Locally turpentine may be used for the same purposes as mustard — that is, to cause an irritation of the skin. A piece of folded flannel should be saturated with hot water, wrung dry, and then sprinkled with spirits of turpentine.

ADMINISTRATION OF MEDICINES.

The doses of medicines vary not only with the drug itself, but also with the age, sex and condition of the patient. A list of doses for adults is appended; in giving medicine to children the following general rules may be followed:

For a child of one year the dose is usually one-twelfth of that given to an adult.

Between one and two years,	One-eighth.
Between two and three years,	One-sixth.
Between three and four years,	One-fifth.
Between four and five years,	One-fourth.
Between five and eight years,	One-third.
Between eight and twelve years,	One-half.
Between twelve and sixteen years,	Two-thirds.

In every case the general condition and strength of the individual must be taken into account in giving the medicine; in administering powerful drugs it will be better to give rather less than the amount indicated in this table.

Medicines are prescribed in this book according to the usual custom of physicians, by the weights and measures used by apothecaries; it is advisable for families who are compelled to prepare their own medicines to have a set of weights and graduated glasses for this purpose. In most instances sufficient accuracy in measurement at least can be obtained by using spoons, after the following table:

A teaspoonful contains	One drachm or 60 drops.
A tablespoonful contains	Four drachms or half an ounce.
A wineglass contains	Two ounces.
A teacup contains	Four ounces.

For measuring solid substances we may also employ spoons; this is not, however, an accurate method, since the weight of solid substances varies extremely. Hence it is not advisable to employ this method in measuring out the doses of powerful drugs.

A teaspoonful contains	One drachm or 60 grains.
A tablespoonful contains	Four drachms or half an ounce.

In these measurements of solids the spoon should be filled level full.

In administering medicine to children it should be remembered that rather less than the proportionate dose should be given in using certain drugs. Thus opium has an unusual influence over children, who are especially susceptible to its action. In administering any form of opium, therefore, less of the drug should be indicated by the above table of comparative ages. In fact opium should never be given to a child less than a year old, except upon the advice of a physician.

List of Medicines and Doses for Adults.

In the following table the effects of the different drugs are indicated in the second column by words which designate in a general way the properties of the various substances.

Some of these terms require explanation, since they are not employed outside of medicine.

An *astringent* is a drug which seem to cause contraction of the tissues. They are used to diminish discharges, and are hence employed in diarrhea, in ulcers of the skin, etc.

A *tonic* is a remedy which increases the strength of the individual either by supplying some element which his system lacks, such as iron, or by improving the condition of his stomach so that this organ is better able to digest and absorb the nutritious elements of the food. The simple bitters, such as quassia, belong to this latter class of tonics.

A *stimulant* is a remedy which increases the strength of the heart's action. As a result, the blood is propelled in greater quantity to different parts of the body, and the various functions are therefore performed in a more satisfactory manner. Familiar examples are hartshorn and whisky.

A *sedative* is a remedy which decreases the strength of the heart's action; they are required in cases of inflammation and sometimes in over-excitement of the brain, as in delirium. Aconite and prussic acid are examples of this class.

A *narcotic* is a remedy which diminished the activity of those parts of the brain concerned in consciousness; most of these remedies therefore decrease sensibility to pain. Opium is a familiar example.

An *alterative* is the name applied to remedies which induce

certain effects in improving the constitutional condition. Arsenic and mercury are examples.

A *diuretic* is a remedy which increases the quantity of urine excreted. Sweet spirits of niter is an example.

A *diaphoretic* is a medicine which increases the quantity of perspiration. Alcohol and sweet spirits of niter are examples. Many of the diaphoretics are also diuretics.

An *expectorant* is used to promote the separation of mucus from the air passages. Ipecac and senega are examples.

An *emmenagogue* is a remedy which promotes the menstrual flow. Tansy is a drug used for this purpose.

Various other designations are employed in medicines to indicate the special effects of different drugs; but those already given will suffice for our purpose.

Medical Name.	Properties.	Dose for Adult. For Child's Dose see page 1088.
Aconite Leaves, Tincture of.	Sedative, Narcotic.....	10 to 15 drops 4 times daily.
Aconite Root, solid Extract of	Sedative and Narcotic.....	¼ to ½ grain 3 times daily.
Aconite Root, Tincture of..	Sedative and Narcotic	5 or 6 drops 4 times daily.
Aloes, Socotrine, powdered.	Cathartic.....	5 to 15 grains at bed time.
Alum.....	Astringent.....	5 to 15 grains.
Ammonia, Aromatic Spirits of	Stimulant	10 to 20 drops in water.
Ammonia, Carbonate of....	Stimulant and Expectorant..	3 to 5 grains every 3 hours.
Ammonia, Water of (Spirits of Hartshorn).....	Stimulant	5 to 20 drops in water.
Ammonium, Bromide of ...	Sedative	5 to 20 grains.
Ammonium Chloride (Sal-ammoniac).....	Expectorant, Diuretic.....	5 to 20 grains.
Angelica Root, Fluid Ext. of	Aromatic.....	Teaspoonful 4 times daily.
Anise Seed, Oil of.....	Aromatic.....	5 to 10 drops on sugar.
Antimonial Powder (James')	Diaphoretic.....	2 to 5 grains.
Antimonial Wine.....	Emetic.....	2 teaspoonfuls.
Arsenic, Donovan's Solution	Alterative.....	5 to 10 drops.
Arsenic, Fowler's Solution..	Alterative.....	3 to 6 drops.
Arsenic, white.....	Alterative.....	$\frac{1}{10}$ of a grain.
Asafœtida.....	Antispasmodic.....	5 to 20 grains (in pills).
Asafœtida, Tincture of.....	Antispasmodic.....	15 to 30 drops.
Atropia (Active Principle of Belladonna).....	Narcotic.....	One grain to an ounce of vaseline as an ointment.
Balsam of Copaiba.....	Diuretic.....	20 drops 4 times a day.

Medical Name.	Properties.	Dose for Adult. For Child's Dose see page 1088.
Balsam of Peru	Expectorant	15 drops every 3 hours.
Balsam of Tolu, Syrup	Expectorant	One teaspoonful.
Bearberry Leaves, Decoction,	Diuretic	Wineglassful.
Bearberry Leaves, Fluid Ext.	Diuretic	Teaspoonful.
Belladonna, Plaster	Anodyne	For external use.
Belladonna, solid Extract	Narcotic	¼ to ½ grain.
Belladonna, Tincture of	Narcotic	10 to 30 drops.
Benzoic Acid	Expectorant	5 to 10 grains.
Bismuth, Subnitrate of	Anti-emetic	20 to 30 grains.
Bittersweet, Decoction of	Narcotic	Wineglassful.
Black Drop	Narcotic	5 to 10 drops.
Blackberry Root	Astringent	Wineglassful.
Blackberry Root, Syrup	Astringent	Teaspoonful.
Blood Root, Tincture	Expectorant	Half a teaspoonful.
Blue Mass	Alterative	3 to 5 grains.
Boneset, infusion	Diaphoretic	Tablespoonful.
Buchu, Fluid Extract	Diuretic	Teaspoonful.
Buckthorn, Fluid Extract	Cathartic	Teaspoonful at bed time.
Caffein	Nerve stimulant	1 to 2 grains.
Calomel,	Alterative	1 to 2 grains, twice daily.
Calomel	Purgative	5 to 15 grains at night followed by a dose of salts in the morning.
Camphor, Gum	Stimulant	2 to 6 grains.
Camphor, Spirits of	Stimulant	20 to 30 drops.
Cascara Cordial	Cathartic for habitual constipation	½ to 1 teaspoonful.
Cascarilla, Infusion	Tonic	2 tablespoonfuls.
Castor Oil	Purgative	1 to 2 tablespoonfuls.
Catechu, Powdered	Astringent	10 to 20 grains.
Catechu, Tincture	Astringent	½ to 1 teaspoonful.
Catnip, Decoction	Diaphoretic	Tablespoonful.
Chalk, Prepared	Astringent	10 to 30 grains.
Chamomile Flowers, Infusion.	Tonic and Diaphoretic	1 to 2 tablespoonfuls.
Chamomile, Fluid Extract	Tonic	Teaspoonful.
Chloral Hydrate	Narcotic	10 to 20 grains.
Chloroform	Anæsthetic and Stimulant	10 to 30 drops in whisky.
Colchicum Root, Fluid Ext.	Diuretic and Sedative	5 to 15 drops.

Medical Name.	Properties.	Dose for Adult. For Child's Dose see page 1088.
Colchicum Root, Wine.....	Diuretic and Sedative.....	20 to 30 drops.
Colchicum, Seed, Tincture,..	Diuretic and Sedative.....	30 to 40 drops.
Colocynth, Compound Ext...	Cathartic.....	5 grains.
Colombo, Tincture.....	Tonic.....	Teaspoonful.
Cubebs, Powdered.....	Diuretic.....	15 to 20 grains.
Dandelion, Fluid Extract,....	Diuretic.....	One teaspoonful.
Dover's Powder.....	Diaphoretic.....	10 grains.
Elaterium.....	Cathartic.....	$\frac{1}{10}$ grain.
Elder Flowers, Decoction...	Diaphoretic.....	1 to 2 tablespoonfuls.
Epsom Salts.....	Cathartic.....	2 teaspoonfuls.
Ergot, Fluid Extract.....	To arrest bleeding.....	15 to 30 drops.
Fennel Seed, Infusion.....	Aromatic.....	Tablespoonful.
Fever Root, Decoction.....	Cathartic and Diuretic.....	Tablespoonful.
Fleabane, Infusion.....	Diuretic.....	Wineglassful.
Foxglove, (Digitalis) Infusion	Stimulant and Diuretic.....	Teaspoonful.
Foxglove, Fluid Extract.....	Stimulant and Diuretic.....	2 to 3 drops.
Foxglove, Tincture.....	Stimulant and Diuretic.....	10 to 30 drops.
Galls, Powdered	Astringent.....	10 to 20 grains.
Gamboge, Powdered.....	Cathartic.....	2 to 5 grains.
Gelsemium, Fluid Extract...	Sedative and Anodyne.....	5 to 15 drops.
Gentian, Tincture.....	Tonic.....	½ to 1 teaspoonful.
Geranium, Decoction.....	Astringent.....	Tablespoonful.
Ginger, Powdered.....	Aromatic and Stimulant.....	10 to 20 grains.
Glauber Salts.....	Cathartic.....	1 to 2 teaspoonfuls.
Guaiac, Tincture.....	Diaphoretic	½ to 1 teaspoonful.
Hemlock Bark, Powder.....	Narcotic	1 to 3 grains.
Hemlock, Solid Extract.....	Narcotic	1 to 2 grains.
Henbane, Solid Extract.....	Narcotic and Anodyne.....	1 to 2 grains.
Henbane, Tincture.....	Narcotic and Anodyne.....	½ to 1 teaspoonful.
Hydrastin.....	Tonic.....	1 to 2 grains.
Indian Hemp, Decoction....	Diuretic.....	Tablespoonful.
Iodoform, Powdered.....	.....	External use.
Ipecac, Powdered.....	Diaphoretic and Emetic....	5 to 30 grains.
Ipecac, Syrup.....	Diaphoretic and Expectorat.	Teaspoonful.
Ipecac, Wine.....	Diaphoretic and Expectorant	Teaspoonful.
Iron and Ammonia, Citrate..	Tonic.....	5 grains.
Iron and Quinine, Citrate...	Tonic.....	5 grains.

Medical Name.	Properties.	Dose for Adult. For Child's Dose see page 1088.
Iron, Bromide	Tonic	1 to 2 grains.
Iron, Carbonate	Tonic	5 to 10 grains.
Iron, Chloride, Tincture of	Tonic	10 to 30 drops.
Iron, Citrate	Tonic	5 grains.
Iron, Iodide, Syrup	Tonic	20 to 30 drops.
Iron, Phosphate	Tonic	5 grains.
Jalap, Powdered	Cathartic	5 to 10 grains.
Juniper Berries, Infusion	Diuretic	Wineglassful.
Laudanum	Narcotic	15 to 30 drops.
Leptandrin	Cathartic	2 to 5 grains.
Liverwort, Decoction	Astringent	Tablespoonful.
Lobelia, Infusion	Diaphoretic	2 teaspoonfuls.
Lobelia, Tincture	Expectorant	½ to 1 teaspoonful.
Magnesia	Laxative	½ to 1 teaspoonful
Manna	Laxative	Teaspoonful.
Marsh Mallow, Infusion	Diuretic	Tablespoonful.
Mayapple, Decoction	Cathartic	Tablespoonful.
Mayapple, Resin (Podophyllin)	Antibilious	¼ to ½ grain.
Mayapple Root, Powdered	Antibilious and cathartic	10 to 20 grains
Mercury, Bichloride, (Corrosive Sublimate)	Alterative	$\frac{1}{12}$ to $\frac{1}{10}$ grain.
Mercury, Biniodide	Alterative	$\frac{1}{10}$ to $\frac{1}{10}$ grain.
Mercury, Iodide	Alterative	¼ to 1 grain.
Morphine	Narcotic	$\frac{1}{10}$ to ¼ grain.
Mullein Leaves, Infusion	Anodyne	Wineglassful.
Musk	Stimulant	2 to 10 grains.
Mustard Seeds, Ground	Emetic	Teaspoonful.
Myrrh, Tincture	Expectorant	20 to 30 drops.
Nux Vomica, Solid Extract	Tonic and Stimulant	¼ to ½ grain.
Nux Vomica, Tincture	Tonic and Stimulant	10 to 20 drops.
Opium, Powdered	Narcotic and Anodyne	½ to 1 grain.
Opium, Tincture	Narcotic and Anodyne	10 to 30 drops.
Opium, Vinegar	Anodyne	5 to 7 drops.
Opium, Wine	Narcotic	10 to 30 drops.
Paregoric	Anodyne	1 to 2 teaspoonfuls.
Pareira, Decoction	Diuretic	Tablespoonful.
Parsley Root, Infusion	Diuretic	Tablespoonful.

Medical Name.	Properties.	Dose for Adult. For Child's Dose see page 1088.
Pennyroyal, Infusion.....	Diaphoretic.....	Wineglassful.
Peruvian Bark, Decoction ..	Tonic.....	Wineglassful
Peruvian Bark, Powdered...	Tonic.....	Teaspoonful.
Peruvian Bark, Tincture....	Tonic.....	½ to 1 teaspoonful.
Pink Root, Infusion.....	To remove worms.....	Tablespoonful.
Pleurisy Root, Infusion.....	Tonic and Diuretic.....	Wineglassful.
Podophyllin	Antibilious and Purgative...	¼ to 1 grain.
Pond Lily Root, Decoction	Astringent.....	Tablespoonful.
Potassium, Bromide.....	Sedative.....	20 to 40 grains.
Potassium, Chlorate.....	Expectorant.....	10 to 20 grains.
Potassium, Citrate.....	Diuretic and Laxative	20 to 30 grains.
Potassium, Iodide.....	Alterative.....	5 to 15 grains.
Potassium, Nitrate (Saltpetre)	Diuretic.....	10 to 20 grains.
Quassia, Infusion	Tonic.....	Tablespoonful.
Quassia, Tincture.....	Tonic.....	Teaspoonful.
Quinine, Sulphate.....	Tonic.....	1 to 5 grains.
Raspberry Leaves, Infusion.	Astringent	Tablespoonful.
Raspberry Leaves, Syrup...	Astringent	Teaspoonful.
Rhatany Root, Decoction..	Astringent	Tablespoonful.
Rhatany Root, Tincture....	Astringent.....	Teaspoonful.
Rhubarb, Aromatic Syrup..	Cathartic and Astringent....	2 teaspoonfuls.
Rhubarb, Powdered.....	Cathartic.....	15 to 20 grains.
Rhubarb, Tincture.....	Cathartic.....	Teaspoonful.
Rochelle Salts.....	Laxative	2 teaspoonfuls.
Rue, Decoction.....	Emmenagogue	Tablespoonful.
Saffron, Infusion	Diaphoretic	Tablespoonful.
Sage, Infusion.....	Diaphoretic	Wineglassful.
Salicin.....	Tonic.....	2 to 5 grains.
Santonin	To destroy Intestinal Worms	¼ to 2 grains.
Sarsaparilla, Decoction.....	Alterative.....	Teacupful.
Sarsaparilla, Fluid Extract..	Alterative.....	Teaspoonful.
Sassafras, Infusion.....	Diaphoretic	Wineglassful.
Savine leaves, Infusion.....	Emmenagogue and Diuretic .	2 teaspoonfuls.
Savine, Oil.....	Emmenagogue and Diuretic .	1 to 5 drops.
Scammony, Powdered.....	Purgative	5 to 15 grains.
Senega Root, Decoction.....	Expectorant and Diuretic....	Tablespoonful.
Senega Root, Fluid Extract	Expectorant and Diuretic....	15 to 30 drops.

Medical Name.	Properties.	Dose for Adult. For Child's Dose see page 1086
Senna, Decoction	Cathartic	Tablespoonful.
Senna, Fluid Extract	Cathartic	Teaspoonful.
Skull-cap, Infusion	Tonic	Wineglassful.
Stramonium, Tincture	Narcotic and Sedative	15 to 30 drops.
Strychnia	Tonic and Stimulant	$\frac{1}{60}$ to $\frac{1}{30}$ grains.
Sulphur, Flowers	Laxative	1 to 2 teaspoonfuls.
Tansy, Decoction	Emmenagogue	Tablespoonful.
Tansy Oil	Emmenagogue	5 to 10 drops.
Thornapple (See Stramonium)		
Thyme, Infusion	Aromatic	Wineglassful.
Turpentine	Stimulant and Diuretic	1 or 2 teaspoonfuls.
Valerian, Tincture	Antispasmodic	Teaspoonful.
Veratrum Viride, Tincture	Sedative and Diaphoretic	2 or 3 drops.
White Oak Bark, Decoction	Astringent	For external use.
Wild Cherry Bark, Infusion	Sedative	Tablespoonful.
Wild Cherry Bark, Syrup	Sedative	Teaspoonful.
Yellow Dock, Decoction	Alterative	Wineglassful.
Yellow Jessamine, Tincture	Nerve Tonic	10 to 30 drops.
Yellow Root, Decoction	Tonic	Tablespoonful.

Preparation of Medicines.

Infusions are made by adding a pint of boiling water to an ounce of the plant, previously bruised and mashed. After standing for two or three hours in a covered vessel, the mixture is strained. Most infusions exert a greater effect when taken warm.

Decoctions are made by adding a pint and a half of water to an ounce of the plant, boiling down to one pint, and straining.

Extracts are made by adding a small amount of alcohol to the bruised leaves or other parts of the plant. The juice is thus extracted, and is placed in a warm place to evaporate until it becomes as thick as honey.

HOW TO CHECK THE SPREAD

OF

CONTAGIOUS OR INFECTIOUS DISEASES

SCARLET FEVER, DIPHTHERIA, SMALL-POX, ETC.

(No 4.) Document issued by the Provincial Board of Health of Ontario.

These diseases are spread by means of infectious particles going from person to person, and *can be stopped if care and systematic means are taken* to destroy these disease germs, and to prevent their being carried from one person to another.

Those parts of the body which are the *breeding places* of the contagious particles give off the poison in the greatest amount—for example :—

In Scarlet Fever, the mouth, throat, nasal passages and skin.
In Diphtheria, the mouth, throat and nasal passages.
In Small-Pox, the pustules, chiefly of the skin.
In Measles, the skin and air passages.
In Whooping Cough, the air passages.
In Typhoid Fever and Cholera, the discharges from the bowels.

The portions of the body thrown off, and containing the contagion, may pass into the air, or find their way into *water or food*, and in this way be introduced by breathing, drinking or eating, or through broken surfaces of the body.

It will be seen that the first five diseases in the above enumeration are very readily communicable through the atmosphere. The contagion of the first three remains virulent for a great length of time and at great distances; and as these diseases are very serious in their effects, our consideration will at present be chiefly directed to them in the following rules for checking their spread :—

What the General Public may reasonably expect from persons afflicted with Contagious Diseases, from their Friends, and from the Municipal Authorities.

1. When anybody, especially a child or young person, has sore throat, bad breath or fever, he *should be kept separated* from all other persons except necessary attendants, until it be ascertained whether he has Scarlet Fever, Diphtheria or some other communicable disease.

2. *Every case of Diphtheria, Scarlet Fever or small-Pox should be at once reported to the Health Officer* appointed by Local Board of Health. (See Secs. 18, 19 and 20, Public Health Act of 1882.)

3. On receipt of such notices, the *Local Health Officers* should immediately verify the reports of cases. If the medical attendant reports the case this will be sufficient verification.

The Board should secure the isolation of those sick with or exposed to these diseases;

Give notice of infected places;

Regulate funerals of persons dead from infectious diseases;

Disinfect rooms, clothing and premises;

Give certificates of recovery and of freedom from liability to communicate the disease.

4. Every person known to be sick with Scarlet Fever, Diphtheria or Small-Pox, should be promptly and effectually isolated from the public; no more persons than are necessary should have charge of patient, and these should be restricted in their intercourse with other persons.

5. Notices should be placed on the house in which a case of Scarlet Fever, Diphtheria or Small Pox exists, and no unnecessary persons allowed to enter.

(In regard to above, see Public Health Act, 1882, and Caps. 190 and 174, R.S.O.)

Management of the Sick Room and Duties of Attendants.

6. The *bed room* of a person sick with Scarlet Fever, Diphtheria, Small-Pox or any other infectious disease should be *cleared of all needless clothing, carpets, drapery,* or any material liable to harbour the poison of the disease. The room should be large, having an absolute air space of at least 1,000 cubic feet for each individual, and should have a *liberal supply of fresh air*—at least 3,000 cubic feet per head

per hour. In summer the supply should be unlimited; windows thrown open, and draughts on the patient prevented by a fine gauze or wire netting, slanting from the top of the sash to within two inches of the ceiling.

7. *Discharges* from throat, nose and mouth should be received, or immediately placed, in vessels containing some of the disinfectants named for that purpose in sec. 8; if on rags or handkerchiefs, these should be immediately burned.

Likewise, the discharges from kidneys and bowels should be passed into vessels containing a pint of disinfectant, and immediately buried at least a hundred feet from any well or other drinking-water supply. If these precautions are impracticable, let the discharges be passed on old cloths, which should immediately be burned.

8. For convenience, *a few disinfectants are here grouped together:*—

(1) Solution of chlorinated Soda (or lime).

(2) " chloride of zinc: water, 1 gal.; sulphate of zinc, 4 ozs.; common salt, two ozs.

(3) " chloride of lead: dissolve two drachms of nitrate of lead in a quart of water,—then, in a larger vessel containing a gallon of water, dissolve two tablespoonfuls of common salt (chloride of sodium); mix the two solutions together and store for daily use.

The above will answer for all purposes of disinfection; discharges, linen, cups, etc.

(4) Carbolic acid solution—say one part in twenty to forty of water, for discharges and clothes, scrubbing floors, etc., and washing hands.

(5) Copperas solution—one and a-half pounds commercial sulphate of iron to one gallon water.

(6) Carbolate of lime.

The two last for discharges; the copperas very good for privies; the carbolate of lime for sprinkling dry in rooms, sheds, etc.

The carbolic acid solution may be made to permeate the air by spray from an atomizer, and to destroy germs in breathable air by actual contact.

9. *Purification of Clothes and Bedding.* The best plan, where practicable, is by the agency of heat. Dr. Henry, of Manchester, disinfected scarlet fever clothing by exposure to 212° F. for one hour. A brick oven or portable furnace will answer the purpose, the clothes to

be disinfected being hung on wires. Boiling clothes is not so good as baking, but still is useful. To every ten gallons of boiling water add half or three-quarters of a gallon of commercial solution of chloride of lime ; or the clothes may be laid for twenty-four hours in a solution of sulphate of zinc in the proportion of 1 to 120, or of chloride of zinc in the proportion of 1 to 240, or in the chloride of lead solution (Sec. 8), and then should be washed with soap and water if they cannot be baked.

10. *Nurses and Attendants* should be required to keep themselves and their patients as clean as possible, *disinfecting their hands* frequently by chlorinated soda or other disinfectant.

Attendants should also wear *cotton or linen* (not woollen) *clothes* or overalls, to which particles will not so readily adhere, and which may be more easily disinfected.

11. *Every person recovering from Diphtheria* should be considered dangerous, and should not be permitted to associate with others, or attend any public assembly until the throat and sores on the lips and nose are healed for some days; nor before, in the judgment of the physicians, he can do so without endangering others, nor until all his clothing has been thoroughly disinfected. These restrictions, of course, extend to churches, schools, etc. Every apartment of the house must also be thoroughly disinfected before patient is permitted to go at large.

After recovery from Scarlet Fever and Small-Pox, a still longer time must elapse to allow all particles of disease-bearing skin to be thrown off.

12. The body of a person who has died of Diphtheria, Scarlet Fever or Small-Pox, should be washed with a strong chloride of lead or zinc solution, double the strength of those in Sec. 8, wrapped in a sheet wet with the same, and at once buried. In no case should the body be exposed to view ; *no public funeral held*, and as few persons as possible should attend.

Disinfection of Dwellings and Premises after Recovery or Death.

13. In addition to thorough cleansing of all wood work with soft soap, and with water to which carbolic acid has been added, (one pint of the common liquid to four gallons of water), and to removing and washing all fabrics which can be removed in the manner described in Sec. 9, and brushing the walls, the *rooms should be fumigated* for a period varying from three to twenty-four hours with sulphurous acid. A metallic dish should be suspended over a tub of water, or should

have ashes placed in it. All doors, windows, and the chimney being tightly closed, sulphur, mixed with a little saltpetre, is to be then placed into the dish and lighted. The proportions should be two pounds of sulphur for every 1,000 cubic feet of space. In a very long room it is best to have the sulphur in two or more places. After the fumigation is completed, the doors and windows should be opened, and kept open for several hours. In disinfecting in this manner with sulphurous acid, the person setting fire to the saltpetre and sulphur must make a precipitate escape from the room the instant the sulphur is burning. Carpets fumigated on the floor by this method should afterwards be removed to the open air and thoroughly beaten. *Pillows and feather beds*, mattrasses, and upholstered furniture, after being disinfected on the outside, should be cut open and their contents exposed to the fumes of burning sulphur. In no case should the disinfection of clothing and bedding be omitted. Where articles of clothing, towels or anything used by sick persons are considered too valueless to be kept, they must not be burned in the house or open air before they have been completely disinfected. A bad epidemic at Philadelphia resulted from neglect of this precaution.

Precautions for Well People to avoid Scarlet Fever, Diphtheria and Small-Pox.

14. *Avoid exposure to special contagion.* There is more danger for *children* than for adults; do not, therefore, let a child go near a case. *Do not permit any person or thing, dog, cat or other animal, plaything, letters, etc., to come direct from a case of these diseases to a child,* unless previously disinfected under competent supervision. If you do visit a case, bathe yourself, especially your hands, face and hair, in a disinfectant solution, and change and disinfect your clothing before you go where there is a child. See that your residence, *premises etc., are kept clean and dry;* that the *sewer connections* are well trapped and drains well *ventilated.* Never allow the *passages from* any person sick with the disease to be placed, without previous disinfection, in water closets or privies, but have them attended to as in Secs. 7 and 8. Give special attention as to the purity of your *milk supply.* Do not allow a child to *ride in any vehicle where there is suspicion* of infected persons having travelled. Avoid *exposure to high winds and cold, dry air.* Do not wear or handle clothing worn by a person during sickness or convalescence from these diseases. *Beware* of any person who has a *sore throat or running at the nose.* Do not kiss or take the breath of such

a person. Do not drink from the *same cup* or put in your mouth anything used by a person who has any of the above diseases. This should be especially attended to in the case of children.

15. In case of all of these diseases, remember that the *contagion may be stored up from one season to another if not destroyed.* Do not let it be so stored; and see that your children do not visit a house where one of the above diseases has been, even though some months have since elapsed, unless you know that the house, clothes, etc., have been thoroughly disinfected.

16. In the case of *SMALL-POX*, too much care cannot be taken to see that every person who has not been *vaccinated within seven years* be vaccinated or re-vaccinated.

17. If vaccination has "taken well" a few years before, this is, if anything, an extra reason for re-vaccination. Persons who have had Small-Pox may take it again.

18. With regard to all these diseases, remember that a *mild form* in one person *may originate a severe form* in another.

19. In connection with this subject, it should be remembered that *too much attention cannot be paid to surroundings* in general, such as drainage, ventilation, food, warmth, etc. Temperature and rainfall have much to do with the spread of some of these diseases. Diphtheria, for example, is generally least prevalent in August, increases until January, and declines again with the same regularity until August. It is also most fatal in the lowest and worst drained parts of cities. Examine the relative positions of wells and privies. Where city water is used, investigate the source of water supply, and the place of debouchure of sewers. (An outbreak of Diphtheria in Naples, 1872, was clearly traced to contaminated water.) In country districts isolated outbreaks, traceable to cesspool effluvia, are not at all uncommon. Frequently the water-closet drain will be found discharging into a cesspool cleaned out only at rare intervals, the gases generated in the cesspool having no outlet except through the water-closet and into the house. Proper attention to the trapping of waste pipes leading to sewers is too frequently taken for granted, hence examine carefully into the arrangement and ventilation of drains. Ascertain whether, in consequence of attention not having been duly paid to the trapping of overflow, lavatory, and every other waste pipe, gases are not being conveyed in sundry ingenious ways into the various apartments from which they were presumed to be excluded; that, in other words, the house drains and sewers have not been ventilated into the bed rooms.

ON THE DISPOSAL OF SEWAGE.

(No. 11.) Issued by the Provincial Board of Health of Ontario.

In most localities in Canada the supply of drinking-water is taken from wells, and the household slops and excrement are deposited in privies. In many cases the well is in such close proximity to the privy as to give good grounds for the unpleasant suspicion that there may be communication between them. That the well-water has a good appearance and taste and is odourless, is no proof that it has not suffered contamination, since highly-polluted water often has these characteristics; nor is the fact that the privy may be on lower ground than the well, a sufficient guarantee of safety, as it may still be many feet above the bottom of the latter. It is a matter of general observation that a deep hole in the ground has a tendency to drain shallower holes in its neighbourhood. In addition to polluting drinking-water, privies poison the air by their filthy emanations, and their ill-effects are aggravated on account of the long intervals that elapse between the times of emptying them. Many instances in various parts of this Province of wells polluted by sewage matter, and of the baneful effects of air rendered injurious in the manner indicated above, have come under the notice of the Board: and it has therefore been thought advisable to issue a pamphlet, pointing out the principles and the best methods to be adopted in order to avoid these results.

In view of the evils mentioned above, the advisability of abolishing the privy-pit system and of substituting something better in its place will not be questioned. The first point to be considered by each municipality is what system is best suited to its own requirements and condition. There can be very little doubt that a properly constructed and connected system of sewers and water-works affords the best means of disposing of the slops and excremental waste; but, in certain cases, the construction of works of this kind may be considered to be out of the question, and some other solution of the problem must be looked for. In many cases conditions very objectionable, from a sanitary point of view, have been introduced, from the fact of the municipal authorities not having considered the system of sewage-

disposal best adapted to the circumstances of the municipality, and not having decided upon plans in accordance therewith. Drains and sewers have been built without regard to proper outfall; closets and cess-pools have been connected with drains quite unfitted to receive and safely carry off their contents. Solid refuse, again, has been deposited and left to decompose in very unsuitable places, and, in many instances, houses have subsequently been built on such unhealthy collections of "made soil." It will save a great amount of subsequent expense, confusion and annoyance, if the municipality decide, in the first place, the system best adapted to it and proceed on some settled plan.

This pamphlet will present certain considerations which may be of assistance in arriving at such decision, the services of a competent engineer being at the same time called into requisition in each case.

I.—Dry Systems of Removal.

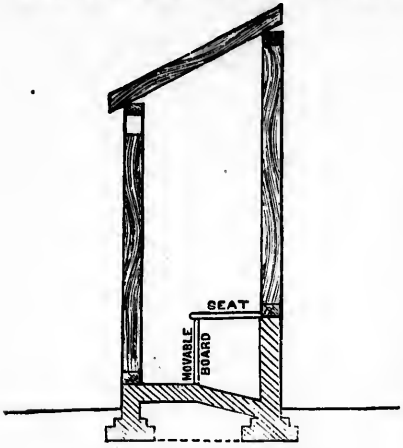
First, then, attention will be directed to the best methods of disposal in those cases where the water carriage system cannot with advantage be adopted.

In this connection it will be found expedient to consider the question of the disposal of the whole refuse of the household. This consists of (1) ashes, dust, waste-paper, and other dry refuse not prejudical to health; (2) kitchen-slops and vegetable and animal refuse; (3) bedroom slops, a mixture of wash-water and urine; (4) fæcal matter and the accompanying urine. The usual method of disposal is to throw the first and second into the ash-heap, the third and fourth into the privy. From an examination of the numerous methods which have been tried with varying success both in Europe and the United States, one is led to the general conclusion that the true principle in these cases is to keep the liquid refuse separate from the solid and to dispose of the two in different ways. It is a matter of common observation that solid organic matter, if kept comparatively dry, is not subject to offensive putrefaction, while the reverse is the case when there is a certain quantity of water present, and a practical attention to this fact will obviate those putrefying masses which now form such offensive abominations in our midst.

The subject naturally divides itself, then, into two portions, which require separate consideration, viz.: the disposal of (*a*) solid refuse, and (*b*) liquid refuse.

Solid Refuse.—Of the various methods hitherto tried for the disposal of solid excrement there are three which seem to have met with a fair degree of success. These are :—

1. *The Hull Ash-closet system.*
2. *The Dry Earth System.*
3. *The Rochdale Pail System.*



HULL ASH-CLOSET. (SECTION.)
Intended to receive all the dry refuse of the household in addition to excrement.

1. *The Hull Ash-closet system.*—In this closet the back, ends and floor of the receptacle under the seat are built of brick, laid in cement. The front side of the receptacle is a removable wooden piece, and the seat may be hinged. The floor is not sunk below the ground level, but slopes slightly from front to back. The whole is properly roofed in and ventilated. In the receptacle are deposited all the ashes, dust, waste-paper, solid kitchen refuse and excrement of the household. The small amount of urine that accompanies the excrement is absorbed by the ashes. All kinds of slops are rigidly excluded from the closet. When it is considered desirable to screen coal ashes, they may be screened into the closet after raising the hinged seat.

In Manchester a modification of this system exists, the floor being made level and the excrement being received into a pail, mixed with the ashes, as in the Hull closet. In some instances a fixed cinder sifter is arranged at the side of the closet, which directs the ashes on to the excrement and allows the cinders to fall into a box.

Mr. Netten Radcliffe made a careful examination of the Dry Ash system in Manchester, where 6,000 such privies were already in use, and thus reports :—

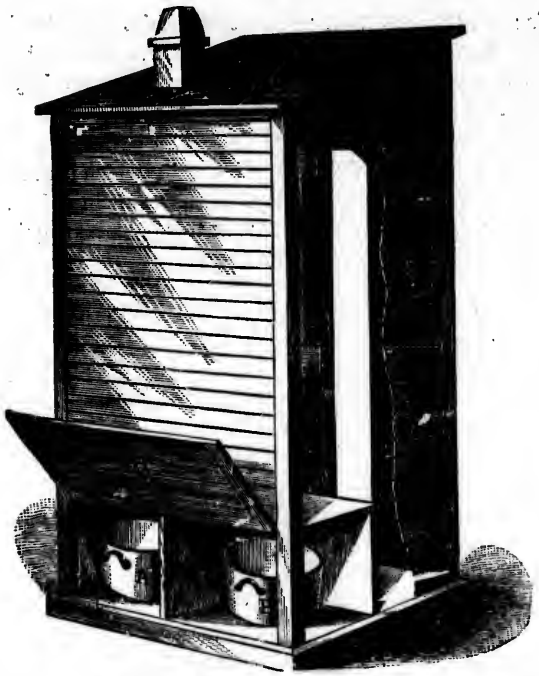
"In the series of inspection I made with reference to the working of this new system, I had occasion first to observe the contrast as to nuisance between the dry-ash closet and the old midden closet. In several streets where the process of reconstruction had been only partially completed, it was possible to compare the old and new

arrangements in contiguous premises. It was the contrast between open, big, uncleanable cavities, containing a greater or less amount of decomposing fæcal matter, and emitting a horrible penetrating odour, and small receptacles, emitting hardly any appreciable smell, even with the nose above the privy seat, and admitting of thorough cleansing. Most significant testimony was given to the benefit of the change by some householders. Many houses in Manchester are built in parallel rows, a back passage running between the rows, and each house having a small yard, in the rear of which the privy is placed. Since the reconstruction of the privies '*it has been possible to open the back windows of the houses.*' The change, moreover, has affected beneficially the value of cottage property, and tenants are quite willing to give 3d. more rent weekly since the reconstruction of the privies for the gain in decency and comfort. Soakage of excremental matter into the soil, and its passage into and accumulation in the drains, is of course obviated by the reconstruction, and the smaller space occupied by the new closet is not an unimportant matter. The removal of the excrement is, with the most ordinary care, free from offensiveness, and if commonly conducted as I saw the operation, it may well be executed during the daytime, and the abomination of night-scavenging done away with.

"The use of cinder-sifters has been adopted by householders with a readiness which proves how accurate the corporation was in depending upon their co-operation in the working of the scheme. The high price of coal during the last two years has contributed to this good result, from the value of the cinders, in encouraging its use. It is found, also, that a class of the population, commonly believed to be unmanageable in regard to any niceties of arrangement for excrement disposal, have rapidly appreciated the advantages of the new closet and taken to the use of the cinder sifter."

The removal is made once a week by the town authorities, and the material stored under waterproof sheds, where it undergoes a gentle fermentation, and is then sold for manure. It is said to be quite as inoffensive in appearance and odour as barn-yard manure.

A modified form of the dry-ash closet has been used successfully in some parts of the United States and Canada, In it two pails are used—one under the seat to receive the excrement and the other in some convenient position for the ashes. Each time the closet is used a quantity of ashes is thrown in with a scoop.



PRIVY USED IN THE UNITED STATES.
A, Excrement Tub ; *B*, Tub of Dry Earth or Ashes ; *C*, Hinged portion of Back of Privy.

Where pails are used, that for the excrement may be cut out of a petroleum barrel, and should, for ordinary families, contain about ten gallons. In isolated cases a soap box will answer the purpose. The ash-receiver should be larger and may be rectangular in form.

The principal advantage in the use of pails seem to be in the convenience attending the removal of their contents. They are also less liable to be injured, and can be more easily repaired than masonry receptacles.

The above closets are all out of doors.

2. *The Dry Earth System.*—This system is substantially the same as the dry-ash system above described, with the exception that earth is substituted for ashes. The earths best adapted for the purpose are moulds and loams. Pure sand possesses little or no deodorizing power, while pure clay is difficult to bring into the proper powdery condition, and has a tendency to absorb too much water.

It is not necessary that the earth should be absolutely dry, the drying that it receives from exposure to the atmosphere being sufficient. For use it must be free from lumps and in a powdery condition. This is best effected by screening it.

After being used it may be placed in a barrel, where it will undergo a slight heating and fermentation, after which it may be thrown out on the floor of the shed and exposed to the air in order to dry, and may then be used again. It is said that this proceess may be repeated ten or a dozen times with the same earth before it becomes offensive. This, however, is not recommended, especially in a country like ours, unless for the manurial value of the product ; but it shows the value of dry earth as an absorbent and deodorizer. Anthracite coal ashes have been found to answer in this respect fully as well as loam. Wood ashes act much more powerfully than coal ashes as a deodorizer. When it is considered no longer desirable to use the material it is sold for manure.

House-closets on the dry earth system have been found to answer the purpose very well. They are usually constructed with some patent device for throwing the earth on the faces each time the closet is used. One of the principal objects of their inventor, the Rev. Henry Moule, was to find a substitute for the water-closet in dwellings, factories, schools, etc.

With dry earth the soap box or barrel, with a scoop, may be used as in the case of the ash system, and will answer every purpose.

Some excellent automatic earth closets, not very extravagant in price, are, however, made in this province. The addresses of various manufacturers of them may be obtained on application to the Secretary of this Board.

The principal objections to the earth closet are the large quantity of earth required (estimated at from 4 to 5 lbs. per diem for each person if used only once), and the executive difficulties in applying the system to a large population.

It has proved a success under private management, or where regulations can be enforced, as for instance, in barracks, factories and various public institutions.

3. *The Rochdale Pail System.*—This system differs from the dry ash-pail method before described principally in the fact that no absorbents are used. The pails are frequently removed, being fitted with tight covers, and clean pails left in their places.

The removal of dry refuse, ashes, etc., forms a part of the system. The excrement and the ashes are brought to a depot, where the

latter are spread out on the floor to a certain depth. The excrement is then emptied into trenches formed in the ashes and treated with a small quantity of dilute sulphuric acid ; the whole is then thoroughly mixed, becomes, after a few weeks, quite inodorous, and forms a valuable manure. The removal and subsequent treatment has of course to be carried out by the municipal authorities.

Mr. Radcliffe reports as follows :—

"That the system had been thoroughly approved of by all who had had experience of it, and that it had not failed under the most varied circumstances, having proved equally efficacious in the highly rented house with its own closet, in the lodging-house, where great numbers were accomodated, and in the factory and workshop.

It need hardly be mentioned that this system is suited to out-door closets only.

ROCHDALE PAIL CLOSET.

A, Excrement Pail ; *B*, Ash-tub ; *C*, Seat Cover (raised) ; *D*, Iron Collar below seat (reaching into Pail when cover is down) ; *E*, Hinged Upright of Seat ; *F*, Door admitting from outside to Excrement Pail. In this Closet ashes are not mixed with the excrement.

Under the old privy system in Rochdale the cost of the removal of the excrement of one thousand persons for one year was £71.

Under the pail closet system it was £19; the resulting manure selling for three-fourths of the cost of collecting and preparing it.

Mr. Radcliffe makes the following estimate of the cost of the dry earth system applied to a village of 1,000 inhabitants:—Original plant, £250; weekly outlay for earth and labour, £4 15*s.*; annual cost, including interest on plant, £260. The product will be 730 tons of manure selling at seven shillings per ton.

In Hull the removal is made by contract. The contractor, in addition to receiving the material he collects and which he sells for such profit as he can obtain, is paid by the sanitary authority from two shillings to three shillings yearly for each house in his district.

Whatever system may be adopted, the old privy-pits should be thoroughly cleaned out and filled with fresh earth.

In many country towns and villages there is sufficient garden space to enable the excretal manure to be utilized; wherever this is not the case the removal and disposal of the excreta should be undertaken by the municipal authorities, and in all cases they should have an efficient system of inspection carried out.

Liquid Refuse.—In any of the proposed methods of dealing with solid excreta, the kitchen and chamber slops must on no account be mixed therewith.

Wherever practicable a system of pipe sewers should be devised for the purpose of disposing of these and should be connected with the house yards by properly arranged traps. The entrance to these pipes should be under cover, but should not be within the walls of the house. Since the volume of this concetrated sewage will in general be small, the pipes should be smaller and laid with steeper gradients than those used in connection with the water-carriage system. They should also be provided with flushing pipes at intervals, rising to the street surface so as to admit of periodical flushing by means of a hose to be connected with the street watering-cart. It may be advisable also, for the same purpose, to connect the sewer, at a few points, with the drains and gutters which carry off the rainfall during storms, but great care must be taken to make the connection in such a manner as to prevent the entrance of mud and other street debris. The sewage should not, on any account, be allowed to flow into any open-jointed water-drains, since at particular points in these, and during some seasons of the year, the level of the sub-soil water may sink below the drain, in which case the sewage would soak out into the surrounding

soil. Lamp-holes and man-holes, for the proper examination and removal of accidental obstructions, and ventilating shafts should also be constructed at proper points. Any urinals on the premises should be connected with the sewer and not with the closet. It is almost unnecessary to remark that no sewerage system should be constructed without the superintendence of a competent engineer.

It may be incidentally pointed out here that the trenches in which the tight pipe sewers are laid act as blind drains to a great extent in carrying off the sub-soil water.

The disposal of the liquid sewage when it has reached the outlet of the sewer system presents many difficulties. It may be allowed to flow into large bodies of water, such as our inland lakes, or into large streams, the water in which is not used for drinking purposes, and in which it is so diluted as to be comparatively harmless. There are, however, many objections to the latter method of disposal. If, from the situation of the town or village, neither of these methods is practicable, it may be collected in a large tank, from which it is periodically removed, and used as liquid manure, for which, on account of its concentration, it is peculiarly adapted. This removal may be automatic or otherwise.

Intermittent Downward Filteration.—In some places where it has been found impracticable to use it as a manure, the following method has been adopted: A small quantity of waste land is under-drained at a depth of from four to six feet; the surface is then intersected with open ditches, which are so arranged that when the sewage is poured into them it flows only over a portion of the land at a time. By the action of the air contained in the soil and of the roots of vegetation, it is purified and then flows through the sub-soil drains into the nearest water-course. The same process is repeated on another portion of the land and then on another, and by the time the whole surface has been treated in this manner, the first portion is ready again to receive the sewage, the soil having had time to dry and re-absorb air. By this method, which is known to sanitarians as "intermittent downward filteration," the soil can never get soaked with water and the organic impurities are thoroughly destroyed by the action of the air and the roots of vegetation.

The requisite extent of filtering area, as estimated by the Rivers Pollution Commissioners (England), is one acre drained to a depth of six feet for every 3,300 of the population, but this ratio must vary according to the nature of the soil.

The soil should be porous and have an easy slope.

Irrigation.—When used as manure the fields are irrigated with the liquid, either by means of surface trenches or open-jointed drain-tile pipes, laid about a foot below the surface. The former method is the cheapest and requires less care to maintain it in good working order. The soil should be under-drained and the sewage should be applied on the intermittent downward-filteration principle explained above.

Sewage farms have been worked for a good many years in England and on the Continent of Europe, and although at first they were looked upon in many instances as public nuisances, yet of late years, with increasing experience and resulting improved methods, they have been gradually growing in public favor. It seems to be the general testimony of medical men, chemists and others, that, when properly managed, they are in no wise injurious to the health of the people in the neighbourhood, and that the produce of such farms, both animal and vegetable, is fully as wholesome as that of any other.

On a sewege farm there should be at least three sets of fields, viz.: one for summer irrigation, a second for winter irrigation, and a third for what may be called storm-water and residual irrigation.

The fields for summer irrigation are treated regularly with the sewage during the growing period of the crop. When the harvesting of the crop or other circumstances render it necessary to stop the irrigation on the fields, it is directed on to the residual irrigation fields. This is also done during storms or floods, in cases where the storm-water passes through the sewers, when the volume of sewage is too great to be used on the ordinary fields. The fields for residual irrigation are best kept in grass and may be used for pasture.

During the winter the sewage is directed on to another set of fields. These are ploughed in the spring and cultivated during the ensuing season without any further addition of sewage: that received during the winter generally proving sufficient.

The experience of Dantzic on the Baltic has shown that winter irrigation is possible even in a cold climate. The mercury is said to fall to 6° or 8° below zero every winter, and in the winter of 1874-5, when it reached 17° below zero, the irrigation was interrupted only three times, and only for a few days each time. "The ground is usually frozen to a depth of three or four feet for about three months; the snow is often several feet deep. The sewage flows out under the snow through the many furrows prepared for it, leaving a thick crust to be ploughed into the land in the spring. About thirty feet from

the conduits the sewage often freezes. During the months of extreme cold, though the sand is so porous that the sewage sinks into it readily at all times, filteration alone can be depended upon. Nevertheless, if the plots of land are large and frequently changed, the purification of the sewage is, even in winter, more complete than can be accomplished by any of the chemical processes."

The experience of the State Insane Asylum, Augusta, Maine has further tested the practicability of this method of sewage disposal in winter. "When the mercury stood at 0° Fahr., and the ground was frozen hard, the sewage was found to disappear very soon after it was put on the land. In spring the early rains wash any refuse that there may happen to be deep into the soil and no offensive odours are noticed. The surface of the ground is then sometimes found covered with a brownish scum."

In the smaller towns and villages of Canada, where there is usually a sufficient supply of garden-space attached to each house in the suburbs and outskirts, similar methods to those described above may be employed on a small scale by householders. Care must be taken to lead the sewage by a tight drain pipe through the ground where there is any danger of its contaminating the drinking-water; it may then be discharged into the garden by a system of open-jointed drain-pipes, placed ten inches or a foot below the surface. If the soil is not very porous it should be under-drained.

In the winter it may be discharged on the surface of the ground if the underground drains are found to choke with ice. Any method of disposal on the surface of well under-drained ground provided it be at a sufficient distance from the house is better than depositing sewage in cess-pits, which experience has shown to be almost invariably in a leaky condition.

The central and more thickly populated portions of the town should be sewered as previously described.

If in any case a cess-pit is considered an absolute necessity it should be built of brick laid in cement with bottom and top arched. It should be surrounded with a clay puddle and lined inside with a coating of cement. The drain emptying into it should be well trapped, and both drain and pit ventilated at a safe distance overhead. The pit should not be more than six or seven feet deep, and should be emptied periodically by the odourless process.

In some public institutions in England where earth closets are used the slops are collected in tanks and sold as manure.

In bringing this subject to a close it may be well to recapitulate some of the facts upon which the above proposed methods of sewage disposal are founded. These are as follows:—Solid organic refuse if kept sufficiently dry does not undergo a putrefacative and offensive decomposition. Coal and wood ashes and most kinds of earths possess great deodorizing properties, and when mixed with solid fæces in the proper proportions will in a short time, through a process of inoffensive fermentation, form a valuable manure. Soils may be repeatedly soaked with liquid sewage provided they are well under-drained and a sufficient time is permitted to elapse between each application so as to allow the soil to fill up again with air, which of course takes the place of the water as the latter filters through. This air oxidises the organic portion of the sewage, and if the under-drains are deep enough the water flows from them sufficiently purified to be allowed to pass into the neighbouring streams when these are not used for drinking or washing purposes.

The action of the air may be supplemented with advantage by that of the roots of vegetation, and hence it will be found expedient in many cases to establish sewage farms.

No system of sewage disposal has yet been made to pay its own expenses by direct money returns. The most that can be hoped from the use of sewage as manure is to keep down in some degree the necessary expenses of the process. If the ultimate object of all systems of sewage disposal, the health and comfort of the population, is secured at the cost of a not undue outlay there will be good reason for satisfaction.

II.—The Water-Carriage System.

It is not intended in this work to deal with all the questions which would need to be considered in connection with a proper system of sewerage. To do so would unduly augment its dimensions, and many such details relate to those parts of the subject which must of necessity presuppose the presence and superintendence of a professional engineer. The pamphlet will therefore take up only those points which may not necessarily or presumably come under the notice of an engineer, and errors in regard to which are constantly causing unsanitary conditions and producing disease.

The primary question of deciding as to whether there are *proper facilities for outfall and a sufficient water supply*, has already been

considered in the first portion of the pamphlet. Its importance before commencing or allowing the construction of sewers cannot be too strongly insisted upon.

The materials and joints of drains have also been incidentally alluded to, as also their shape, course, and foundation. In this connection the too common practice of using wooden box-drains must be condemned. They allow sewage to soak out, they soon break down, and they permit of deposit and choking, especially when laid on the flat, as they commonly are. If they are used to avoid expense for any temporary purpose, they should be laid with the angle down, so as to secure a better flow and less deposit. But for a permanent drain, glazed tile pipes, with impervious joints should be used ; or, inside of houses, cast iron pipes, which when hot have been dipped in pitch. The joints of these should be filled with lead and caulked. These inside iron drains should, when possible, be left exposed to view. In some cities this object is carried out by fastening them along the basement walls. Any leakage is in this way made visible, and can at once be remedied. This precaution holds true of all inside plumbing.

The errors which are most frequently coming under notice as detrimental to health are those which allow of the *entrance of sewer gases into houses.*

It is no conclusive proof of the absence or sewer gases that they cannot be perceived by the sense of smell.

Some injurious gases reveal themselves unpleasantly to the nose, whilst others do not. These last are so insidious in their nature as to be doubly dangerous. As examples, the baneful results which ensue from living in houses under which water lodges and becomes stagnant may be referred to. There are few medical practitioners who have not witnessed these results. The miasmatic poison of ague is similarly inodorous, or has no necessarily unpleasant odour. In like manner sewers have sometimes very little unpleasant smell. In some cases we have a smell somewhat similar to that produced by those burning fluids into the composition of which fusel-oil enters. People living in a house become so accustomed to these faint odours as to take little notice of them ; and with some people the sense of smell is not very acute. Hence we must be careful how we accept negative evidence as to the presence of noxious gases. And hence, too, we must be all the more careful to avoid their existence and presence, and to devise means to this end.

It is plain that to prevent the constant accumulation of noxious gases, we must in the first place, get rid, as far as possible, of decomposable material before it begins to decompose; and, secondly, we must see that the noxious gases from any decomposing material which has evaded our care does not reach us. These two propositions may seem very simple, but in practice we often find that they have not been carried out.

As regards the first of them it has become an acknowledged desideratum amongst sanitarians that all decomposable material entering sewers should pass out of the sewer-system within twenty-four hours. For the accomplishment of this object many points need careful consideration, such as the materials of which drains and sewers are to be constructed, their course, their slope, their bed or foundation, the construction of their joints, the course of their junctions, the facilities for flushing them, etc. Some details in connection with these points have been referred to above; others will necessarily come under the direct superintendence of an engineer.

It will be found that with all possible care in carrying off rapidly the material thrown into the drains, we cannot entirely prevent the collection of a certain amount of noxious gases in them. We find that such gases are in practice disposed of in three principal ways :—

1. In a very large number of cases they are allowed to escape into the inside of dwellings. To such an extent is this the case that some sanitarians advise us to abolish sewers altogether, an advice which is not practicable under existing circumstances.

2. In some instances they are supposed to discharge through gratings in the centre of the road bed.

But in many cases they discharge at the edge of the sidewalk through the traps of gullies emptied by evaporation. Examples of this may be seen at many street corners in winter time.

The ventilating gratings of sewers are often so clogged with dirt that they are of little value in disposing of the total amount of sewer-gas. In winter they are very often completely closed.

3. In a few cases the sewer-gas is discharged above the house-tops. Very little consideration will suffice to show that this is the proper method. It is surely safer to discharge it away above our heads than at our very feet.

This method is illustrated in the diagram on page 1117.

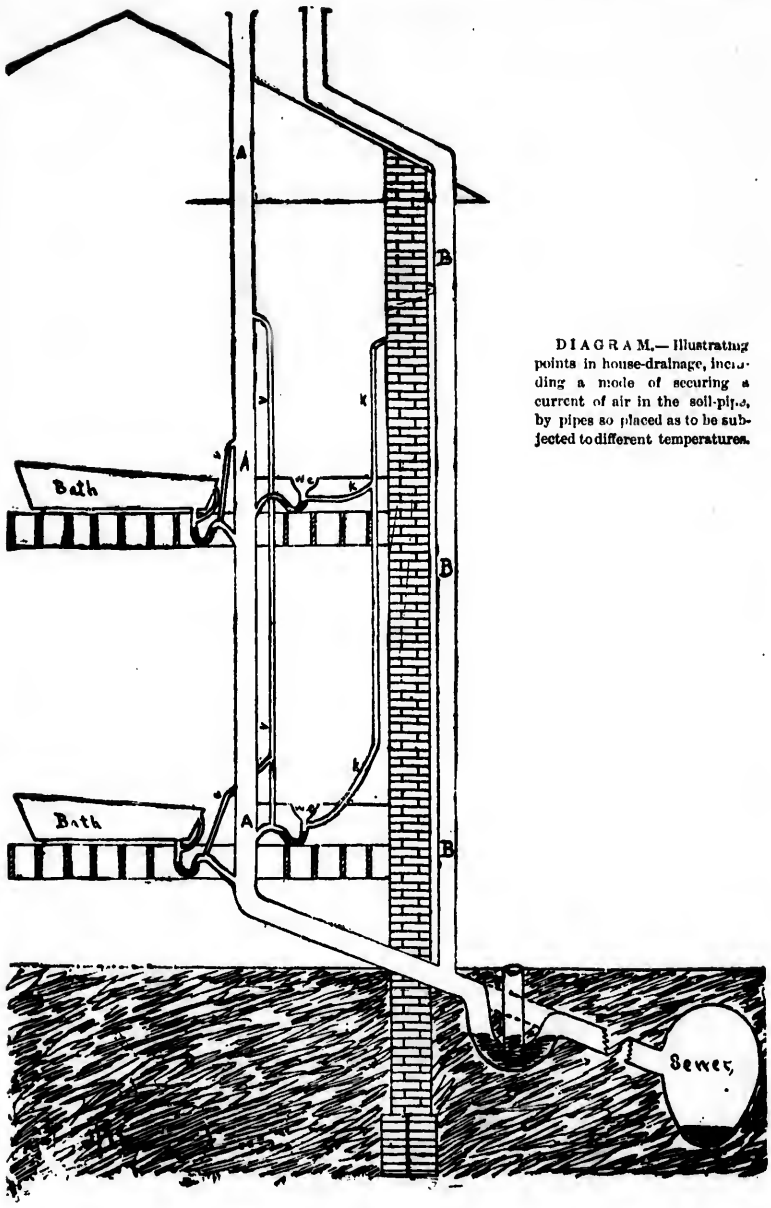
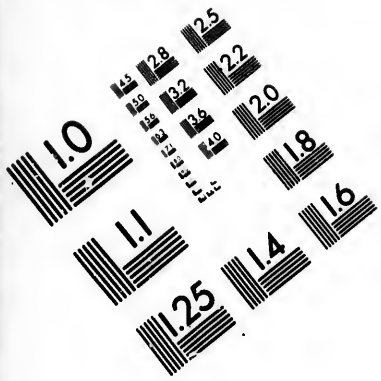


DIAGRAM.— Illustrating points in house-drainage, including a mode of securing a current of air in the soil-pipe, by pipes so placed as to be subjected to different temperatures.



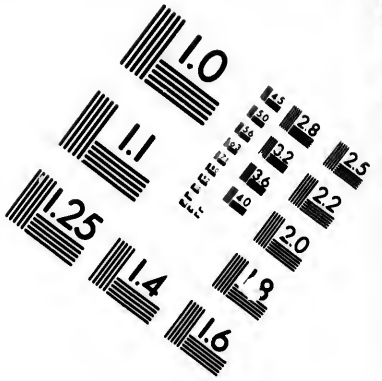
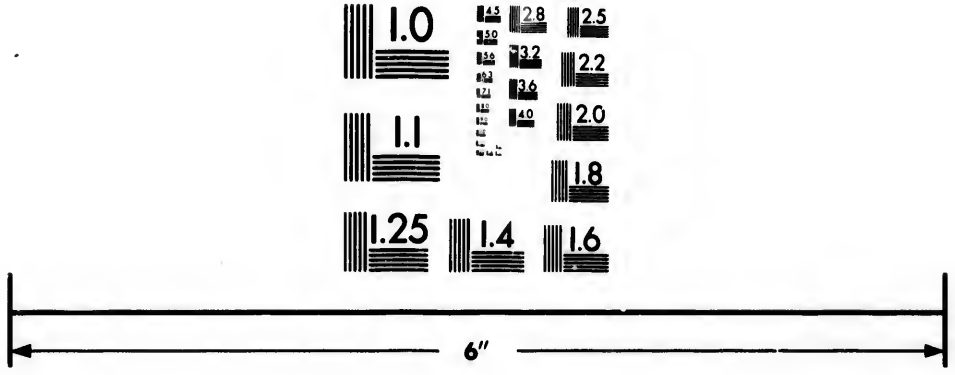
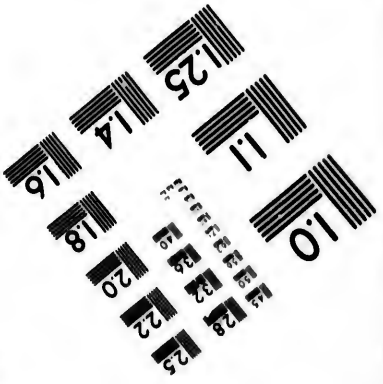


IMAGE EVALUATION TEST TARGET (MT-3)





Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

2.8
3.2
3.6
2.5
2.2
2.0
1.8
1.1
1.0

It is almost superfluous to say that every precaution should be taken to prevent sewer gas from disposing of itself in the first mode, by finding its way into houses ; and yet a very great deal of carelessness exists on this point.

It will be necessary then to consider how sewer-gases obtain entrance into houses :—

1. In some cases there is no "trap" interposed between the drain or sewer and the interior of the building served by that drain or sewer, no attempt at any mechanical impediment to the return of sewer-gas. This, of course, should not be the case. Some form of trap should be placed as near as possible to the commencement of every waste-pipe.

2. Where there are traps they are liable to be forced. Some persons think that if they have a trap all is right, but a trap without a vent is of hardly any practical value. A trap with a protecting depth of water (commonly called the "seal") of three inches, (a three inch seal), only resists a pressure of some two ounces to the square inch. Any person can readily convince himself of the insufficiency of a water trap without a vent by filling such an one and blowing through it. Without any great exertion he can displace the water and force his breath through the trap. If he now make a vent between his mouth and the water he cannot displace the latter no matter how hard he blows.

Let us next consider what influences are at work to force gas back through traps :—

a. The expansive force caused by pouring water into a drain ; two bodies cannot occupy the same space at the same time, and if the lower part of the drain be full, or its mouth be closed by water in the sewer into which it empties, then the sudden pouring in of water will cause the confined gas to burst its way back through the trap.

b. Storm-water suddenly filling the sewers has the same action.

c. The expansive force of hot water entering increases the temperature and consequently the bulk of the air. If raised suddenly from 50° to 150° the result would be a pressure equal to nearly seven feet head of water.

d. Direct afflation through the sewer ; the wind blowing up the sewers will force the sewer-gas backwards. Some engineers have proposed flap gates at the mouths of sewers. But it is better to let the fresh air blow up, and make sufficient vents for it to sweep through and purify the sewers.

e. Partial choking of the drain gives rise to confined air constantly increasing, expanding and being displaced. A vent allows the escape of all gas which would otherwise force the trap.

3. Again, sewer-gas may be admitted on account of the trap being emptied by syphoning. If to the end of the trap a tube bent downward be added, it forms the long leg of a syphon, the portion of the trap to which it is added being the short leg; if a full stream be poured through the trap, the water will syphon out of it, leaving the seal broken, as may be proved by actual experiment. An opening or vent at the arch of the syphon will of course prevent this.

4. A large body of water rushing full bore down a pipe into which a trapped tube empties will suck the water out of the trap.

This, again, will be prevented by a vent pipe.

5. Alterations may leave some pipe open or unsealed.

6. Disuse of a trap for a long time will allow evaporation and emptying of the trap, giving room for free passage backwards of gas.

7. Corrosion of pipes and traps, or bad workmanship in joints, will often allow escape of gas.

8. By absorption through the contents of traps, gas is often taken up and given off. Dr. Fergus, of Glasgow, experimented with ammonia, and found it transmitted through an ordinary trap in about twenty minutes.

This may be obviated by having a second main ventilating-tube, and these two will form a circulation (as shown in the tubes A and B in the diagram), preventing foul air from accumulating—stagnant—at the trap.

In a system of house-drainage, one of these two tubes may be secured by running a three or four inch pipe (B) from the sewer, just outside the house wall, up to the roof, clear of cornices, chimneys and windows; whilst the other will be obtained by continuing the soil-pipe (A) up through the roof. A difference of temperature in the pipes will cause the air to circulate through them. The last named pipe (A) will save the traps opening into it from being forced by gas from the sewer and drain. The traps of the baths and lower closet—all traps in fact below the uppermost one—must be saved by their own vents (v, v, v, v,) from being syphoned by sudden liberations of water above. These vents may open into the extended soil-pipe above the highest trap.

In the diagram, pipes (k, k, k,) will also be seen rising from a point below the hopper of the closet, a little above the water in the trap. These pipes may serve a double purpose. By branches from the water-closet tanks they may act as flushers to the water-closet traps, and they may also ventilate the water-closets. They may lead to the outer air or the chimney-flue of an isolated kitchen in constant use, but never into a bed-room chimney or any other not used *constantly* in the strictest sense of the word. *And never should any tubes which have direct connection with the drain open into the chimney of a dwelling-house.*

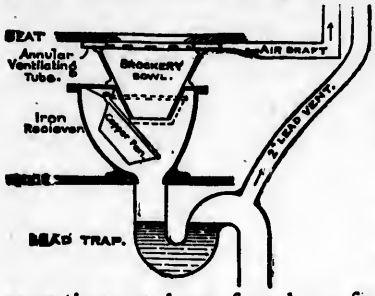
As for the trap shown between the house wall and the street sewer it might be left out, were the system to become generally adopted as it should be by by-law), the drain being then carried directly to the sewer as shown by the dotted lines, for, as remarked before, a point away up thirty feet or so above our heads is surely the best place to discharge the gas from our sewers, and not at our feet. But if the plan were not general then it would not be advisable for the individual to make his ventilating tubes the means for ventilating the whole sewer of his street; though even that would be better, than ventilating the whole sewer by a grating opposite his hall door and sitting-room windows. The best plan even in a general system would be to leave the trap in the position shown and have a third ventilating pipe running up on to the roof from a point just outside of the trap and between it and the sewer. We would thus lessen the danger of even *diluted* sewer-gas finding its way into apartments through corroded pipes or defective plumbing, whilst at the same time overhead ventilation of the sewers would be secured.

In no case should weeping-drains, wastes from refrigerators or other like appliances have direct connection with the drains or drainage pipes of the house.

Dry-traps are not to be relied upon, as they do not entirely prevent reflux of gas.

Great care must be taken to prevent the contamination of drinking-water by the gas or "foul air" of water-closets or drains. For this reason closets should be supplied by pipes from a separate tank, and never from the general system of water supply. Epidemics of Typhoid Fever have arisen from neglect of this caution; and also from contamination by interchange of contents through leaky pipes carrying respectively water and sewage.

Water Closets.—It may be well here to utter a warning against that very common form of closet, the pan-closet, of which a diagram is here shown. The passage from the bowl into the receiver, is closed



by the pan, holding water and preventing the constant passage backward of gas when the closet is not in use. But when the handle is drawn up the pan is deflected downwards so as to discharge its contents into the receiver, as shown in the diagram; and, as two bodies cannot occupy the same space at the same time, we have forced up from the receiver the gas rendered doubly foul by the repeated coatings of fæcal matter adhering to its wall as it is dropped on to it from the pan.

There are good forms of patent closets, but the simple hopper with a good swirl of water to keep its walls washed clear of fæces whilst in use, and with an occasional flush, will meet every sanitary requirement and will be free from the objections to which many forms of patent closet are open. The hopper should be of glazed earthenware or porcelain: metal fouls more readily. Its trap should be placed above the floor so as not to leave a long tube between the bottom of the hopper and the surface of the water in the trap. This lessens to a minimum the surface for filth accumulation. The trap is also more accessible in case broken tumblers or other impediments should get into it.

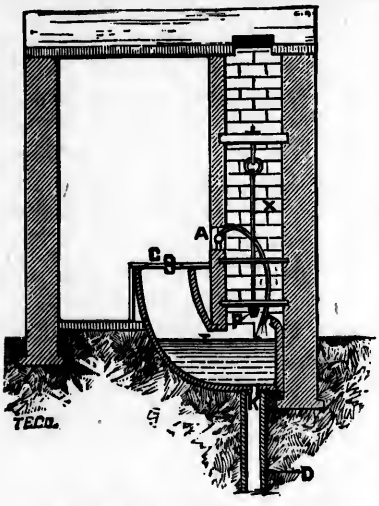
A foul odour often proceeds from the fact of a space being left between the seat and the top of the hopper of water-closets, through which urine or other water may slop over.

Latrines.—It now seems to be no longer a matter of doubt that the water-carriage system may be employed in this country in connection with out-door closets and latrines. In the densely populated districts in which the water-carriage system is established, these should be made to supersede the privy-pit.

When numbers of persons of various classes have to use closets, they cannot be relied upon for care and cleanliness. Hence it becomes necessary to use latrines, which may be attended to by some servant of the corporation, or other person, who shall, from time to time, change their contents, and supply them with water.

Of the various forms of these Latrines, the following may be mentioned :—

1. *The Liverpool Trough Closet.*—"This may be described as consisting of a series of closets communicating with a long trough [T], situated beneath and behind the seat [C], which receives the excreta from each closet in the series. The lower end of the trough communicates with a drain [D], leading to the sewer by an opening [K] which is closed by a plug [P]. Behind the back wall of the closet there is a small space [X] to which no one has access but the scavenger, and from which alone the plug can be raised by means of a handle. The scavenger visits daily, empties the trough, washes it out with a hose connected with a hydrant [A], and again charges it with water. As much water is let in as will cover the excreta received during twenty-four hours, and so prevent any smell. The closets are kept clean by the users."



2. *The Bristol Eject.*—"This consists of a strongly constructed dip-trap, interposed between the privy-trunk, as the receptacle is termed, and the drain. It thus admits of the ready extraction of foreign matters which may have been thrown in; it is not easily broken; and, as it is flushed and kept clean by the servants of the corporation, it is found to answer much better than ordinary water-closets among the poorer classes of large towns."

3. *Other forms of Latrines*, on the same principal, are thus spoken of in Wilson's "Hand-book of Hygiene:"—

"For barracks, prisons, etc., water-latrines of a much simpler construction than either of the above answer exceedingly well. An open metal trough, roofed in, and with the necessary partitions and doors, receives the excreta, while its anterior upper margin constitutes the seat. In order that the excreta may be constantly covered, the trough should be kept one-third full of water. It should also be well flushed

at least twice daily, and the contents allowed to run off into a drain connected with a sewer. A plug, or flap-door, at the lower end of the trough will be required to prevent the water from draining off during the intervals.

"There is a further advantage, common to all closets of the trough system, which may here be pointed out. In the event of an epidemic of cholera or enteric fever raging in the crowded courts where these closets are in use, it will be an easy matter to throw disinfectants into the troughs, and thus destroy the infectious power of the alvine discharges."

In some latrines water does not stand in the receptacle, but is admitted daily to sweep out the contents with a sudden flush. Those in which the fæces are received into the water, the whole being suddenly let off and flushed, are to be preferred, where the receptacle can be placed at a depth sufficient to protect it from frost, as is done now with our water-pipes, hydrant-services and drains, always remembering, however, that the open troughs are more exposed to atmospheric changes of temperature. In this Province out-door water-closets have, in some instances, been introduced, and, when carefully constructed, have been found to work satisfactorily in the winter season. Great care, however, needs to be exercised.

4. In various cities on this Continent, so-called "*Iron Sinks*" are manufactured, and are being largely introduced.

In New York the change from the old system to the new is being gradually made. No new pits are allowed to be dug; and when any existing one becomes a cause of complaint, the following order is issued by the Board of Health and must be carried out:—

"That the privy vault thereat be emptied, cleaned and disinfected, and filled with fresh earth. That a receptacle, vault or sink be constructed thereat, of a depth not greater than two feet, which shall be impermeable and secured against any saturation of the walls or ground, and shall be connected at the upper end with the Croton water, and at the lower end with the street sewer, and provided with an outlet at the lowest point and on the bottom, so as to admit of the complete discharge of the contents, and of being daily flushed with water. The bottom thereof shall be so inclined that the lowest point at the outlet shall be at least six inches below the lowest point at the opposite end."

In these privy sinks the hopper and trough are all in one piece. They are similar in principle of construction to the trough-closets

above noticed. They are very moderate in price, one with two holes costing about $15.00; with three holes, $20.00; and so in proportion.

Some places, such as factories on the course of our largest rivers, may be so favourably situated as to allow of troughs with a continuous stream; but extreme vigilance, as regards outfall, must be exercised in connection with this practice. Numerous cases of drinking-water polluted by excrementitious sewage have come under the notice of this and other boards.

Urinals.—Urinals become offensive for want of proper provision for preventing the incrustation of them with deposits from the urine, and of proper means of frequently cleansing or removing surfaces which collect the droppings. A tray of ashes or saw-dust in front of, and beneath, the urinal will meet this latter requirement, the contents of the tray being frequently changed. For the first mentioned cause of offensiveness, it seems necessary to have a flow of water washing the urinal, whilst in use. Disinfectant contrivances should also be used.

Intercepting Tanks.—In many places where the natural facilities for outfall are not very good, the mixed contents of sewers are received into tanks, the solid portions allowed to settle, the liquid portion removed and disposed of in the methods described in connection with liquid refuse in the first part of this work, and the solid settlings also removed, mixed with earth, ashes or chemicals, and used for manure

TREATMENT OF THE DROWNED.

(No. 11.) Issued by Provincial Board of Health of Ontario.

RULE 1.—Proceed *at once* to employ means to restore breathing. Do not delay this in order to procure shelter, warmth, stimulants, etc.

RULE 2.—*Remove all obstructions to Breathing.*—Instantly loosen or cut apart all neck and waist bands ; turn the patient on his face, with the head lower than the feet ; stand astride the hips, with your face towards his head, and, locking your fingers together under his

belly, raise the body as high as you can without lifting the forehead off the ground, and give the body a smart jerk, to remove mucus and water from the mouth and windpipe. Hold the body suspended long enough to slowly count one, two, three, four, five, repeating the jerk more gently two or three times.

RULE 3.—Next place the patient on his back on a flat surface, inclined a little from the feet upwards, raise and support the head and shoulders on a firm cushion or folded article of dress, placed under the shoulder blades. Cleanse the mouth and nostrils, open the mouth, draw forward the patient's tongue, securing it there either by holding it with the fingers, or by a piece of string or an elastic band placed over it and under the chin.

RULE 4.—Grasp the patient's arms just above the elbows, and draw them gently and steadily upwards until they meet above the head. (This is for the purpose of drawing air into the lungs.)

Keep the arms in this position for two seconds, then turn them down and press them gently and firmly for two seconds against the sides of the chest, pressing at the same time on the breast and abdomen. (This is with the object of pressing air into the lungs.)

Pressure on the breast-bone and abdomen by an assistant will aid this action.

Repeat the measures alternately and deliberately until a spontaneous effort to breathe is perceived, immediately upon which cease to imitate the movements of breathing, and proceed to induce circulation and warmth.

RULE 5.—*To excite Respiration.*—During the employment of the above methods excite the nostrils with snuff or smelling-salts, or tickle the throat with a feather. Rub the chest and face briskly, and dash cold and hot water alternately upon the patient.

Do not be too soon discouraged. Remember that at any time within two hours your efforts may be successful.

RULE 6.—*To induce circulation and warmth.*—After breathing is commenced wrap the patient in warm blankets, and apply bottles of hot water, hot bricks, or anything to restore heat.

Warm the head nearly as fast as the body, lest convulsions should be induced. Rubbing the body with warm cloths, or with the hands, and slapping the fleshy parts may assist to restore warmth and breathing.

If the patient can swallow *with safety* give him hot coffee, tea, milk or spirits. Allow the patient to have abundance of fresh air.

HINTS TO WHARF OWNERS, AND TO OTHER PERSONS RESIDING NEAR THE WATER.

Keep a coil of rope and pieces of boards in some convenient place, ready for immediate use.

TO PERSONS WHO CANNOT SWIM.

If you get into water beyond your depth do not plunge, struggle, nor throw your hands and arms out of the water. "Tread water" in the erect position, by moving the feet up and down, at the same time slowly paddling with the hands, keeping them under water. If any person approaches to rescue you preserve your presence of mind and do not grasp him; do what he tells you. If any small object of support be thrown to you, place it under your chest or arm-pits, and do not struggle to raise yourself out of the water; your head will not go under if you follow these directions; and you may keep your mouth and nose above water long enough for assistance to arrive. By considering these directions carefully *now*, you will be less apt to lose your presence of mind should occasion arise for acting on them.

Parents should have their children taught to swim. Many deaths might be thereby averted.

N. B.—In *Suffocation by Smoke or any Poisonous Gas*, as also in cases of *Hanging or Choking*, proceed in the same way as in drowning seeing that no obstruction exists in the mouth and throat, but omitting the efforts to expel water, etc., from the lungs.

ADDENDA.

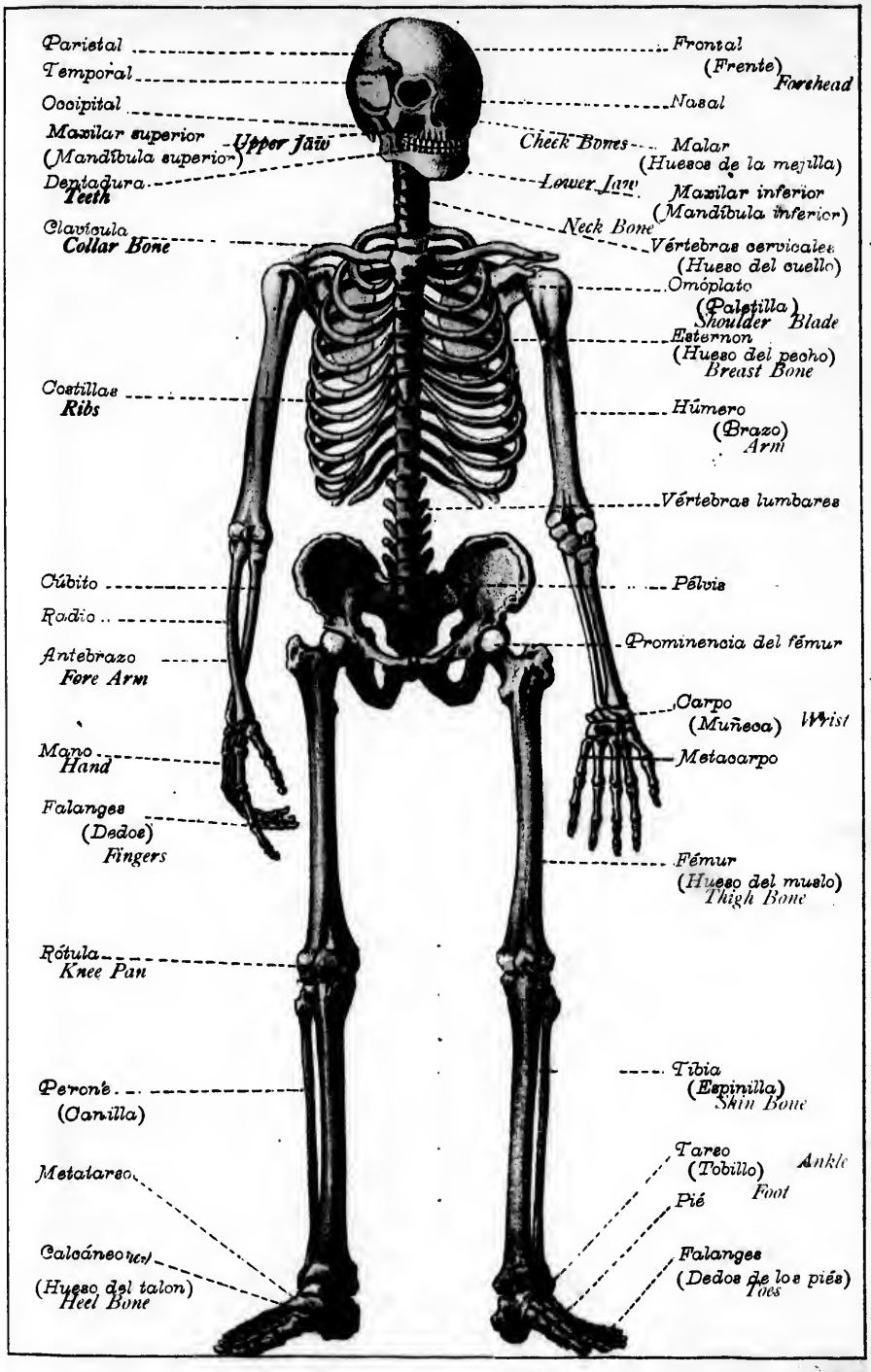
ANATOMY AND PHYSIOLOGY.

THE health of the human body depends upon the natural performance of function, by the various organs of which it is composed. Hence, in a work of this kind, devoted to a study of the prevention and cure of disease, a brief account of the anatomy and physiology of the body is necessary, in order that the derangements of its component parts may be understood.

Before describing the structure and functions of the various organs, it will be well to considered the tissues which enter into their formation. Thus we have connective tissue, bone tissue, muscular tissue, and epithelial tissue. Blood and lymph, the two fluid tissues, will be described later.

According to the cell doctrine, all tissues are developed from cells, or small bodies of living matter called *protoplasm;* these contain a *nucleus* (that is, a living centre) and at times a *nucleolus*, or smaller spot within the nucleus. These cells in the body are held in a basis substance which may be structureless, or striped, and grow by subdivision, each portion being a living cell and having a nucleus. The connective-tissue group, which includes bone and cartilage, has a common cell, which is also the starting point of various tumors.

Connective tissue (areolar or cellular tissue) is found throughout the whole body, and binds its various parts together; it forms the foundation of all organs, blood-vessels and nerves, the sheaths of the muscles (fasciæ), the covering of bone (periosteum), the ligaments and tendons. It is composed of two kinds of fibrous tissue; the *white fibrous tissue*, which is made up of fine wavy interlacing fibres, and the *yellow elastic fibrous tissue*, which is made of larger fibres, which branch and join each other. These two kinds are united in varying proportions throughout the body, forming structures varying from a delicate film to a thick dense tendon. Connective tissue is supplied with blood-vessels and nerves, and its function is to unite the different parts of the body into one compact whole.



A subdivision of connective tissue is *adipose* or fatty tissue, which consists of a growth of small sacs containing fat bound together by connective tissue and small blood-vessels.

FIG. 1.

FIG. 2.

FIGURE 1.—White fibrous tissue.
FIGURE 2.—Yellow fibrous tissue.

Cartilage, which is the familiar gristle, is a structure without blood-vessels and nerves, containing cells lying in a dense substance, which on boiling becomes jelly-like, resembling glue. It gets its nourishment from the connective tissue incasing it, and in the joints from the blood-vessels of the bones. There are three kinds — *fibrous*, *hyaline*, and *elastic* cartilages. These are found chiefly in the joints, but also in the nose, ear, and the air-tubes of the chest.

Permanent cartilage is that cartilage which remains during adult life, in contradistinction to *temporary* cartilage, from which all the bones are at first formed. The function of cartilage is to render the surfaces of the joints smooth, and by its elasticity to prevent shock. In the air-tubes it prevents collapse by rendering them rigid.

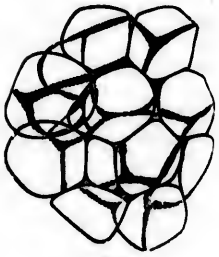


FIG. 3.

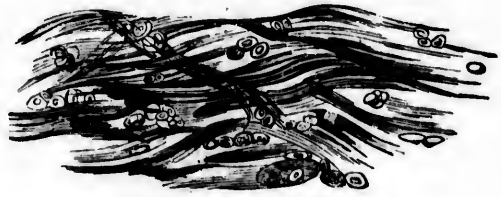


FIG. 4.

FIGURE 3.—Fat vesicles.
FIGURE 4.—Fibrous cartilage. From the Symphysis Pubis. Magnified.

Bone is the hardest tissue in the body. It consists of one-third organic, or living matter, and two-thirds earthy matter, consisting principally of phosphate and carbonate of lime, with some magnesium and iron. Fresh bone is of a pinkish hue externally, and reddish within; it

is covered externally by a membrane of connective tissue, the *periosteum*, and internally by another, the *endosteum*, from both of which it receives a large part of its nourishment.

The shafts of the long bones, and the exterior layer of the flat bones, are made up of compact bony tissue, while the ends of the long bones, and the interior of the flat bones, are *cancellated*, that is, built up of a loose meshwork of bony arches, which add greatly to their strength and lightness. The shafts of the long bones are hollow, being filled with marrow, and giving passage to the blood-vessels; this arrangement not only increases their lightness but also their strength, a hollow column being stronger than a solid one of the same weight.

Bone is developed from temporary cartilage; the cartilage corpuscles of which we have spoken arrange themselves into rows, loops of blood-vessels project into the cartilage, the living matter in the corpuscles

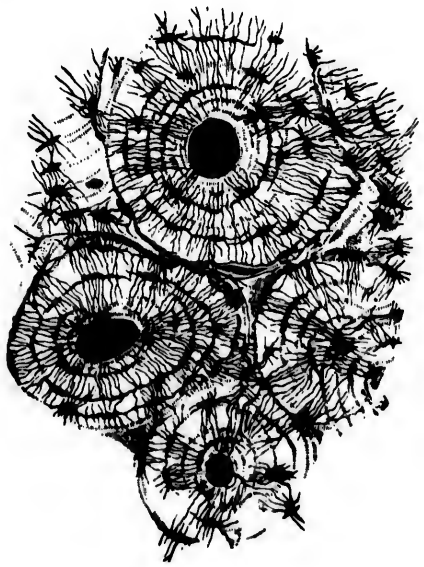


FIGURE 5.—Transverse section of bone. Magnified. Showing Haversian canals, lacunæ, and canaliculi.

begins to deposit earthy salts in their vicinity, and they become bone corpuscles, enclosed in cavities, the *lacunæ*, but united by little prolongations of living matter running in small bony canals, the *canaliculi*.

The lacunæ are arranged in concentric circles around a blood vessel which forms the centre of their system, and which runs in a large bony canal, the *Haversian canal.* In cancellated bone the corpuscles are found in the bony plates.

The process of ossification begins at one or more points in the bones before birth, and is a slow process, not being completed in all the bones until after the twentieth year. In old persons the brittleness of the bones is due to the obliteration of some of the blood-vessels, and the death of some of the bone corpuscles depending upon them for nourishment, thus diminishing the amount of living matter.

Muscular tissue consists of two kinds, the *voluntary*, or *striped* muscles, or muscles of animal life, and the *involuntary* or *smooth* muscles, the muscles of *organic* life. The voluntary muscles make up about two-fifths of the body, encasing the bones and giving shape to the figure. They are composed of bundles of fibres enclosed in a delicate sheath of connective tissue, these in turn consisting of smaller bundles, until we get down to the smallest bundles, called the *primitive fasciculi*, which average about $\frac{1}{700}$ inch in breadth and varying in length; the fasciculi are

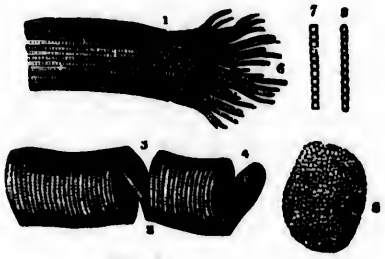


Fig. 6

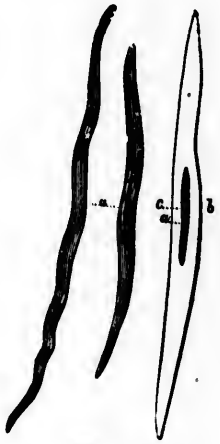


Fig. 7.

Figure 6.—Striped muscle. 1. Longitudinal cleavage; 2, 3, 4, transverse cleavage; 5, a detached disk; 7, 8, separate fibrillæ.

Figure 7.—Smooth muscle.

traversed by fine parallel lines about $\frac{1}{3000}$ inch apart, and are composed of primitive fibrils, which consist of a single row of disks measuring $\frac{1}{18000}$ inch in thickness.

The voluntary muscles are, with the exception of those of the heart, gullet, and some others, under the control of the will, and contract quickly and strongly.

The *involuntary* muscles are independent of the will, and are found in the intestines, bladder, the generative organs, lungs, blood-vessels, some glands, and in the skin. They contract more slowly and feebly than the striped muscles, are paler, and are composed of spindle-shaped, flattened fibres, in which an elongated nucleus is seen, these fibres being about $\frac{1}{3000}$ inch broad and $\frac{1}{300}$ inch long.

Within a few hours after death the muscles become rigid, giving rise to the well-known stiffness of a corpse; when this rigidity passes away, putrefaction has begun.

The structure of the nerves, blood-vessels and skin will be described later.

One or more layers of cells, called *epithelium*, cover all the surfaces of the body, both external and internal. Their purpose is both protection and secretion; thus in the skin, where they are called *epidermis*, being reproduced as fast as they are destroyed by friction, they protect the nerves and blood-vessels from injury; in the intestinal mucous membranes and glands they secrete a fluid from the blood for the purpose of digestion. In the nose, throat and lungs, they keep the surface lubricated by a fluid, and thus preserve an equable temperature. In the serous membranes they maintain a perfectly smooth surface. In all excreting and secreting glands they are the agency which selects the special substance from the blood.

FIGURE 8. — Pavement epithelium.

Epithelium is divided into several varieties. *Pavement*, or flat epithelium, is composed of flat scales, with nuclei of varying size. This variety is found in the skin, in the serous membranes, lining the blood-vessels and many ducts.

Columnar epithelium, consisting of conical cells laid side by side, their ends forming the surface of the membrane, is found in the stomach, intestines and elsewhere.

FIGURE 9.—Columnar epithelium lining gland.

Spheroidal epithelium is circular, and filled with granules. This lines the kidney, ureter and bladder, and all the secreting glands. When the surface of the cell is covered with long waving hair-like projections it is called *ciliated epithelium*. This is found in the air-passages, Eustachian and Fallopian tubes, and upper part of uterus, the object of

FIGURE 10.—Ciliated epithelium.

the ciliæ (eye-lashes) being by their waving to carry the secretions away.

Epithelium, besides covering the skin of the body, enters into the formation of three kinds of membranes, viz., serous, synovial and mucous, and also of various kinds of glands.

Serous membranes are closed sacs, consisting of a layer of flat epithelium upon a structureless membrane, beneath which is a layer of connective tissue carrying blood-vessels, nerves, etc. They secrete a thin watery fluid, which in dropsy is enormously increased, forming great sacs. Their function is to encase important organs and prevent friction. Certain of them will be described later.

Synovial membranes are constructed in a similar manner to serous, but their secretion is thicker. They are found in all the movable joints and keep them lubricated.

Mucous membranes line all the cavities in the body which communicate with the external air. They are more complex in structure than the two others. The epithelium is of different kinds, and is supported by a basement membrane, resting upon connective tissue, in which are great numbers of blood-vessels, nerves and glands. These glands secrete a thin glairy fluid like the white of egg (*mucus*), in sufficient quantities to keep the membrane moist and carry off the deceased cells.

In inflammation of mucous membranes it is the increase of this fluid and of dead cells, which gives rise to the discharge which is so familiar in catarrhs of the nose, throat and bowels. When the discharge becomes yellow and thick, it is because the inflammation has destroyed the epithelial covering, and penetrated the connective tissue below.

Secreting glands are theoretically formed by a turning in of the mucous membrane, so as to bring more surface in contact with the capillary blood-vessels. Their function is to secrete; that is, separate out some substance from the blood. They vary in size from the liver, which weighs four pounds, to the little mucous glands, which are hardly perceptible. Their structure may be simply an open tube, as in the peptic glands of the stomach, or branches may project from the bottom forming a racemose gland.

The so-called lymphatic glands and spleen will be taken up with the lymphatic system.

There is another class of glands which have no connection with the above, the *ductless glands;* they are the *supra renal capsule*, the

thyroid and *thymus* glands. Of their physiology little is known, and they will simply be mentioned later in connection with certain diseases.

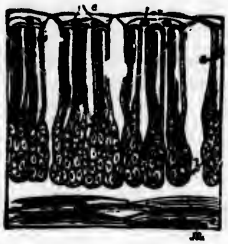


FIGURE 11.—Simple gland.

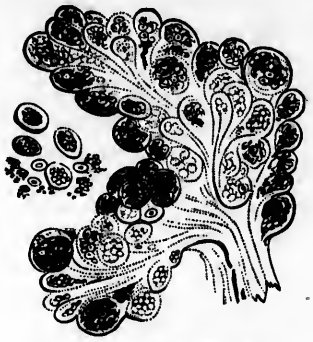


FIGURE 12.—Racemose gland.

Pigment is deposited in the body in the form of granules. To its presence in the deep layer of the skin is due the difference of color in the different races, and even in the different individuals. Tan and freckles are due to a similar deposit caused by the irritation of the sun's rays.

THE BONES.

The bony skeleton forms the framework of the body. Bones are divided into long, short, and flat bones. The long bones consist of a hollow shaft of compact bone, and two broader extremities of cancellated bone. They are found in the extremities, and form levers, by which the trunk is moved. Short bones are placed where strength is more necessary than mobility, as in the palm of the hand, and foot: their structure is spongy, covered by a thin layer of compact bone.

The flat bones are found in situations where protection of important organs is necessary, as in the skull, breast-bone, and shoulder-blades. They consist of two tables of compact bone, filled in with cancellous bone tissue. In the skull this tissue, lying between the

plates, is called the *diplœ*. Certain bones do not belong entirely to either class, and hence are called mixed bones.

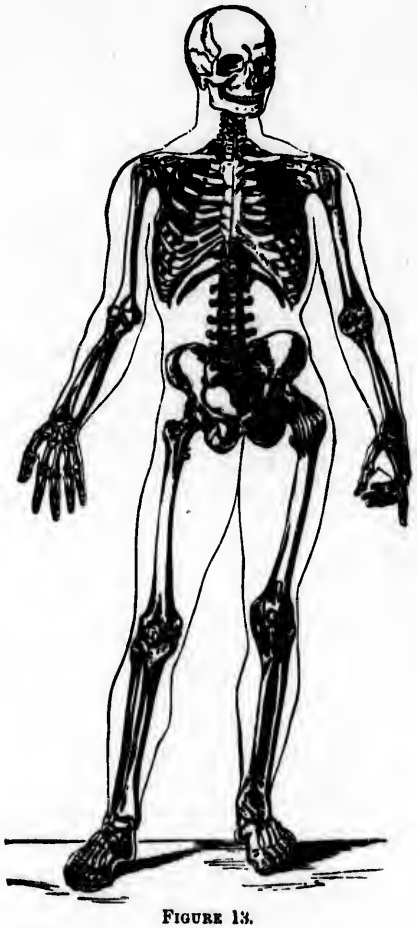


FIGURE 13.

There are in the adult human skeleton, exclusive of the teeth and the small irregular bones which sometimes develop in the sinews (tendons), 206 separate bones. These are:

In the spinal column	26
In the skull	8
In the face	14
Little bones of the ear	6
Ribs, breast-bone and hyoid bone	26
Upper extremity	64
Lower extremity	62

THE SPINE.

The spine is a flexible column made up of bones called *vertebræ*. It is divided as follows: Seven cervical, twelve dorsal, five lumbar, five sacral and four coccygeal vertebræ. The five sacral vertebræ unite into one bone, the sacrum, and the four coccygeal into another, the coccyx.

A *vertebræ* consists of a solid portion in front, the body, and an arch behind. The bodies piled

FIG. 14.

FIGURE 14.—Lateral view of the spinal column; 1, atlas; 2, dentata; 3, seventh cervical vertebra; 4, twelfth dorsal vertebra; 5, lumbar vertebra; 6, first piece of sacrum; 7, last piece of sacrum; 8, coccyx; 9, a spinous process; 10, 10, intervertebral foramina.

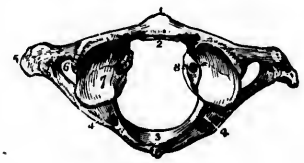


FIG. 15.

FIGURE 15.—The atlas; 1, anterior tubercle; 2, articular face for the dentata; 3, posterior surface of spinal canal; 4, 4, intervertebral notch; 5, transverse process; 6, foramen for vertebral artery; 7, superior oblique process; 8, tubercle for the transverse ligament.

one upon another form the flexible support of the trunk and head, and the arches form a hollow tube for the spinal cord. These arches are formed by two bony projections from the body, the *lamina* and *pedicles*, which unite behind, to form a spine, for attachment of the muscles of the back. From the sides of the arch spring other projections, to articulate with the vertebræ above and below, and for the attachment of muscles. The cervical vertebræ are slighter and flatter than the rest, and the spinous processes taper and project nearly horizontally. In the

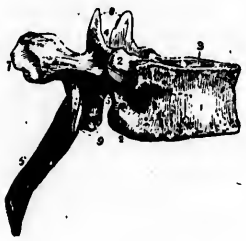


FIG. 16.

FIG. 17.

FIGURE 16.—Dorsal vertebra ; 1, the body ; 2, face for the head of a rib ; 3, superior face of the body ; 4, superior half of the intervertebral notch ; 5, inferior half of the intervertebral notch ; 6, spinous process ; 7, articular face for the tubercle of a rib ; 8, two superior oblique process ; 9, two inferior oblique processes.

FIGURE 17.—View of a lumbar vertebra ; 1, face for the intervertebral substance ; 2, anterior surface of the body ; 3, spinous process ; 4, transverse process ; 5, oblique process ; 6, a portion of the bony bridges ; 7, the spinal foramen.

dorsal region the bodies are larger and thicker, and the spinous processes are heavier and project downward. There is one or more facet on the side of each body for articulation with the ribs. The lumbar vertebræ are large, and broader than the others; the spinous processes are thick, short, and project horizontally.

The first two cervical vertibræ are peculiar, and merit special description. The first or *atlas* (see Fig. 15) has no body, and no spinous process. It consists of an anterior arch, a posterior arch and two lateral masses. The upper surface of these lateral masses is hollowed out to receive the condyles of the occipital bone of the skull, thus permitting the nodding movement of the head.

The *axis*, or second cervical vertebræ has a projection from the upper surface of its body, which is really the detached body of the atlas. The projection or odontoid process lies between the anterior arch and the lateral masses of the atlas, to which it is firmly bound

by ligaments, and permits the atlas and the head to be rotated from side to side.

The *sacrum* consists of the five sacral vertebræ welded into one bone. It is a large triangular bone, inserted like a wedge between the two haunch bones, and forms the back of the pelvis. Its anterior surface is concave and smooth, being pierced by four pairs of holes, showing where the vertebræ have united. The posterior surface is convex, and very rough for attachment of muscles. Attached to its apex, and continuing it, is the *coccyx*, so-called from having been compared to a cuckoo's beak. It consists of four pieces, forming a single small bone. The tip of the coccyx may be felt immediately behind the anus.

The vertebræ are separated by disks of fibro-cartilage and bound together by numerous ligaments. The spine, as a whole, presents two curves. The cervical and lumbar region being convex anteriorly, and the dorsal and sacral regions concave. Usually there is in the dorsal region also a slight lateral curvature toward the right side, owing to the more powerful muscular action of that side.

THE SKULL.

For convenience of description, the skull is divided into the cranium and face. The cranium is composed of bones, as follows: One occipital, two parietal one frontal, two temporal, one sphenoid and one ethmoid. The *occipital* bone forms the back and base of the skull. Internally concave, it is externally convex and rough, and marked by ridges for attachment of muscles.

At the lower part is a large oval opening, the *foramen magnum*, which lies between the condyles which articulate with the atlas. It transmits the spinal cord from the skull to the spinal canal. The internal surface of the occipital bone is divided by a crucial ridge into four depressions; which hold the cerebellum and medulla. To these ridges are attached the sinuses, into which the veins of the brain empty, and also two strong membranes of the brain. The occipital bone articulates with two parietal bones behind, with the temporal and sphenoid in front, and below with the atlas.

The two *parietal* bones form the sides and top of the cranium, they join each other on top in the median line, forming the sagittal suture, and extend from the occipital bone behind to the frontal bone in front;

below they articulate with the temporal bone. They are quadrangular, smooth externally, with a ridge across the middle for attachment of the temporal muscle.

Internally they are traversed by grooves for the meningeal artery, and have numerous depressions for the convolutions of the brain. The *frontal* bone forms the brow, extending from the bony ridges over the

Fig. 18.

Fig. 19.

Figure 18.—Front view of the skull: 1, Os frontis; 2, nasal tuberosity; 3, supraorbital ridge; 4, optio foramen; 5, sphenoidal fissure; 6, sphenomaxillary fissure; 7, lachrymal fossa; 8, opening of the anterior nares, and the vomer; 9, infra-orbital foramen; 10, malar bone; 11, symphysis of the lower jaw; 12, anterior mental foramen; 13, ramus of the lower jaw-bone; 14, parietal bone; 15, coronal suture; 16, temporal bone; 17, squamous suture; 18, great wing of the sphenoid.

Figure 19.—External view of the base of the cranium: 1, hard palate; 2, foramen incisivum; 3, palate plate of palate bone; 4, crescentic edge, 5, vomer; 6, internal pterygoid process of sphenoid bone; 7, pterygoid fossa; 8, external pterygoid process; 9, temporal fossa; 10, basilar process; 11, foramen magnum; 12, foramen ovale; 13, foramen spinale; 14, glenoid fossa; 15, meatus auditorius externus; 16, foramen lacerum anterius; 17, carotid foramen; 18, foramen lacerum posterius; 19, styloid process; 20, stylo-mastoid foramen; 21, mastoid process; 22, condyles of occipital bone; 23, posterior condyloid foramen.

eyes, back to the parietal bones; another portion extends horizontally backward, forming the roof of the orbit and the floor of the anterior lobe of the brain. The orbital plates do not join on the median line, but are filled out by the ethmoid bone. The *temporal* bone consists of a squamous, or scale-like portion, which overlaps the parietal bone at the lower part of the side of the head, and a petrous or stony portion, which fits like an irregular wedge into the base of the skull. This latter contains

the internal structure of the organ of hearing. Just in front of the opening for the ear is a depression for articulation with the lower jaw.

The *sphenoid* bone is the key-stone of cranial architecture; its shape is very irregular, and has been compared from time immemorial to a bat with extended wings. It articulates with twelve other bones, and binds the bones of the head firmly together. The *ethmoid* bone is a loose, spongy bone, lying between the orbits and the root of the nose, and helping to form each cavity.

The bones of the face are fourteen in number, viz.:

The two *nasal* bones, which form the bridge of the nose.

The two *superior maxillary* bones, which form the bony part of the cheek, the side of the nose, the floor of the orbit, and the roof of the mouth. The interior of these bones is hollow, and communicates with the nose.

The *lachrymal* bones are two small plates of bone, resembling a finger-nail, which form a portion of the wall of the orbit.

The *malar* bones form the prominence of the side of the face, uniting with the maxillary bone in front and the spur of the temporal bone behind, forming an arch, which protects the articulation of the lower jaw.

The *palate* bones are wedged in at the back of the nasal fossa (cavity), and take part in the formation of the nose, orbit, and roof of the mouth.

The *inferior turbinated* bones, assist in forming the walls of the nasal cavity.

The *vomer* forms the bony partition between the nostrils.

The *inferior maxillary* bones, or lower jaw, consist of a horizontal portion containing the teeth, and two upright portions, the *rami*. Each ramus is notched at the top, thus forming two projections. The posterior projection is rounded, and fits into the articulating cavity in the temporal bone; the anterior one is pointed, and gives attachment to the temporal muscle. The *hyoid* bone, which is suspended from the base of the skull, is shaped like the letter U, and gives attachment to many of the muscles of the tongue and throat.

THE CHEST.

The *thorax*, or chest, is an elastic box, containing and protecting the lungs and heart. It is formed behind by the bodies of the vertebræ,

in front by the breast bone, and at the sides by the ribs and their cartilages. The *sternum*, or breast bone, is a flat bone consisting of three pieces, compared to an ancient sword. The short upper piece is called the *manubrium*, or handle, the long central portion the *gladiolus*, or blade, and the small pointed extremity the ensiform, or xiphoid appendix.

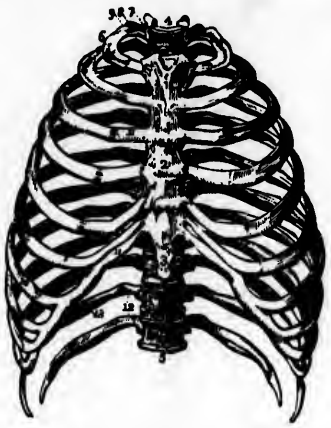


FIGURE 20.—Front view of the thorax; 1, first bone of the sternum; 2, second bone of the sternum; 3, third bone or ensiform cartilage; 4, first dorsal vertebra; 5, last or twelfth dorsal vertebra; 6, first rib; 7, its head; 8, its neck; 9, its tubercle; 10, seventh or last true rib; 11, its cartilage; 12, angle of eleventh rib; 13, its body.

The ribs are twenty-four in number, there being twelve on either side. They articulate behind with the bodies of the dorsal vertebræ, and in front by their cartilages to the sternum. They vary greatly in their size and shape, but are irregularly semi-circular in shape, and twisted slightly on themselves. They are flat antero-posteriorly, and have a *head* for articulation behind; a constriction just in front of the head, the *neck;* and a point of greatest curvature, the *angle*. The seven upper ribs unite directly by their cartilages to the sternum, and are called true ribs. The other five are called *false* ribs, the upper three being united in front to the cartilages of the upper ribs, and the last two, having no attachment in front, are called *floating* ribs. The general direction of the ribs is downward and forward.

THE UPPER EXTREMITY.

The upper extremity consists of the arm, fore-arm, and hand, and is joined to the trunk by the two bones of the shoulder, the clavicle, or collar-bone, and the scapula, or shoulder-blade.

The *clavicle* is a long bone curved like the italic letter *f*, and lies in front of the first rib. It unites with the upper border of the breast bone by its inner extremity, and by its outer enlarged end with the acromion process of the scapula.

The *scapula* forms the back of the shoulder; it is triangular in shape, the apex pointing downward. Its under surface is concave and smooth, to lie upon the ribs; its outer surface being divided by a *thick spine*, which terminates at the superior outer angle in a high projection

FIG. 21.

FIG. 22.

FIGURE 21.—Venter of scapula: 1, 1, 1, oblique ridges; 2, 2, fossa for subscapularis muscle; 3, superior border; 4, superior angle; 5, suprascapular notch; 6, coracoid process; 7, acromion process; 8, spine of scapula; 9, articular surface; 10, glenoid cavity; 11, head of scapula; 12, neck; 13, inferior border; 14, inferior angle; 15, posterior border; 16, origin of spine.

FIGURE 22.—Anterior view of humerus of the right side: 1, shaft or diaphysis; 2, the head; 3, anatomical neck; 4, greater tuberosity; 5, lesser tuberosity; 6, the bicipital groove; 7, external bicipital ridge for pectoralis major; 8, internal bicipital ridge; 9, point of insertion of deltoid muscle; 10, nutritious foramen; 11, face for head of the radius; 12, face for the ulna.

which overhangs the shoulder; the *acromion* process. Beneath this process, the upper angle is hollowed out to form a smooth cup-shaped depression; the socket of the shoulder joint. In front of this depression is a short, sharp prominence, *coracoid* process.

The *humerus*, or arm bone, consists of a long cylindrical shaft, having above a rounded head for articulation with the shoulder blade, and

a broad flattened lower extremity, which consists of an enlargement on either side called a *condyle*, and between them a depression crossed by a ridge, for articulation with the two bones of the forearm.

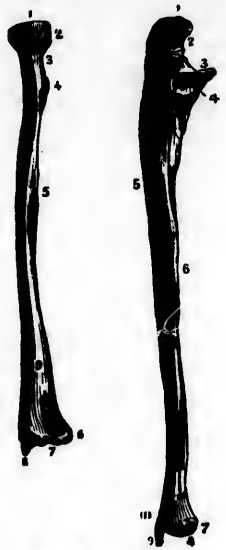


Fig. 23.

Fig. 24.

Figure 23.—Anterior view of radius of right side; 1, cylindrical head; 2, surface for lesser sigmoid cavity of the ulna; 3, neck of the radius; 4, its tubercle, for insertion of biceps muscle; 5, interosseous ridge; 6, concavity for lower end of the ulna; 7, carpal surface; 8, styloid process; 9, surface for pronator quadratus muscle.

Figure 24.—Anterior view of ulna of the left side: 1, olecranon process; 2, greater sigmoid cavity; 3, coronoid process; 4, lesser sigmoid cavity; 5, external surface; 6, ridge for interosseous ligament; 7, small head for the radius; 8, carpal surface.

The two bones of the forearm are the *ulna* and *radius*. The *ulna* lies on the inner side of the forearm, when the arm is straight, and the palm of the hand points upward. It has a large upper extremity, which articulates with the humerus by a hinge joint; it has two processes, the *olecranon*, which is situated behind, and forms the prominence of the elbow, the end of it fitting into a depression in the humerus when the forearm is straightened, and in front the *coronoid* process, which fits into the surface between the condyles, and strengthens the joint. The lower end of the ulna is small, and does not articulate with any bone of the wrist. The *radius* lies on the outer side of the forearm; it is small above, having a rounded head, which articulates with the outer condyle by a cup-shaped depression. The rounded edge of the head articulates with the side of the head of the ulna, and is firmly bound to it by a sling-like ligament, which allows this head of the bone to rotate. Below the head is a constriction, the neck. The lower extremity is larger, and articulates with the bones of the wrist; its lower surface being hallowed out to receive them.

Flexion and extension of the forearm are due to the hinge joint of the ulna and humerus, but the rotation of the hand is allowed by the slinging of the round head of the radius, which allows the lower end of that bone to cross the lower end of the ulna, thus turning the palm down. When the palm is held upward, the two bones are nearly parallel.

The wrist or *carpus* is made up of eight small bones, arranged in two rows. The first row, counting from the radial side, are the scap-

hoid, semilunar, cuneiform, and pisiform bones; those of the lower row are the trapezium, trapezoid, os magnum and unciform bones. The body of the hand is made up of five long cylindrical bones, the *metarcarpal* bones. The lower extremities of these bones form, with the heads of the phalanges, the prominences of the knuckles. The fingers are formed by small bones, the *phalanges:* there being two for the thumb and three for each finger.

FIGURE 25. — Articulations of bones of the carpus: 1, ulna; 2, radius; 3, interarticular fibro cartilage; 4, metacarpal of thumb; 5, metacarpal of first finger; 6, metacarpal of second finger; 7, metacarpal of third finger; 8, metacarpal of fourth finger; S, scaphoid; L, lunar; C, cuneiform; P, pisiform; T, T, trapezium and trapezoid; M, magnum; U, unciform.

THE LOWER EXTREMITY.

The lower extremity consists of three parts, the thigh, the leg, and the foot, and is united to the trunk by the *os innominatum*, or haunch bone, which bears the same relation to the lower extremity that the bones of the shoulder do to the upper.

The os innominatum is a large, flat irregular bone, composed of three parts, which unite in the adult to form one bone. These bones are the ilium, the ischium, and the pubis.

FIGURE 26.—Anterior view of the male pelvis.

The ilium is the broad upper expanded portion which forms the prominence of the hip. The ischium forms the lower portion of the haunch, and ends in an enlargement or *tuberosity* upon which we sit. The pubis is situated in front, and consists of two arms, the upper one running upward and backward to join the ilium at its junction with the ischium, and the lower one running downward and backward to join a similar arm or *ramus*, sent up by the ischium. Between these arms is a large oval opening, the *obturator foramen*, which is covered during life by a membrane.

FIGURE 27. — Posterior view of the femur: 1, depression for round ligament; the head; 3, depression for rotary muscles; 4, trochanter major; 5, trochanter minor; 6, roughness for gluteous maximus tendon; 7, 7, linea aspera; 8, surface for gastrocnemius muscle; 9, external condyle; 10, depression for anterior crucial ligament; 11, depression for posterior crucial ligament; 12, origin of internal lateral ligament.

At the junction of the three bones, in the strongest part of the haunch, is a deep cup-shaped depression, the *acetabulum*, in which the head of the hip bone rests. The two haunch bones articulate in front with each other, and behind with the sacrum, which fits between them like the key-stone of an arch. These three bones form a solid bony ring, the *plevis*, which supports the trunk upon the limbs. In the female the pelvis is of especial importance, for through it the child has to pass to get into the world.

The thigh bone, or *femur*, is the largest and strongest bone in the skeleton. It consists of two extremities and a long cylindrical shaft with a rough ridge running down the back for attachment of muscles. The upper extremity consists of a head and neck. The head is globular and smooth, and fits into the acetabulum, there being a slight depression in its centre, from which a round ligament passes to a similar depression in the socket. The neck joins the shaft at an obtuse angle, and at their junction is a rough mass of bone with two projections, the *greater* and *lesser trochanters*, the former being the prominence which is felt over the hip immediately beneath the skin.

The lower extremity is larger than the upper, being divided into two lateral enlargements, the *condyles*, separated by a groove. The inner condyle is the larger, and lower, but as the femur hangs obliquely, in the erect position they are about on a level. The articulating sur-

face is smooth, and forms a hinge joint with the principal bone of the leg, the tibia. This surface is extended up in front to articulate with the patella, or knee pan, which is a small triangular flat bone, developed in the tendon of the great muscles of the front of the thigh, and serves to protect the joint and increase the leverage.

Fig. 27*a*

28

Figure 27.—Anterior view of the tibia ; 1, spinous process ; 2, surface for condyles of the femur ; 3, face for head of the fibula ; 4, the head ; 5, the tubercle ; 6, 6, spine and shaft of the bone ; 7, internal malleolus ; 8, process for internal lateral ligament of the ankle ; 9, tarsal surface ; 10, face for lower end of fibula.

Figure 28.—The fibula ; 1, head ; 2, articular face ; 3, insertion of external ligament ; 4, shaft ; 5, 5, external face ; 6, interosseous ridge ; 7, face for lower end of tibia ; 8, malleolus externus ; 9, tarsal surface.

The leg has two bones, the *tibia* or shin-bone, and the *fibula*. The tibia is the larger and stronger of the two. Its upper extremity is enlarged, having a tuberosity on either side. In front there is an elevation called the *tubercle*, to which the tendon from the patella is attached. The broad, flat, upper surface articulates with the femur. The shaft is triangular, having a sharp edge in front, which may be felt through the skin ; the lower extremity forms the inner part of the ankle joint, and extends past the joint to form the inner *malleolus*, which is felt at the side of the ankle.

The *fibula* is a long, slender, splint-like bone, lying on the outer side of the leg. Its head lies against the outer side of the head of the fibula, and its lower extremity forms the outer side of the ankle joint ending in the *external malleolus*.

FIGURE 29.—Upper surface of the left foot; 1, astragalus; 2, its anterior face; 3, os calcis; 4, navicular, or scaphoid; 5, internal cuneiform; 6, middle cuneiform; 7, external cuneiform; 8, cuboid bone; 9, 9, metatarsal bones; 10, first phalanx of the big toe; 11, second phalanx of the big toe; 12, the first, 13, second, and 14, third phalanges of the other toes.

The skeleton of the foot consists of three divisions; they are the *tarsus*, the *metatarsus* and the *phalanges*. The seven bones of the tarsus are the *calcaneum* or *os calcis*, which forms the projection of the heel, the *astragalus*, which articulates with the bones of the leg, the *cuboid*, *scaphoid*, and three *cuneiform* bones, which form the bulk of the body of the foot. The five *metatarsal* bones run forward from the cuneiform bones and the cuboid, and correspond to the metacarpal bones of the hand. The first metatarsal bone is the largest and shortest, its articulation with the first phalanx of the great toe forming the prominence on the inner side of the foot, which is so often the seat of inflammation, causing what is known as a bunion. The *phalanges* of the foot are similar to those of the hand, there being two for the great toe, and three for each of the other toes.

THE JOINTS

The various bones of the skeleton are connected together, and such connection is called a *joint*, or *articulation*. Joints may be *immovable*, as in the bones of the skull; *movable*, as in most of the joints of the limbs; or *mixed* joints, where the ends of the bones are separated by fibro-cartilage, and slight movement is allowed, as in the articulation of the bones of the pelvis. The movable joints again are divided into gliding joints, hinge, and ball and socket joints. The elements of a movable joint are a covering of cartilage over the opposing end of the articulating bones, numerous ligaments or bands of fibrous tissue, which unite them and inclose the joint, the whole being lined by a *synovial* membrane, which secretes a thin fluid to lubricate the joint.

FIG. 30.

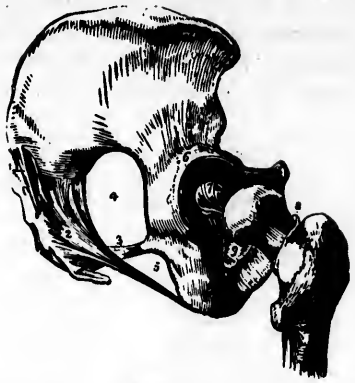


FIG. 31.

FIGURE 30.— Ligaments of acromio-clavicular and scapulo-humeral articulations: 1, superior acromio-clavicular ligament; 2, coraco-clavicular ligament; 3, coraco-acromial ligament; 4, coracoid ligament; 5, capsular ligament of the shoulder joint; 6, ligamentum adscititium, or coraco-humeral ligament; 7, tendon of long head of the biceps muscle.

FIGURE 31.—Ligaments of the hip-joint and pelvis: 1, posterior sacro-iliac ligament; 2, greater sacro-sciatic ligament; 3, lesser sacro-sciatic ligament; 4, greater sacro-sciatic notch; 5, lesser sacro-sciatic notch; 6, cotyloid ligament around the acetabulum; 7, ligamentum teres; 8, line of attachment of the capsular ligament of the hip-joint, posteriorly; 9, obturator ligament.

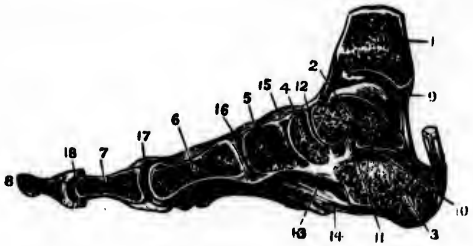


FIGURE 32.— Vertical section of the ankle-joint and foot: 1, tibia; 2, astragalus; 3, os calcis; 4, scapholdes; 5, cuneiform internum; 6, metatarsal bone of the great toe; 7, first phalanx of the great toe; 8, second phalanx of the great toe; 9, articular cavity between the tibia and astragalus; 10, synovial capsule between astragalus and calcis; 11, calcaneo-astragaloid interosseous ligament; 12, synovial capsule between astragalus and scapholdes; 13, calcaneo-scaphoid ligament; 14, calcaneo-cuboid ligament; 15, synovial capsule between scapholdes and cuneiform internum; 16, synovial capsule between cuneiform internum and first metatarsal bone; 17, metatarso-phalangeal articulation of the great toe, with the sesamoid bones below; 18, phalangeal articulation of the great toe.

It will not be necessary to describe the individual joints, as reference has been made to them in connection with the description of the

bones. When a bone is dislocated, or "put out of joint," the articulating end has been forced through the ligaments holding it in place, thus for the time being destroying the mobility of the joint.

THE MUSCLES.

The muscles are attached to the bones, ligaments, cartilages and skin; they vary much in size and shape. In some the bundles of fibres

FIGURE 33.—Muscles, back view: The fascia is left upon the left limbs, removed from the right.

are arranged parallel, in others they spread out fanshape. They are attached by fibrous cords, the *tendons*, or by broad fibrous bands, the *aponeuroses*. The end of the muscle which has the firmer attachment is

FIGURE 34.—Muscles, front view : On the right half, the superficial muscles ; left half, deep-seated muscles.

called its *origin*, the other end its *insertion;* this is, as a rule, merely relative, as in most cases the muscles act from either extremity; for instance, the sterno-cleido-mastoid, the muscle which forms the promi-

nent cord at either side of the neck, has its origin from the top of the breast bone and end of the collar bone, and its insertion into the bony prominence of the skull, behind the ear; its action is to bow the head and turn the face to the opposite side; but if the head be fixed, it serves to raise the ribs, and is thus an accessory muscle of respiration.

FIGURE 35.—The arteries of the face and head: 1, common carotid; 2, internal carotid; 3, external carotid; 4, occipital artery; 5, superior thyroid artery; 6, trapezius; 7, lingual artery; 8, sterno-mastoid; 9, facial artery; 10, temporal artery, dividing into anterior and posterior branches; 11, submental branch; 12, transverse facial artery; 13, inferior labial branch; 15, inferior coronary branch; 17, superior coronary branch; 19, lateral nasal branch; 21, angular branch

Of the numerous small muscles of the face, it is not necessary to speak here; as a rule they arise from the bones of the face, and are inserted into the skin, by their mobility giving expression to the countenance.

The muscles of the orbit will be taken up in connection with the description of the eye. The muscles of mastication are the *temporal*,

masseter, the two *pterygoids* and the *buccinator*. The temporal arises from the side of the head above the ear, and is inserted into the anterior projection at the top of the lower jaw-bone. The masseter runs from the bony process external to the orbit to the angle of the jaw, and forms the hard mass felt in the cheek when the jaw is tightly closed.

The *pterygoids* arise from the sphenoid bone at the base of the skull, and are attached to the ascending portion of the lower jaw. The buccinator is a broad, flat muscle, which forms a thin muscular lining for the whole cheek.

The muscles of the neck, aside from those of the larynx, which will be spoken of later in connection with the diseases of the throat, need not be described, with the exception of the *sterno-cleidomastoid*, which runs from the top of the breast bone to the bony prominence behind the ear; paralysis of one of these muscles causes the face to be drawn to the paralysed side by the action of the opposite muscle.

The muscles of deglutition are the constrictors of the pharynx, which encircle the gullet, and a number of small muscles which run from the base of the skull and the hyoid bone to the tongue and the gullet.

The muscles of the back are laid in layers, and are very numerous. It will be sufficient to describe the superficial layer consisting of the *trapezius* and *latissimus dorsi*. The trapezius is a flat triangular muscle, arising from the occipital bone and a strong ligament—the *ligamentum nuchæ*, the last cervical and all the dorsal vertebræ, and is inserted into the outer end of the collar bone and the spine of the shoulder-blade; these two muscles together form a figure resembling a trapezoid; their action is to draw the shoulder upward and backward.

The *latissimus dorsi* covers the lower part of the back and sides; it arises from the lower six dorsal, and all the lumbar and sacral vertebræ, the ilium and the three lower ribs; running up from this origin, it is inserted by a flat tendon into the humerus just below its head. It forms the posterior border of the armpit, and its action is to draw the arm inward, downward, and backward. The muscles which form the abdominal wall unite along the middle line in a thick, fibrous band, called the *linea alba*, or white line; along either side of it, running from the breast bone down to the pubis, lie the two *recti* muscles.

The remainder of the side and front of the wall is made up of three layers of muscles which unite in a broad aponeurosis, joining its fellow of the opposite side, and these muscles are, from without inward, the external oblique, internal oblique and transversalis.

The *external oblique* arises from the eight lower ribs, and running forward and downward, is inserted into the crest of the ilium and os

FIGURE 36.—Second layer of muscles of the back: 1, trapezius; 2, a portion of the tendinous ellipse formed by the trapezius on both sides; 3, spine of scapula; 4, latissimus dorsi; 5, deltoid; 6, infra-spinatus and teres minor; 7, external oblique; 8, gluteus medius; 9, gluteus magnus; 10, levator scapulæ; 11, rhomboideus minor; 12, rhomboideus major; 13, splenius capitis; 14, splenius colli; 15, portion of origin of latissimus dorsi; 16, serratus inferior posticus; 17, supra-spinatus; 18, infra-spinatus; 19, teres minor; 20, teres major; 21, long head of triceps extensor cubiti; 22, serratus major anticus; 23, internal oblique.

pubis below, the aponeurosis being interlaced with its fellow from the opposite side. That portion which runs from the spine of the ilium to the os pubis forms a thickened cord called *Poupart's ligament*, a structure of importance in connection with hernia or rupture.

Just above the insertion of the muscle, and resting on Poupart's ligament is a split in the muscles which gives passage to the spermatic cord and vessels going to the testicle, and through this ring certain forms of rupture pass.

The *internal oblique* runs in the opposite direction ; arising from the crest of the ilium and Poupart's ligament, the inner fibres run horizontally to the linea alba, the outer ones directly upward and inward, to be inserted into the four lower ribs ; while those arising from Poupart's ligament are inserted with the tendon of the transversalis muscle into the pubic bone. The *transversalis,* lying beneath the internal oblique, arises from Poupart's ligament, the crest of the haunch bone, the cartilages of the six lower ribs and the lumbar vertebræ ; running horizontally across the belly, it is inserted into the pubic bone, the tip of the breast bone, and into the aponeurosis of its fellow from the opposite side.

The muscles of the chest may be divided into those which move the upper extremity, and those of respiration. The muscles of respiration are the intercostals which lie in two layers between the ribs, the external layer rising the ribs, and the internal layer depressing them.

The main muscle of respiration is the *diaphragm,* which forms the separation between the cavities of the chest and abdomen ; it is in the form of a vaulted dome, arising from the spine, the ribs and their cartilages ; it forms a central tendon in the shape of a trefoil. Through it are openings for the passage of the gullet, the large blood-vessels and nerves. In contracting it shortens its vault, and thus enlarges the cavity of the chest, causing the lungs to expand by negative pressure. In vomiting, defecation, and expulsion of the child during labor, it is an accessory force.

The *serratus magnus,* the *latissimus dorsi,* and the *pectoral* muscles are all accessory muscles of respiration.

The muscles of the upper extremity, include those arising from the chest as well as those of the shoulder, arm, forearm and hand.

The *great pectoral muscle* arises from the collar bone, the cartilages of all the true ribs, and from the aponeurosis of the external oblique muscle ; from this broad origin the fibres converge, being twisted slightly, to be inserted into the humerus just below its neck ; its action is to draw the arm across the chest. Its lower border forms the anterior margin of the arm-pit. It is assisted in its action by the small pectoral which lies beneath it.

The *deltoid* muscle forms the prominence of the shoulder ; it arises from the outer part of the collar bone, and from the spine and acromion process of the shoulder-blade, to be inserted by a thick tendon into a prominence on the outer side of the shaft of the arm bone. Its action is to raise the arm from the side ; in this it is assisted by the *supraspinatus,* a muscle arising from the upper portion of the back of the

FIGURE 37.—Superior muscles of the upper front of the trunk: 1, sterno-hyoid; 2, sterno-cleido-mastoid; 3, sterno-tyroid; 4, sterno cleido-mastoid; 5, edge of the trapezius; 6, clavicle; 7, clavicular origin of the pectoralis major; 8, deltoid; 9, fold of pectoralis major on the anterior edge of the axilla; 10, middle of the pectoralis major; 11, crossing and interlocking of fibres of the external oblique of one side with those of the other; 12, biceps flexor cubiti; 13, teres major; 14, serratus major anticus; 15, superior heads of external oblique interlocking with serratus major.

shoulder-blade, and inserted into the head of the arm-bone.

The *infraspinatus* and *teres minor*, which arise from the lower part of the back of the shoulder-blade and are inserted into the arm-bone, roll the arm outward.

The *subscapular* muscle, which arises from the whole under surface of the shoulder-blade, and the *teres major*, which arises from its lower angle, roll the arm inward, the principal muscles of the front of the arm are the *biceps*, so called from its two heads, and the *anterior brachial*.

The biceps forms the prominence of the front of the arm, when any weight is lifted; arising from the coracoid process of the scapula by one head, and from the socket of the shoulder-joint by the other, it is inserted by a flat tendon into a prominence on the radius below its head.

The anterior brachial muscle arises from the shaft of the humerus below the biceps, and is inserted into the coronoid process of the ulna.

The action of these two muscles is to flex the fore-arm on the arm, or, the fore-arm being fixed as in climbing, to draw the arm toward the fore-arm.

The *triceps*, which fills out the back of the arm, has three heads, one arising from the shoulder-blade, and the other two from the back of the humerus, and is inserted into the olecranous process of the ulna (funny-bone); its action is to straighten the arm.

The muscles of the fore-arm consist of two layers, and are twenty in number, giving to the hand its truly wonderful mobility.

The muscles which turn the palm downward, or pronate it, are the *pronator radii teres*, which runs from the inner condyle to the shaft of the

radius, and the *pronator quadratus*, which passes from the lower third of the ulna to a similar portion of the radius beneath the other muscles. The prominence of the radial side of the arm below the elbow joint, is made up of the supinator longus, whose action is to turn the palm up or supinate it. It arises from the outer condyle and is inserted into the enlarged lower end of the radius; the supinator brevis lies beneath and behind it, and encases the head of the radius as in a sling; its action being similar to the long supinator.

The *radial* and *ulnar flexors of the wrist* arise from the inner condyle, and are inserted, the former into the metacarpal bone of the index finger by a large tendon, which can be felt crossing the middle of the wrist, and the latter into the pisiform bone. Just inside of the ulnar flexor lies the long palmar muscle, which is inserted into the ligament of the wrist and the fascia covering the palm of the hand.

Beneath these last muscles lies the *flexor sublimus digitorum*, or superficial flexor of the fingers; it arises from the inner condyle and the upper two-thirds of the ulnar and radius; its tendon divides into four slips, one for each finger, which are inserted into the side of the second bones of the fingers; opposite the first bones the tendons are split so as to give passage to the tendons of the *flexor profundus*, which arises beneath and below this muscle, and is inserted into the last bones of the fingers.

The long flexor of the thumb arises from the upper part of the radius, beneath the long supinator, and its tendon, after passing through the slit in the short flexor, is inserted into the last bone of the thumb.

The muscles on the back of the fore-arm are the *longer* and *shorter radial extensors of the wrist*, which lie behind the long supinator, and whose tendons are inserted respectively into the metacarpal bones of the first and second fingers. The ulnar extensor of the wrist lies on the ulnar side of the back of the fore-

FIGURE 38. — Outer layer of muscles on the back of the fore-arm: 1, biceps flexor; 2, brachialis internus; 3, triceps extensor; 4, supinator radii longus; 5, extensor carpi radialis longior; 6, extensor carpi radialis brevior; 7, tendinous insertions of these muscles; 8, extensor communis digitorum; 9, extensor communis digitorum; 10, extensor carpi ulnaris; 11, anconeus; 12, flexor carpi ulnaris; 13, extensor minor pollicis; 14, extensor major pollicis; 15, posterior annular ligament.

arm, and is inserted into the metacarpal bone of the little finger. Between these muscles, in the middle of the fore-arm, is the common extensor of the fingers, which is inserted by four tendons into the backs of the two last bones of the four fingers, furnishing as they pass ligaments to the backs of the joints of the fingers..

FIGURE 39. — Outer layer of muscles on the front of the fore-arm: 1, biceps flexor cubiti; 2, brachialis internus; 3, triceps; 4, pronator radii teres; 5, flexor carpi radialis; 6, palmaris longus; 7, flexor sublimus digitorum; 8, flexor carpi ulnaris; 9, palmar fascia; 10, palmaris brevis muscle; 11, abductor pollicis manus; 12, flexor brevis pollicis manus; 13, supinator longus; 14, extensor ossis metacarpi pollicis.

The little finger has a special extensor which arises by the side of the common extensor and is inserted into the last two bones of the little finger, uniting to the tendon of the common extensor. The thumb has three special extensors, which arise deep in the fore-arm and are inserted into its metacarpal bone and two phalanges. The index finger likewise has a special extensor, which joins the tendon of the common extensor, and is inserted with it. All these tendons pass through canals, either alone or two or more together, in the *annular ligament* which surrounds the wrist.

The muscles of the hand proper consist of those of the thumb, those of the little finger, and those of the palm. The muscles of the thumb consist of the short flexor of the thumb, through whose tendon the tendon of the long flexor passes; the abductor, which draws the thumb toward the palm; the abductor which draws it away from the palm; the opposer of the thumb, which draws the base of the thumb inward. The muscles of the little finger are the *opposer*, the short flexor, and the *abductor*. Above them lies the short palmar muscle, which is but a pale slip and puckers the skin on that side of the hand. Springing from the tendons of the deep flexor, as it passes through the hand, are four small muscular slips which are inserted into the sides of the phalanges. Seven small muscles arise from the sides of the metacarpal bones to be inserted into the sides of the fingers. Three of these are on the palmar surface of the hand, and bring the fingers together; the four others are on the back of the hand, and separate the fingers from this imaginary line. The numerous small muscles of the hand increase its strength and dexterity.

Muscles of the Lower Extremity.

The muscles of the lower extremity consist of those of the hip, thigh, leg and foot. The *great psoas* and the *iliac*, the former arising from the last dorsal and all the lumbar vertebræ, and the latter from the concavity of the flat portion of the haunch-bone, are inserted in a common tendon into the lesser trochanter of the thigh-bone. Their action is to flex the thigh upon the body, and roll it slightly outward. The muscles of the hip which form the prominence of the buttock are the great, the middle and the smallest gluteus, which, arising from the sacrum and from the external surface of the haunch-bone, are inserted into the outer side of the trochanter and shaft of the thigh-bone; the action of the great gluteus is to roll the thigh outward; the front portion of the middle gluteus and the smallest gluteus roll the thigh inward, and together they extend the thigh, and support the trunk upon the thigh-bone.

In the stooping posture they help to raise the body. Partly beneath them lies a group of muscles, the rotators of the hip; they are the *pyriformis*, or pear-shaped muscles, the two *gemelli*, or twin muscles, the *internal* and *external obturator* muscles and the *quadratus*.

The muscles of the thigh are covered by a thick layer of fibrous tissue, called the *broad fascia*, which extends from the top of the haunch-bone to the knee-joint; attached to this fascia is a small flat muscle, the *tensor* of the fascia of the thigh, which arises from the front of the outer rim of the haunch-bone, and is inserted into the fascia on the outer side of the thigh.

The *sartorius*, or tailor-muscle, is the longest in the body; it arises from the prominence at the front of the upper part of the haunch-bone, and, running obliquely across the thigh, is inserted into the inner side of the shin-bone below the knee. Its action is to draw one leg across the other, at the same time flexing the thigh.

The muscles which make up the front of the thigh are the *rectus*, the internal vastus, the *external vastus*, and the *crureus;* these uniting into one tendon, are called the four-headed muscles of the thigh, and are inserted into the prominence on the shin-bone just below the knee, the knee-cap being a small bone developed in this tendon to protect the knee-joint. The rectus forms the central part of the muscle, and arises from a projection on the front of the haunch-bone, and from above the socket of the hip.

FIGURE 40.—Nerves of the thigh: 1, gangliated cord of sympathetic; 2, third lumbar nerve; 3, branches to iliacus internus; 4, fourth lumbar nerve; 5, anterior crural nerve; 6, lumbosacral nerve; 7, branch to psoas; 8, obturator nerve; 9, external cutaneous nerve (cut); 10, nerve to pectineus; 11, superficial division of anterior crural nerve (cut); 12, superficial division of obturator nerve; 13, 13, sartorious muscle; 14, 14, adductor longus; 15, branch to rectus; 16, deep division of obturator nerve; 17, branches to vastus externus and crureus; 18, adductor brevis; 19, branch to vastus internus; 20, adductor magnus; 21, vastus externus; 22,22, internal saphenous nerve; 23, rectus femoris; 24, patellar branch of saphenous nerve; 25 vastus internus; 26, gracilis.

The *internal vastus* and *crureus* are really one large muscle arising from the upper portion of the inner side and back of the shaft of the thigh-bone. The external vastus, the largest portion of the muscle, arises from the outer side and back of the thigh. The action of this large muscle is to extend the leg upon the thigh. Situated behind these, the inside of the thigh is made up of a group of muscles which draw the thigh inward; they are the *gracilis*, *pectineus* and the *long*, *short* and *great adductors*. They all arise from the middle portion of the haunch-bone, and are inserted into the inner side of the thigh, extending down to the knee-joint, with the exception of the gracilis, which is inserted into the upper portion of the shin-bone. The hamstring muscles, which flex the leg on the thigh, are the *biceps* (two-headed), *semi-tendinosus*, and *semi-membranosus*. The former, which arises from the prominence at the lower part of the haunch-bone (tuberosity of the ischium) by one head, and from the back of the thigh-bone by the other, forms the outer hamstring, and is inserted into the head of the fibula. The other two, with the addition of the tendons of the gracilis and sartorious, form the inner hamstring. They arise from the same prominence of the haunch-bone, and are inserted into the inner side of the shin-bone.

Muscles of the Leg.

The muscles which flex the ankle upon the leg are the *tibialis anticus*, the *long extensor of the toes*, the *proper extensor of the great* toe, and the *peroneus tertius*. They form the prominence on the outer side of the leg. The *tibialis anticus* arises from the

upper part of the tibia or shin-bone, and its tendon crossing the front of the ankle is inserted into the base of the metatarsal bone of the great toe, and into the internal cuneiform bone. The *proper extensor of the great toe* is a thin muscle arising between the anterior tibial and the long extensor of the toes, and its tendon is inserted into the last bone of the great toe.

The *long extensor of the toes* arises behind the other two muscles, and its four tendons are inserted into the bases of the three bones of the toes, covering the joints to form ligaments. The *peroneus tertius* is really a part of this muscle, and its tendon goes in a like manner to the bones of the little toe.

The prominence of the calf of the leg is made up of two muscles, the *gastrocnemius* and *soleus;* the former arising by two heads from the two condyles of the femur, and the latter from the upper portion of the back of the two bones of the leg; together they form a thick fleshy mass, and are inserted by one thick tendon, the *tendo achillis*, or heel cord, into the extremity of the heel-bone. Their action is to raise the heel, as in walking and jumping, and to hold the thigh erect upon the leg. At times a third small muscle, the *plantaris*, is found lying upon them. Beneath these lie the *popliteus*, running from the external condyle of the femur to the back of the shin-bone; and the *long flexor of the great toe*, the *long flexor of the toes*, and the *posterior tibial* below. The long flexor of the great toe arises from the back of the fibula, from the outer side of the leg, and its tendon crossing behind the heel, runs to the inner

FIGURE 41.—Deep-seated muscles on the posterior part of the hip-joint: 1, fifth lumbar vertebra; 2, ilio-lumbar ligament; 3, crest of the ilium; 4, anterior superior spinous process; 5, origin of the fascia femoris; 6, gluteus medius; 7, its lower and anterior portion; 8, pyriformis; 9, gemini; 10, trochanter major; 11, insertion of the gluteus medius; 12, quadratus femoris; 13, part of the adductor magnus; 14, insertion of the gluteus magnus; 15, vastus externus; 16 long head of the biceps; 17, semi-membranosus; 18, semi-tendinosus; 19, tuber ischii; 20, obturator internus; 21, point of the coccyx; 22, posterior coccygeal ligament; 23, 24, greater sacro-sciatic ligament; 25, posterior superior spinous process of ilium; 26, posterior sacro-iliac ligaments.

side of the ankle, and is inserted into the base of the last bone of the toe. The long flexor of the toes arises from the back of the shin-bone, and its tendons running through a slit in the short flexor, are inserted into the last bone of each toe.

FIGURE 42.—Muscles of the front of the leg: 1, tendon of quadriceps; 2, spine of tibia; 3, tibialis anticus; 4, extensor communis digitorum; 5, extensor proprius pollicis; 6, peroneus tertius; 7, peroneus longus; 8, peroneus brevis; 9, soleus; 10, gastrocnemius; 11, extensor brevis digitorum.

The *posterior tibial* muscle arises from both bones of the leg, lying between the two just described, and its tendon is inserted into the scaphoid and internal cuneiform bones. The outer side of the leg is covered by the *long* and *short peroneal* muscles. Arising from the fibula, the former is inserted into the base of the metatarsal bone of the great toe, its tendon having crossed the sole of the foot obliquely; and the latter into the metatarsal bone of the little toe. On the back of the foot is but one muscle, the *short extensor of the toes*, which assists the long extensor, its tendon being inserted into the tendon of the latter, except in the case of the little toe.

The sole of the foot is covered in by a dense fibrous sheath, the plantar fascia, running from the heel-bone behind to the metatarsal bones in front; it sustains the arch of the foot, and protects the vessels and nerves beneath. Immediately beneath it lies the *short flexor of the toes*, which, arising from the heel-bone, is inserted by four tendons into the second bones of the four lesser toes. This tendon is split, as in the hand, to give passage to the tendon of the long flexor. Beneath the short flexor is the *accessory flexor*, arising by two heads from the two sides of the heel-bone to be inserted into the tendon of the long flexor. On the inner border of the sole of the foot lie the *abductor* of the great toe, and on the outer side the *abductor of the little toe*.

Beneath these lie the short flexor of the great toe; the *adductor of the great toe*, the short flexor of the little toe, and the *transverse* muscle of the foot. The action of these muscles corresponds to their names, and they are analogous to similar muscles in the palm of the hand.

THE ARTERIES.

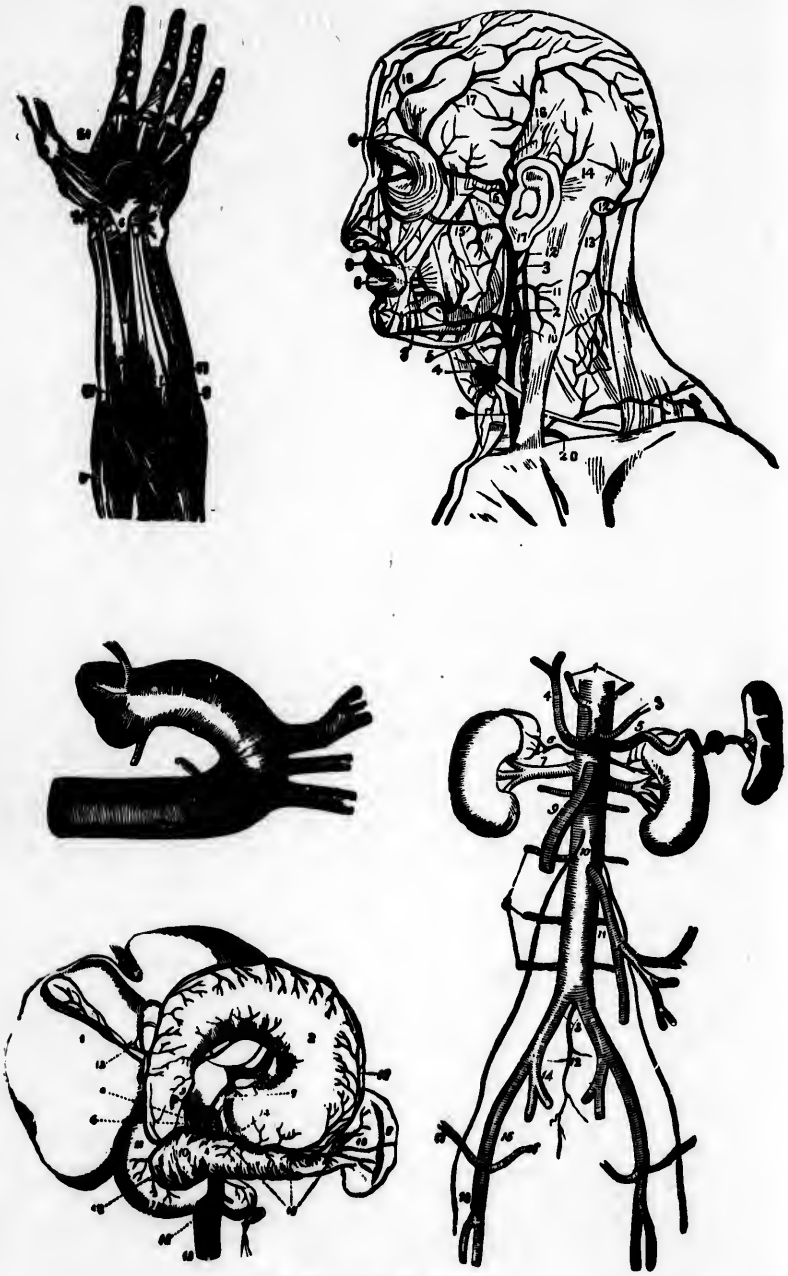
The arteries are cylindrical elastic tubes which convey the blood from the heart to every part of the body. They have been compared to

a tree, starting from a single trunk and dividing and subdividing into numerous branches. This mode of division is by no means regular; an artery sometimes dividing into two branches, sometimes giving off several in succession; again, branches from different trunks will unite, forming an *anastomosis*, so that most parts of the body can be supplied by blood from different trunks, which is a valuable provision of nature against loss of nourishment in case of accident to the main vessel. The

FIGURE 43.—The arteries of the face and head: 1, common carotid; 2, internal carotid; 3, external carotid; 4, occipital artery; 5, superior thyroid artery; 6, trapezius; 7, lingual artery; 8, sterno-mastoid; 9, facial artery; 10, temporal artery, dividing into anterior and posterior branches; 11, submental branch; 12, transverse facial artery; 13, inferior labial branch; 15, inferior coronary branch; 17, superior coronary branch; 19, lateral nasal branch; 21, angular branch.

arteries diminish in size until the smallest of them empty into a network of smaller vessels about $\frac{1}{3000}$ of an inch in diameter, the *capillaries;* from which again the blood, having nourished the tissues, empties into the smallest veins to be returned to the heart and lungs.

An artery as a rule has three coats, viz.: 1, an internal lining or epithelial coat, consisting of epithelial cells lying upon a membrane of



ARTERIES.

Explanation of "Arteries" Plate.

Figure No. 1.

(This shows the arteries of the palm of the hand and of the fore-arm.)

3. The deep part of the round pronator of the radii.
4. Large supinator muscle.
5. Large flexor of the thumb.
6. Square pronator.
7. Deep flexor of the fingers.
8. Cubital flexor of the wrist.
9. Annular ligament with the tendons which pass beneath the centre of the palm of the hand; the number is shown on the tendon of the long palmary muscle divided near its insertion.
10. Brachial artery.
12. Radial artery.
13. Radial recurrent artery, joining the termination of the superior profound artery.
14. Superficial veins.
15. Cubital artery.
16. Superficial palmary arch, discharging digital branches for three and a-half fingers.
17. Principal artery of the thumb, and radial of the fore-finger.
18. Posterior cubital recurrent.
19. Anterior interosseal artery.
20. Posterior interosseal artery, passing through the interosseal membrane.

Figure No. 2.

1. Primitive carotid artery, dividing into two, the external and internal carotid arteries.
3. Occipital branch on the posterior part of the cranium.
4. Superior hyoid artery.
5. Inferior pharyngeal artery.
6. Masseteric artery.
7. Submental artery.
8. Inferior coronary artery.
9. Superior coronary artery.
10. Profound branch.
11. Posterior cervical artery.
12. Continuation and fold of the occipital.
13. Descending branch to the muscles of the neck.
14. Posterior auricular.
15, 15. Temporal arteries.
16. Parietal branches.
17. Frontal branches.
19. Orbital branches.
20. Subclavian artery.

Figure No. 3.

Thoracic aorta.

The three branches from the left to the right are the innominata.

The primitive left carotid and the left subclavian.

The small branch in the curve is the bronchial branch.

Figure No. 4.

1. The liver.
2. The stomach.
3. The upper intestine.
4. The pancreas.
6. Great mesenteric artery.
7. Gastric branch.
8. Spleen, or milt.
9. Pyloric branch.
10. Pancreatic branch.
11. Hepatic artery.
12. Duodenal branch.
13. Cystic artery.
14. Branches to the stomach.
15, 16. Splenic arteries.
17. Gastro-epiploic artery.
18. Descending aorta.
19. Great mesenteric artery.

Figure No. 5.

1. Frænic arteries.
2. Cœliac centre.
3. Gastric artery.
4. Hepatic artery, dividing into right and left branch.
5. Splenic artery.
6. Supra-renal artery on the right side.
7. Right renal artery, which is longer than the left one.
8. Lumbar arteries.
9. Superior mesenteric artery.
10. The two spermatic arteries.
11. The inferior mesenteric.
12. The median sacrals.
13. The common iliacs.
14. Internal iliac of the right side.
15. External iliac.
16. Epigastric artery.
17. Circumflex iliac artery.
18. Femoral artery.

elastic fibres and connective tissue; 2, a middle muscular coat, which in the larger arteries consists mostly of elastic tissue, but in the smaller ones of muscular fibres, and 3, a connective tissue coat, consisting of both kinds of connective tissue. All arteries have little blood-vessels in their sheaths, by which they themselves are nourished.

The main artery of the body is called the *aorta*. It arises from the left ventricle of the heart in front, and ascending a short distance it

FIGURE 44.—The side of the neck: 1, occipital artery; 2, facial vein; 3, spinal accessory nerve; 4, facial artery; 5, internal jugular vein; 6, hypoglossal nerve; 7, communicans noni nerve; 8, lingual artery; 9, pneumogastric nerve; 10, superior laryngeal nerve; 11, phrenic nerve; 12, superior thyroid artery; 13, sterno-cleido-mastoideus (reflected); 14, common carotid artery with descendens noni nerve; 15, inner end of clavicle (reflected); 16, sterno-hyoid; 17, subclavian vein (cut); 18, omo-hyoid; 19, subclavian artery giving off the thyroid axis and the internal mammary artery; 20, inferior cervical ganglion of sympathetic; 21, apex of pleura.

arches over the heart to the left side of the spine, and passes through the diaphragm, descends to a point opposite to the fourth lumbar vertebra, where it divides into the two iliac arteries. In its course it gives off important branches.

The first branches given off are the two *coronary* arteries, which supply blood to the muscle of the heart itself. Next at the top of the

arch is the *innominate* artery, a large trunk about an inch and a half long, which divides into the right *carotid* and right *subclavian* arteries. Behind the innominate rise the left *carotid* and left *subclavian* arteries from the posterior portion of the arch of the aorta. The course and distribution of these vessels is the same on both sides excepting the first two or three inches. The carotids run straight up the neck, in a line drawn from the breast bone to the prominence behind the ear, to a point opposite the top of the larynx or Adam's apple, where they divide into two branches, the *external carotid*, which sends branches to the organs of the face, neck, and back of the head, and the *internal carotid*, entering the base of the skull to supply the brain, and eye, and ear.

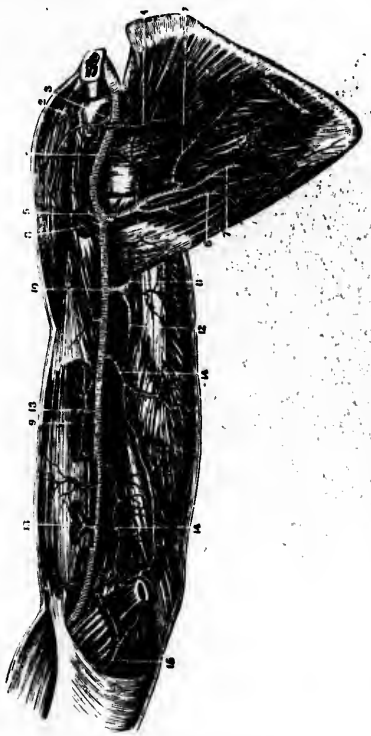


FIGURE 45.—Arteries of the arm and shoulder: 1, auxillary artery; 2, thoracica acromialis; 3, thoracica superior; 4, subscapularis branch; 5, inferior scapular; 6, 7, branches to the teres and sub-scapularis muscles; 8, anterior circumflex; 9, brachial artery; 10, profunda major humeri; 11, posterior circumflex; 12, main trunk of the profunda major; 13, muscular branches; 14, branches to the brachialis internus; 15, recurrens ulnaris anastomosing with the anastomotica of the brachial.

The *subclavian* artery supplies blood to the chest, neck and upper extremity. It is really one trunk from its origin to the bend of the elbow, but it is called subclavian only as far as the border of the first rib, when it becomes the *axillary* artery. It arches up behind the clavicle (hence its name) and in its course gives off important branches, viz.: the *temporal*, which runs up through the openings in the transverse processes of the six upper vertebræ, enters the skull, and, anastomosing with the carotid, insures a free supply of blood to the brain. Next the *thyroid* axis, which divides into three branches, supplying blood to the neck and shoulder. Below it gives off two branches, the *internal mammary*, which supplies the muscles of the chest, the breast, and sac inclosing the heart; and the *superior intercostal*, which supplies the structures in the vicinity of the first rib.

The *axillary* artery, which is a continuation of the subclavian from the lower border of the first rib to the posterior fold of the arm-pit, gives off in its course seven branches, which go to the side and back of the chest, the shoulder-blade and the shoulder-joint.

From the posterior fold of the arm-pit to an inch below the elbow where it divides into the radial and ulnar arteries, the axilliary artery becomes the *brachial*, which runs a straight course along the inner side of the humerus beneath the inner edge of the biceps muscle. The five branches which it gives off are supplied to the arm.

The *radial* artery runs from below the bend of the elbow to the outer side of the wrist, where it winds around the base of the thumb, enters the palm between the thumb and index finger; crossing the palm it goes to form the *deep palmar arch*, and at its termination joins a deep branch of the ulnar artery. In the forearm the radial sends branches to the arm, forearm and wrist; in the wrist to the back of the hand and wrist, and in the hand from the palmar arch arise branches going to the thumb and fingers. Where the artery lies on the bone above the wrist, before winding around the thumb, its pulsation can be easily felt, and "by feeling the pulse" the rapidity and strength of the heart's action can be ascertained.

The *ulnar* artery is larger than the radial, and passes down the inner side of the forearm, beneath the superficial flexor muscles; when it reaches the wrist, it passes to the inside of the pisiform bone, and crosses the

FIGURE 46.—Deep dissection of the front of the forearm and hand: 1, supinator longus (cut); 2, ulnar nerve; 3, brachialis anticus; 4, biceps; 5, musculo-spiral nerve; 6, median nerve; 7, posterior interosseous nerve; 8, pronator teres and flexor carpi radialis (cut); 9, extensor carpi radialis longior (cut); 10, brachial artery; 11, supinator brevis; 12, flexor sublimis digitorum (cut); 13, 13, radial nerve; 14, 14, flexor carpi ulnaris; 15, extensor carpi radialis brevior; 16, ulnar artery; 17, radial origin of flexor sublimis digitorum (cut); 18, flexor profundus digitorum; 19, tendon of pronator teres (cut); 20, 20, dorsal branch of ulnar nerve; 21, 21, radial artery; 22, 22, deep branch of ulnar nerve; 23, flexor longus pollicis; 24, abductor minimi digiti; 25, anterior interosseous nerve; 26, digital branches of ulnar nerve; 27, tendon of supinator longus (cut); 28, one of the lumbricales muscles (cut); 29, pronator quadratus (cut open); 31, tendon of flexor carpi radialis (cut); 33, digital branches of median nerve; 35, abductor pollicis.

palm, forming the *superficial palmar arch.* In the forearm it sends branches to the muscles and bones of the arm and forearm; in the wrist it sends branches to the front and back of the hand, and from the superficial palmar arch sends four branches to the four lesser fingers, the thumb and radial side of the index finger being supplied by the artery.

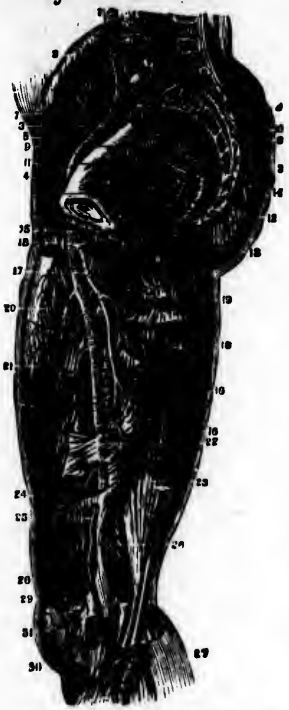


FIGURE 47.—Arteries of the pelvis and thigh: 1, inferior extremity of abdominal aorta; 2, right primitive iliac; 3, right external iliac; 4, epigastric artery; 5, circumflex illii; 6, internal iliac; 7, ileo lumbar; 8, gluteal; 9, obturator; 10, lateral sacral; 11, vesical arteries cut off; 12, middle hemorrhoidal; 13, internal pudic; 14, ischiatic; 15, origin of femoral artery; 16, point where it passes through the adductor muscles; 17, profunda major; 18, internal circumflex.

That portion of the aorta which lies between the fourth dorsal vertebra and the opening in the diaphragm is called the *thoracic* aorta, situated above on the left of the spine as it descends it lies directly on the spinal column. It gives off branches to supply the lungs, the gullet, the pericardial sac, the glands of the chest, and usually ten branches to supply the intercostal spaces, excepting the first.

From the opening in the diaphragm to its bifurcation at the fourth lumbar vertebra, it is the *abdominal* aorta; in its course it gives off the *phrenic*, which goes to the diaphragm, the *coeliac axis*, a short trunk, which divides into three branches; the *gastric* to the stomach, the *hepatic* to the liver, and the *splenic* which goes to the spleen; the *superior mesenteric*, supplying all the small intestines; the two *suprarenal* arteries, which go to the little suprarenal capsules, the two *renal* to the kidneys; the two *spermatic*, which in the male go to the testicles, and in the female to the ovaries; the *inferior mesenteric*, which supplies all the lower bowel; the four *lumbar*, which go to the muscles of the abdominal walls, and the *middle sacral*, which runs down the hollow of the sacrum and goes to the tissues adjoining.

Opposite the fourth lumbar vertebra the aorta divides into the two *common iliac* arteries; short trunks which again divide into the *external* and *internal* iliac, giving off no branches. The internal iliac dips

into the pelvic cavity and divides into two trunks, the anterior gives off branches to the bladder, rectum, anus, genital organs, buttock, and upper part of the thigh; the posterior trunk sending branches to the buttock, the sacrum and the muscles of the thigh within the pelvis

The external iliac runs across the pelvis, and escaping below Poupart's ligament is continued down the thigh as the femoral artery. It gives off two large branches to the muscles of the belly.

The *femoral* artery runs a straight course down the thigh from the middle of the groin to the lower third of the femur, where it passes through an opening in the great adductor muscle and becomes the popliteal. A line drawn from the middle of the groin to the internal condyle marks the course of this vessel. After giving off several small vessels to the muscles of the upper part of the thigh, about two inches below Poupart's ligament, the *profunda*, or deep femoral, which sends two *circumflex* branches to supply the muscles of the thigh, and three perforating branches which pierce the adductor muscles; below the femoral gives off muscular branches and the *great anastomosing* artery.

The popliteal artery begins at the termination of the femoral, and running in the hollow behind the knee-joint, divides about two inches below the joint into the anterior and posterior tibial arteries. The branches are small and supply the joint and muscles in its vicinity.

FIGURE 48.—Anterior tibial artery: 1, extensor proprius pollicis pedis muscle and tendon; 2, 2, articular arteries; 3, anterior tibial artery; 4, 5, the same artery; 6, recurrent branch; 7, branch to muscles; 8, 8, other muscular branches; 9, pedal artery, or continuation of the anterior tibial on the foot; 10, external malleolar artery.

The *anterior tibial* passes forward between the bones of the leg at its upper part, passes down the front of the leg, and, on the front of the foot, becomes the dorsalis pedis. In its course it gives off branches to the leg and ankle. The *dorsalis pedis* runs along the foot and terminates as the artery of the great toe; it gives off branches to the tarsus and metatarsus, the latter forming an arch and giving off branches to the toes, one branch communicating with the arch in the sole of the foot.

The *posterior tibial* descends along the inside of the back of the leg to the hollow below the inner ankle, where it divides into the two

plantar arteries. It gives branches to the muscles of the leg, the shin bone and the ankle.

The *internal* and *external* plantar arteries crossing the foot form an arch, from which branches are given off to the toes, in a manner analogous to those in the hand.

From the right ventricle of the heart is given off the *pulmonary* artery, which conveys the impure blood returned to the heart by the veins to the lungs to be oxygenated. It is a short, wide vessel about two inches long, and divides into the *right* and *left* pulmonary arteries. Upon reaching the lungs, these arteries branch and form an arterial tree.

THE VEINS.

The blood which has been distributed all over the body by the arteries is collected by another set of vessels, the veins. These beginning by minute branches empty into larger branches, which finally emptying into the main venous trunks go to the auricles of the heart.

The veins have three coats, like the arteries, but are thinner, less elastic, and when empty collapse. They are supplied at intervals with valves to prevent the reflex of blood in case the current is intercepted. They are most common in situations where the veins would be subject to pressure. Communication between veins is much more common than between arteries. Veins are divided into three sets.

The superficial veins are found beneath the skin; the deep veins accompany the arteries, the large arteries having one vein and the smaller ones two, and the sinuses, which are in reality not veins, but simply channels formed by the separation of the dura mater, for the return of the impure blood from the veins of the brain.

It will be necessary here simply to describe the superficial veins, and some others of special importance.

The small veins of the exterior of the head and neck follow the course of the arteries, and have similar names. They empty into the two principal veins of the neck, the *internal* and *external* jugular veins. The internal jugular vein, after receiving the impure blood from the veins and sinuses of the brain passing out by an aperture at the base of the skull behind where the carotid artery enters, passes down the neck in a sheath with the carotid artery, receiving branches from the deep veins of the neck, and joins the subclavian vein

behind the collar bone to form the innominate vein. The two innominate veins unite to form the *superior vena cava*. The *external* jugular receives the blood from the superficial veins of the scalp, face and neck. It begins opposite the angle of the jaw, in the parotid gland, and runs straight down the neck to the middle of the collar bone, where it empties into the subclavian vein. Its course down the neck can easily be seen, as it lies just beneath the skin and superficial muscles.

The veins of the upper extremity, besides those accompanying the arteries, are, a radial vein, an anterior and posterior ulnar and a median vein. These collect the blood from the hand and forearm, and just above the bend of the elbow the ulnar veins unite to form the *basilic* vein, which passes up the inner side of the arm and empties usually into the axillary vein. The radial vein forms the *cephalic* vein, which passes up the outside of the arm and winding around in front of the shoulder empties into the axillary vein just before it becomes the subclavian. Below the bend of the elbow, the median vein and a branch from the deep veins empty into a large V-shaped vein; running from its apex into which these veins empty, it unites together the basilic and cephalic veins, one arm being called the median basilic, and the other the median cephalic. This latter, owing to its accessibility, is the one usually selected from which to bleed a person; the nearness of the median basilic to the brachial artery rendering it less safe. The *axillary* vein becomes the *subclavian*, and joining the jugular forms the innominate vein.

The superficial veins of the lower extremity, into which the smaller collecting veins empty, are the internal or long saphenous, and the external or short saphenous.

The *internal saphenous* vein commences on

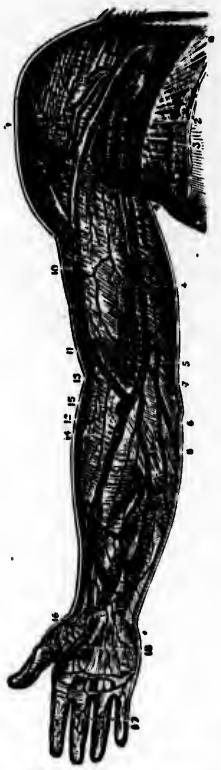


FIGURE 49.—Superficial veins of the upper extremity: 1, axillary artery; 2, axillary veins; 3, basilic vein; 4, 4, basilic vein; 5, point where the median basilic joins the basilic vein; 6, posterior basilic vein; 8, anterior basilic vein; 9, point where the cephalic enters the axillary vein; 10, a portion of the same vein; 11, point where the median cephalic enters the cephalic vein; 12, lower portion of the cephalic vein; 13, median cephalic vein; 14, median vein; 15, anastomosing branch; 16, cephalicapellicis vein; 17, subcutaneous veins of the fingers; 18, subcutaneous palmar veins.

the back of the foot, and running straight up the inner side of the leg and thigh, receiving large superficial branches in its course, it passes through an opening in the broad fascia below the groin called the saphenous opening, to empty into the femoral vein. The *short saphenous* begins at the outer side of the foot, and ascending behind the outer ankle, it reaches the middle of the back of the leg, and below the back of the knee-joint it empties into the popliteal vein.

FIGURE 50.—Superficial veins of the legs: 1, saphena major; 2, collateral branch; 3, anastomosis of veins; 4, internal saphena; 5, origin of the saphena vein; 6, anastomosing branch; 7, branches on the back of the leg; 8, the great internal vein of the foot; 9, arch of veins on the metatarsal bones; 10, branch from the heel; 11, branches on the sole of the foot.

The *femoral* vein, which receives the venous blood from all the veins of the leg, accompanies the femoral artery, and passing with it through the opening beneath Poupart's ligament, it enters the abdominal cavity and becomes the *external iliac* vein. This is joined by the internal iliac vein, which receives the venous blood from the territory supplied by the artery of the same name, to form the *common iliac* vein, which empties into the inferior vena cava. The *inferior vena cava*, which is formed by the junction of the two common iliacs in front of the fourth and fifth lumbar vertebræ, passes up the right side of the spine, perforates the diaphragm, and empties into the right auricle. In its course it receives the *lumbar renal, supra renal* and *hepatic* veins.

The veins from the stomach, spleen, and intestines, that is, the veins which contain blood loaded with absorbed food, do not empty directly into the vena cava, but are collected into a short trunk, the *portal vein*, which enters the liver on its under surface, and dividing into numerous small branches which accompany the branches of the hepatic artery through the structure of the liver, again unite to form the hepatic veins, which empty into the vena cava. The spinal column is abundantly supplied by a network of small veins without valves. The veins of the heart empty directly into the right auricle, either separately or by one large vein.

The *four pulmonary veins*, which start as minute capillaries in the walls of the air cells of the lungs, really carry bright arterial blood, and empty into the left auricle of the heart.

THE HEART.

The heart is a hollow muscular organ of conical form, placed in the chest between the lungs and inclosed in a serous sac, the pericardium. It is placed obliquely in the chest; the base, to which is attached the great vessels, is directed upward and backward and corresponds to the space between the fifth and eighth dorsal vertebræ; the apex is directed down-

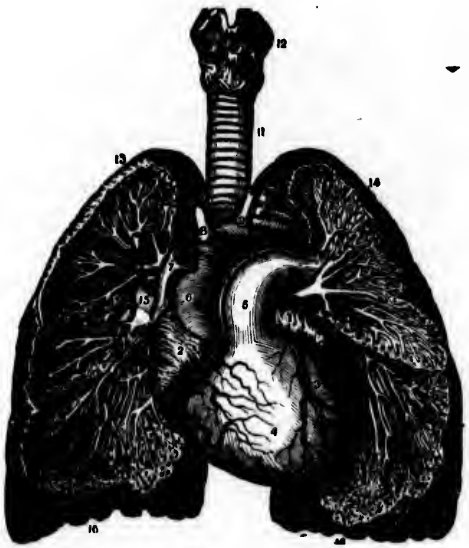


FIGURE 51.—Branchi and blood-vessels; 1, left auricle; 2, right auricle; 3, left ventricle; 4, right ventricle; 5, pulmonary artery; 6, arch of the aorta; 7, superior vena cava; 8, arteria innominata; 9, left primitive carotid artery; 10, left subclavian artery; 11, trachea; 12, larnyx; 13, upper lobe of right lung; 14, upper lobe of left lung; 15, trunk of right pulmonary artery; 16, lower lobes of the lungs.

ward and to the left, and corresponds to the interval between the fifth and sixth ribs, one inch to the inner side, and two inches below the nipple. Lying behind the lower part of the breast bone, it projects an inch and a half to the right side, and three inches to the left. The anterior

surface of the heart is convex and directed upward and forward; the posterior surface, which rests upon the diaphragm, is flattened.

In a grown person the heart is about five inches in length, three and a half inches in breadth at its broadest part, and two and a half inches thick. In the male it weighs from ten to twelve ounces, and in the female about two ounces less.

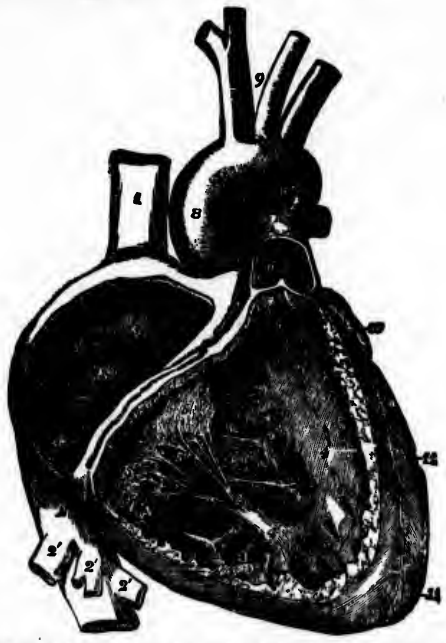


FIGURE 52.—The right auricle and ventricle opened, and a part of their right and anterior walls removed, so as to show their interior; 1, 1, superior vena cava; 2, inferior vena cava; 2', hepatic veins cut short; 3, right auricle; 3', placed in the fossa ovalis, below which is the Eustachian valve; 3'', is placed close to the aperture of the coronary vein; +, +, placed in the auriculo-ventricular groove, where a narrow portion of the adjacent walls of the auricle and ventricle has been preserved; 4, 4, cavity of the right ventricle; the upper figure is immediately below the semilunar valves; 4', large columna carnea or musculus papillaris; 5, 5', 5'', tricuspid valve; 6, placed in the interior of the pulmonary artery, a part of the anterior wall of that vessel having been removed, and a narrow portion of it preserved at its commencement where the semilunar valves are attached; 7, concavity of the aortic arch close to the cord of the ductus arteriosus; 8, ascending part or sinus of the arch covered at its commencement by the auricular appendix and pulmonary artery; 9, placed between the innominate and left carotid arteries; 10, appendix of the left auricle; 11, 11, the outside of the left ventricle, the lower figure near the apex

The heart is divided longitudinally by a muscular partition into two halves, and a transverse partition divides these halves into two cavities. The two lower, or main, halves are called the *ventricles* of the heart, and the upper ones the *auricles*. The right side of the heart contains dark-

impure, or venous blood, and the left side red or arterial blood. The walls of the auricles are thinner than those of the ventricles, and the walls of the right side of the heart are thinner than those of the left.

The *right auricle* receives the blood from the two main veins of the body—the two *venæ cavæ*. From the auricle the blood is forced into the right ventricle through an opening, the *auriculo ventricular orifice*. This opening is guarded by the *tricuspid valve*, to prevent the reflex of blood into the auricle when the ventricle forces it into the lungs. This valve is composed of three segments, to the free margin of which are attached *tendinous cords*, which, springing from the muscular ridges projecting from the inner surface of the ventricle, the *columnæ carnæ*, give support to the valves.

The right ventricle will contain about two fluid ounces, or a wineglass full. Its walls are about one-third as thick as those of the left ventricle. Besides the opening into the auricles there is the opening into the pulmonary artery, by which the blood is sent to the lungs. This opening is guarded by the *semilunar valves*, which are three semicircular folds of the lining membrane of the heart, the free margin being somewhat thick. During the passage of the blood toward the lungs, these folds are pressed against the wall of the vessel; but when the ventricle is empty, the current being checked, these pockets fill with blood, and their free margins uniting prevent the blood from flowing back into the ventricle.

The *left auricle* is smaller than the right, but thicker; it receives the blood which returns from the lungs by the pulmonary veins. This blood is forced from the auricle into the left ventricle through an opening, guarded by valves, similar to the right auriculo-ventricular orifice, except that the valve, called the *mitral* valve, has but two segments.

The *left ventricle* is the thickest and strongest portion of the heart. The blood received by it through the auriculo-ventricular orifice is discharged into the main artery of the body, the *aorta*, through an opening which is guarded by *semilunar* valves, as in the case of the pulmonary artery. The cavities of the heart are lined by a delicate endothelium, which is continuous with that of the blood-vessels. The wall of the heart consists of muscular fibres and fibrous rings. The fibrous rings surround the orifices of the heart, and give attachment to the muscular fibres which make up its bulk. The muscular fibres are arranged in numerous layers, which interlace.

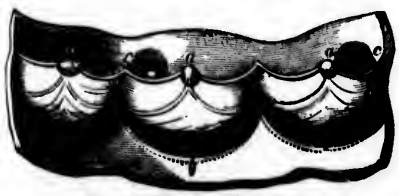


FIGURE 53.—Semilunar valves.

The heart is a pump, which pumps the blood to nourish the tissues of the body. The auricles being filled with blood from the veins, contract and force the blood into the ventricles, which upon being filled also contract; but the closure of the tricuspid and mitral valves prevents the reflux of blood into the auricles, and it is forced into the pulmonary artery and aorta. In contracting, the heart raises its apex, and shortens itself somewhat, twisting also from left to right. The number of contractions per minute is from seventy-five to eighty for an adult, in childhood being more rapid. The strength and rapidity are governed by the nerves which supply the heart with force.

Upon listening to the heart two sounds are heard, called the first and second sounds of the heart. The first sound, which is a heavy, dull sound, is caused by the contraction of the muscle of the heart and by the rush of blood through the openings. The second sound, which is a sharp clicking sound, is due to the snapping shut of the semilunar valves. The dark venous blood is poured into the right auricle, from whence it goes into the right ventricle, which forces it through the pulmonary artery into the lungs to be purified, returning from the lungs by the pulmonary veins it is discharged into the left auricle, by it into the left ventricle, to be pumped through the aorta all over the body. The blood, reaching the aorta, is forced forward by the muscular walls of the arteries, hence the flow in the arteries is comparatively rapid.

The pulse is caused by the impulse given to the column of blood by the contraction of the ventricle; from the smallest arteries the blood goes to the capillaries, which are thin-walled vessels of large aggregate capacity lying in a net-work all over the body, and here it is that the blood comes in contact with the lymph which bathes and nourishes the tissues; an exchange takes place, the lymph giving up its waste tissue and carbonic acid gas, and the blood giving up nourishment and fresh oxygen.

From this capillary net-work, the blood, now loaded with impurities, is emptied into the veins, where, owing to their large size and flaccid walls, the current is slow, the principal motive power being muscular action, and the negative pressure of the chest. It is estimated that the entire blood passes through the heart once in forty-eight seconds.

BLOOD.

Blood is a fluid tissue, usually constituting about one-eighth of the body weight. It consists of corpuscles and plasma. The corpuscles

constitute about one-third of the blood, and are of two kinds, the red and the white. The red corpuscles, which give to blood its color, are small, flattened, biconcave disks about $\frac{1}{3200}$ of an inch in diameter. The white, which exist in proportion to the red as 1 to 500, are larger, spherical, and contain a nucleus, and usually granules. These latter are identical with the corpuscles formed in lymph and pus. The *plasma*, or liquor sanguinis, consists of fibrin and serum. The fibrin is probably formed by a ferment which unites two elements of the blood into a clot. Blood, upon being drawn from the vessels, or if the wall of the vessel be injured, possesses the property of coagulating, the fibrin formed entangling the blood corpuscles and squeezing out the serum, or fluid portion.

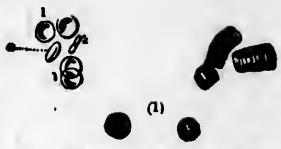


FIGURE 54.—Blood corpuscles.

Chemically, blood is composed of about ninety per cent. water, the solids being fats, salts and albumen. The red corpuscles contain a substance called *hæmoglobin*, which carries the oxygen from the lungs to the tissues. The difference in color of arterial and venous blood is due to the different color of this substance where oxygen or carbonic acid be in combination with it.

RESPIRATORY ORGANS.

The organs by which the venous blood of the body is changed to bright arterial blood are the larynx, the trachea, and the lungs (see Fig. 51). The larnyx forms the projection in the throat, which is known as Adam's apple; as it is the organ of the voice, it will be described in connection with the diseases of the throat. It is situated at the opening of the windpipe, or trachea, and through its opening the inspired air passes.

The trachea is a tube composed of elastic rings, joined together by connective tissue; it rests upon the gullet, and is about five inches long; at its lower extremity it divides into two tubes, one going to each lung, the *bronchial tubes*. These divide and sub-divide into numberless branches.

The lungs are the essential organs of respiration; they are two in number, one in either half of the chest, the heart, gullet and vessels lying between them. Each lung is conical in shape, its apex being above, behind the collar bone, and its broad base resting upon the vault of the

diaphragm. Its outer surface is smooth and convex, its inner surface concave, and having a fissure into which pass the bronchial tubes, arteries, veins and nerves. The left lung is divided into two lobes, the right usually into three. The surface of the lung is covered with a smooth, shining serous membrane, the pleura, which is reflected upon the diaphragm and walls of the chest, the space between the two layers of this membrane containing a small amount of fluid to prevent friction during the incessant movements of respiration.

The lung is made up of millions of minute spaces, the *air cells;* to each of these goes a minute bronchial tube, the tube being lined with

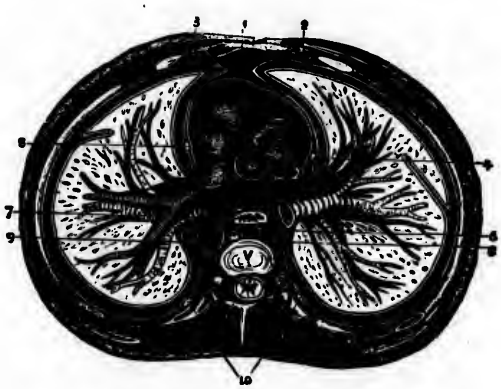


FIGURE 55.—Diagram of a transverse section of the thorax : 1, anterior mediastinum ; 2, internal mammary vessels ; 3, triangularis sterni muscle ; 4, right phrenic nerve between pleura and pericardium ; 5, left phrenic nerve between pleura and pericardium ; 6, thoracic duct in posterior mediastinum ; 7, œsophagus with left vagus in front and right vagus behind ; 8, vena azygos major ; 9, thoracic aorta giving off intercostal arteries ; 10, gangliated cord of sympathetic ; R. V., right ventricle ; R. A., right auricle of heart in middle mediastinum ; P. A., pulmonary artery ; A., aorta ; C., vena cava superior ; V., dorsal vertebra.

mucous membrane, and the air cell with large flat plates of epithelium. These cells are held together by a delicate connective tissue, in which is a fine abundant capillary net-work. In these air spaces the oxygen of the air passes into the circulating blood, and the carbonic acid of the blood is given up to take its place. The mechanism by which this takes place is as follows : The cavity of the chest is an air-tight box. The contraction of the diaphragm and elevation of the ribs enlarges this box, and creates a vacuum. The lungs being distended, air rushes into the windpipe to fill them. When the diaphragm relaxes the thorax is diminished in size, and squeezes the air out of the lungs.

By being inspired air loses about four per cent. of oxygen, and gains four per cent. carbonic acid; besides this, expired air contains various impurities of an unknown nature, the result of the waste of the tissues of the body. An adult breathes about seventeen times per minute. The air inspired under ordinary circumstances, *i.e.*, the *tidal air*, amounts to about thirty cubic inches. This air rarely penetrates below the larger bronchial tubes, but mixes with the air which is held by the elasticity of the lungs, the reserve air, by diffusion. The total amount of air which can be given out by the most forcible expiration following the most forcible inspiration is about 250 cubic inches.

THE LYMPHATICS.

The fluid which bathes all the tissues and conveys to and from the blood their waste products and nourishment, is the lymph. This is carried in very small thin-walled vessels with valves, which begin in

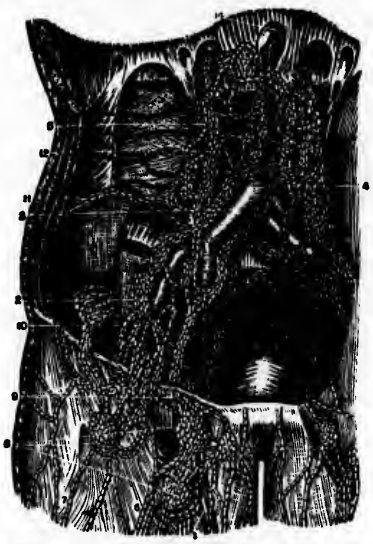


FIGURE 56.—Femoral iliac and aortic lymphatic vessels and glands: 1, saphena magna vein; 2, external iliac artery and vein; 3, primitive iliac artery and vein; 4, aorta; 5, ascending vena cava; 6, 7. lymphatics; 8, lower set of inguinal, lymphatic glands; 9, superior set of inguinal lymphatic glands; 10, chain of lymphatics; 11, lymphatics which accompany the circumflex iliac vessels; 12, lumbar and aortic lymphatics; 13, origin of the thoracic duct; 14, thoracic duct at its commencement.

open spaces among the tissues; as the vessels grow larger, we find in their course so-called *lympathic glands*, which consists of a capsule

enclosing a loose cellular tissue held together by bands of fibrous tissue. They are largest in the groin, armpit and neck. Where tissues are inflamed in their vicinity they become enlarged, painful and swollen. They empty into the thoracic duct, a vessel about the size of a goose-quill, which runs up along the spine and empties into the left subclavian vein. The lymphatics of the right side of the head, neck, chest and liver, empty by a separate duct into the right subclavian vein.

The *lymph* is a thin watery fluid containing cells analogous to the white blood corpuscles. A special set of lymphatics, called the lacteals, which receive the absorbed food from the small intestines and empty into the thoracic duct, will be described in connection with digestion.

THE NERVOUS SYSTEM.

The nervous system consists of the *cerebro-spinal* system, including the brain and spinal cord, the *ganglia*, constituting the *sympathetic system*, and the *nerves*, which connect these systems with the different organs. The cerebro-spinal system, which with its nerves receives the impressions from the organs of sense, is the seat of all voluntary action

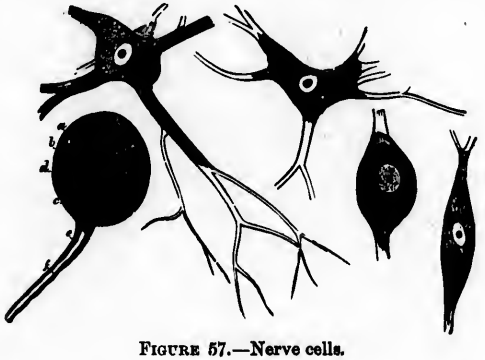


FIGURE 57.—Nerve cells.

and intellectual work, and presides over all the functions of animal life. The *sympathetic* system, which is only indirectly connected with the other, presides over the functions of the digestive, circulatory, absorptive and secretory apparatus; that is, over the functions of organic life.

Nervous tissue is divided into gray and white. The *gray* nerve

tissue consists of *nerve* cells or *corpuscles*, each having a nucleus and nucleolus, which are intimately connected with each other by means of numerous branches. This gray matter forms the central portion of the brain spinal cord and ganglia, and is the active portion of nervous tissue. The *white* nervous tissue consists of numberless nerve tubes bound together, which connect the gray matter with the periphery.

A *nerve* tube consists of a white portion which is fatty, and which protects the central portion, or axis cylinder. This central portion is smooth and homogeneous, and is the essential conducting portion of a nerve. Surrounding these is a *tubular membrane* composed of epithelial cells. The nerves of the body are made up of bundles of these tubes, bound together by connective tissue and enclosed in a sheath of the same. The tubes do not branch and unite as do the blood-vessels, but each tube runs from the nerve corpuscle, from which it originated, to its ultimate destination. Nerves terminate in the different organs in different ways; in the striped muscles as small *plates* of *axis cylinder* situated in the primitive fibril, beneath the skin as small bulb-like enlargements, while in some of the organs of special sense their terminations are so minute that they have not as yet been discovered.

FIGURE 58.—A, diagram of nerve-tubule; *a*, axis cylinder; *b*, inner border of white substance; *c*, *c*, outer border of same; *d*, *d*, tubular membrane; B, tubular fibres; *e*, in natural state; *f*, under pressure; *g*, *g'*, varicose fibres.

The nerves are divided into *sensory* and *motor* nerves; the former convey impressions from their terminations to the corpuscle from which they originated; and the latter convey motor impulses from the brain and cord to the muscles. A *direct* nervous impulse is one which starts in the brain and goes by its nerves to its destination; thus any voluntary action is direct. A *reflex* nervous action is one where the impulse comes from without, that is involuntary. For instance, removing the hand quickly from a hot surface is reflex, because the will has nothing to do with it; the impulse in this case comes by the sensory nerve of the finger to the corpuscle, which sends out of its own accord an impulse by the motor nerve to remove the finger. Actions which in childhood are

direct, become reflex in later life; all unconscious actions, the result of habit, being reflex.

The spinal cord is the elongated portion of the cerebro-spinal system which is contained in the spinal canal. It is covered by three membranes, an external one, the *dura mater*, is dense and strong, and being attached to the skull above, and the bony walls of the canal, it protects the cord from injury; a middle serous membrane, the *arachnoid*, one layer of which covers the inside of the dura mater, and the other the internal membrane, or pia mater, there being enough fluid between the two layers to lubricate the cord and prevent friction; and an internal membrane, the *pia mater*, which is simply a loose film of connective tissue, carrying the blood-vessels going to the cord.

The spinal cord does not fill the entire spinal canal, but stops opposite the first lumbar vertebra, where it breaks up into a bundle of large nerves, covered by dura mater, the *cauda equina*, or horse-tail, which runs to the end of the canal. The cord is about sixteen inches long, and without its membranes weighs about one ounce and a half. In the neck, and in the loin, where the nerves going to the upper and lower extremity are given off, the cord is enlarged. Opposite the articulation of the vertebræ are given off from each side of the cord two roots, which unite to form a nerve. The anterior root contains the motor, and the posterior root the sensory fibres.

FIGURE 59.—Anterior view of the brain and spinal marrow: 1, 1, hemispheres of the cerebrum; 2, great middle fissure; 3, cerebellum; 4, olfactory nerves; 5, optic nerves; 6, corpora albicantia; 7, motor oculi nerves; 8, pons Varolii; 9, fourth pair of nerves; 10, lower portion of the medulla oblongata; 11, 11, medulla spinalis in its whole length; 12, 12, spinal nerves; 13, cauda equina.

Upon section the cord is seen to be composed exteriorly of white nervous tissue, and internally of the gray, which is arranged somewhat in the shape of the letter H. The cord is divided by two antero-posterior fissures into two equal lateral halves, which are united in the centre by a bridge of gray matter. On either side of these fissures are two depressions—one anterior, which marks the origin of the anterior roots of the nerves from the anterior

horn of gray matter; and the other posterior, which marks the origin of the posterior roots in a similar manner. These fissures divide the cord into three lateral columns, which have different physiological functions. The gray matter in the anterior horns presides over motion, and in the long posterior horns over sensation. The function of the spinal cord is to carry impulses from the brain to the muscles, and sensory impulses from the muscles to the brain; beside this, in it are found centres for reflex action, which preside over different organs. In the posterior columns are the nerves which co-ordinate movements, and in the lateral columns some nerves which govern the nutrition of parts.

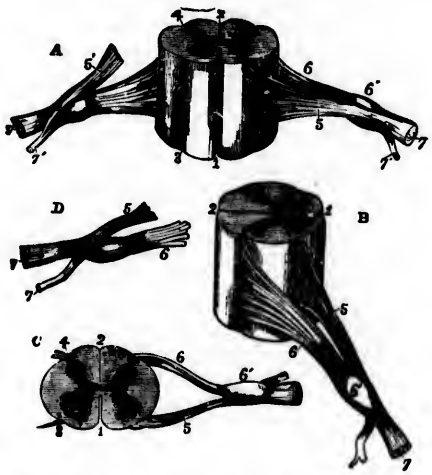


FIGURE 60.—Different views of a portion of the spinal cord from the cervical region, with the roots of the nerves slightly enlarged: In A, the anterior surface of the specimen is shown, the anterior nerve-root of its right side being divided; in B, a view of the right side is given; in C, the upper surface is shown; in E, the nerve-roots and ganglion are shown from below; 1, the anterior medium fissue; 2, posterior medium fissure; 3, anterior lateral depression, over which the anterior nerve-roots are seen to spread; 4, posterior lateral groove, into which the posterior roots are seen to sink; 5, anterior roots passing the ganglion; 5', in A, the anterior root divided; 6, the posterior roots, the fibres of which pass into the ganglion 6'; 7, the united or compound nerve; 7', the posterior primary branch, seen in A and D to be derived in part from the anterior and in part from the posterior root.

The *brain* consists of four principal parts: The *cerebrum*, or hemispheres; the *cerebellum*, or little brain; the *pons Varolii* (bridge of Varolius), and the *medulla oblongata*.

The brain, like the cord, is incased by three membranes, having similar names and functions to those of the cord, except that the dura mater of the brain is attached to the skull bones forming their endos-

teum. From this dura mater strong processes, the *falx cerebri, tentorium cerebelli,* and *falx cerebelli,* are sent inward into the cavity of the skull, supporting and separating the different portions of the brain.

The average weight of the brain in males is 49½ oz., and in females 44 oz. The largest male brain weighed 65 oz., and the largest female brain 56 oz. In idiots the brain rarely weighs more than 23 oz., so that

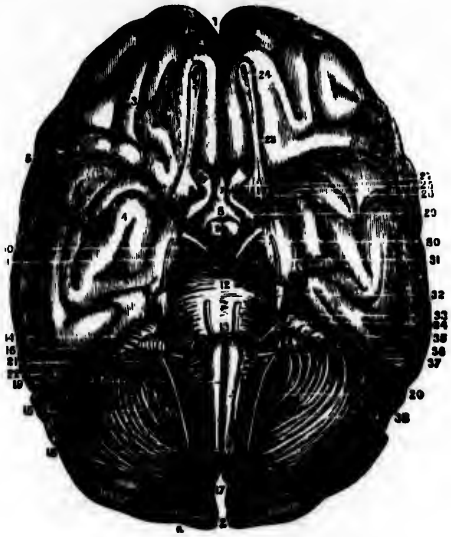


FIGURE 61.—Base of the cerebrum and cerebellum: 1, fissure of the hemispheres; 2, posterior extremity of the same fissure; 3, anterior lobes of the cerebrum; 4, its middle lobe; 5, fissure of Sylvius; 6, posterior lobe of the cerebrum; 7, infundibulum; 8, its body; 9, corpora, albicantia; 10, cineritious matter; 11, crura cerebri; 12, pons Varolii; 13, medulla oblongata; 14, posterior prolongation of the pons Varolii; 15, middle of the cerebellum; 16, anterior part of the cerebellum; 17, its posterior part and fissure; 18, medulla spinalis; 19, middle fissure of the medulla oblongata; 20, corpus pyramidale; 21, corpus rotiforme; 22, corpus olivare; 23, olfactory nerve; 24, its bulb; 25, its external root; 26, its middle root; 27, its internal root; 28, optic nerve beyond the chiasm; 29, optic nerve before the chiasm; 30, third pair of nerves; 31, fourth pair; 32, fifth pair; 33, sixth pair; 34, facial nerve; 35, auditory; 36, 37, 38, eight pair of nerves.

there is some relation between the size of the brain and the intelligence of the individual.

The *cerebrum* forms the bulk of the brain, resting in front upon the roof of the orbit and base of the skull, and behind upon the tentorium cerebelli. It is divided into lateral halves by the falx cerebri. Its under surface is flat, and its superior surface is rounded and convoluted. Internally it is composed of white, and externally of gray nervous tissue.

The gray substance of the convolutions is the seat of the mind, and its injury gives rise neither to pain nor motion. In the white portion centres of motion have been discovered. There is no scientific basis for the humbug taught by phrenologists that the bumps on the surface of the skull correspond to enlargements of the brain beneath, which are the seat of special faculties. The two hemispheres are united together by the *corpus striatum*, or striped body.

The *cerebellum* lies beneath the posterior portion of the cerebrum, and is separated from it by the tentorium cerebelli; it is connected with the rest of the brain by branches, or *crura*. Its weight is about 4 oz. The gray matter on its surface is laid not in convolutions, but in concentric ridges. It is divided into lateral halves, which are united by bridges. Its function is to coördinate muscular movements, and possibly to preside over the generative function.

The *pons Varolii* is the bond of union of the various parts of the brain, connecting the cerebrum above, the medulla below, and the cerebellum behind. Its structure is of mixed gray and white nerve tissue. Its function is to transmit impulses between the brain and cord, and to preside over the centre of coördinate movements.

Below the pons is the *medulla oblongata*, which is really the enlarged portion of the spinal cord. Beginning at the foramen magnum, it rests in the depressions at the lower part of the occipital bone. Here the fibres going to the brain cross, those from the right side going to the left side of the cord, and *vice versa*. Hence it will be seen that an injury to a motor centre in the brain above the medulla will cause paralysis of the opposite side of the body, while if it is below the medulla, the injury and paralysis will be on the same side. In the medulla is the centre which presides over respiration; if this be injured, breathing stops, and the individual dies of asphyxia. Here also is the centre which presides over the nerves going to the blood-vessels, stomach and kidneys.

There are other centres in the brain whose physiology is little understood.

The brain gives origin to nine pairs of nerves, called the *cranial nerves*, beside those which pass out with the spinal cord. They are:

First pair, olfactory, the special nerves of smell.

Second pair, optic, the special nerves of sight.

Third pair, motor of the eye, supplying all the muscles of the eye except two.

Fourth pair, pathetic, going to the superior oblique muscles of the eye.

Fifth pair, trifacial, a small motor nerve going to the muscles of the gullet and cheek, and a large sensory nerve, which supplies the face and neck.

FIGURE 62.--Nerves of the face and scalp: 1, attrahens aurem muscle; 2, anterior belly of occipito-frontalis; 3, auriculo-temporal nerve; 4, temporal branches of facial nerve (7th); 5, attollens aurem muscle; 6, supra-trochlear nerve (5th); 7, posterior belly of occipito-frontalis; 8, supra-orbital nerve (5th); 9, retrahens aurem muscle; 10, temporal branch of orbital nerve (5th); 11, small occipital nerve; 12, malar branches of facial nerve; 13, posterior auricular nerve (7th); 14, malar branch of orbital nerve (5th) (subcutaneous malæ); 15, great occipital nerve; 16, infra-orbital branches of facial nerve (7th); 17, facial nerve (7th); 18, nasal nerve (5th); 19, cervico-facial division of 7th; 20, infra-orbital nerve (5th); 21, branches to digastric and stylo-hyoid (7th); 22, temporo-facial division of 7th; 23, great auricular nerve; 24, buccal branches of facial nerve; 25, trapezius; 26, buccinator [long buccal] nerve (5th); 27, splenius captis; 28, masseter; 29, sterno-mastoideus; 30, supra-maxillary branches of facial nerve (7th); 31, superficial cervical nerve; 32, mental nerve (5th); 33, platysma; 34, infra-maxillary branches of facial nerve (7th).

Sixth pair, *abducens*, going to the muscles which roll the eyes outward.

Seventh pair consists of a soft portion, which is the special nerve of hearing, and a hard portion, which is the motor nerve of the facial muscles.

Eighth pair, a large nerve, consisting of the *glosso-pharyngeal*, which is the nerve of taste; the *pneumogastric*, or par vagum, which presides over swallowing, the movements of the stomach and intestines

respiration, and the movements of the heart; and the *spinal accessory*, a motor nerve of the muscles of the neck.

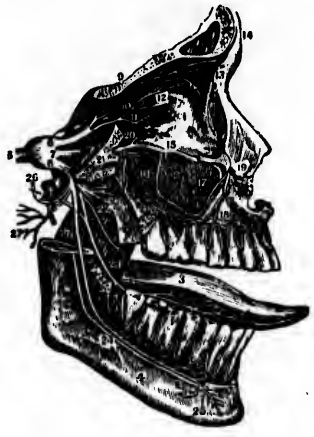


FIGURE 63.—Distribution of the fifth pair: 1, orbit; 2, antrum highmorianum; 3, tongue; 4, lower jaw-bone; 5, root of the fifth pair forming the ganglion of Gasser; 6, first branch of the fifth pair; 7, second branch; 8, third branch; 9, frontal branch; 10, lachrymal branch; 11, nasal branch; 12, internal nasal nerve; 13, external nasal nerve; 14, external and internal frontal nerve; 15, infra-orbital nerve; 16, posterior dental branches; 17, middle dental branch; 18, anterior dental nerve; 19, terminating branches of the infra-orbital nerve; 20, orbitar branch; 21, pterygoid, or recurrent nerve; 22, five anterior branches; 23, lingual branch of the fifth; 24, inferior dental nerve; 25, its mental branches; 26, superficial temporal nerve; 27, auricular branches; 28, mylo-hyoid branch.

Ninth pair, hypoglossal, is the motor nerve of the tongue.

All these nerves arise from distinct centres in the brain substance, and pass through separate openings in the skull. They are the channels of communication between the organs of special sense and the brain. The eye, the most delicately constructed organ of the body, has, beside its special nerve by which we appreciate visual impressions, three pairs of nerves, which regulate the motions of its numerous muscles.

The pneumogastric nerve, which is a part of the eighth pair, is the *regulator* of the actions of the heart, lungs and digestive organs, which also receive their nerve force from the spinal nerves.

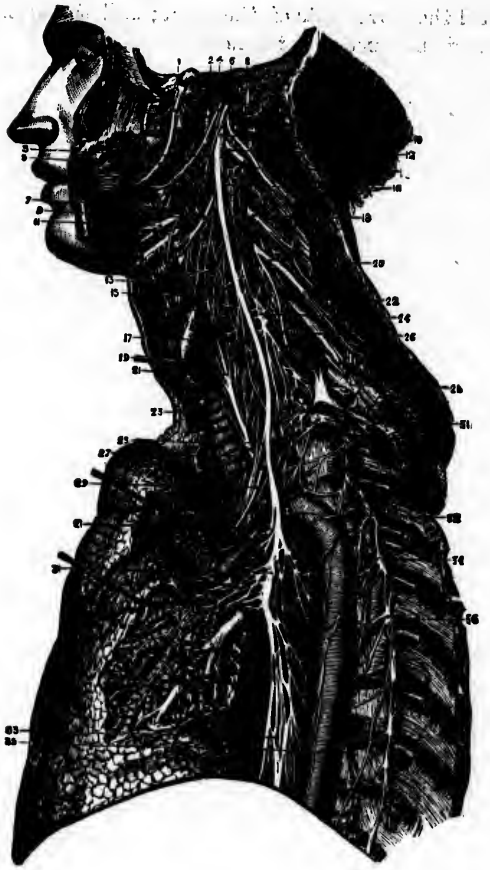
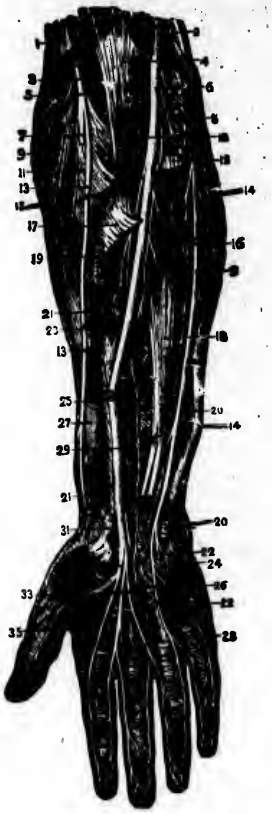


FIGURE 64.—Distribution of the eighth pair of nerves on the left side: 1, Gasserian ganglion of 5th nerve; 2, internal carotid artery; 3, pharyngeal branch of pneumogastric; 4, glosso-pharyngeal nerve; 5, lingual nerve (5th); 6, spinal-accessory nerve; 7, middle constrictor of pharynx; 8, internal jugular vein (cut); 9, superior laryngeal nerve; 10, ganglion of trunk of pneumogastric nerve; 11, hypoglossal nerve (cut) on hyoglossus muscle; 12, ditto (cut) communicating with eighth and first cervical nerve; 13, external laryngeal nerve; 14, second cervical nerve looping with first; 15, pharyngeal plexus on inferior constrictor; 16, superior cervical ganglion of sympathetic; 17, superior cardiac nerve of pneumogastric; 18, third cervical nerve; 19, thyroid body; 20, fourth cervical nerve; 21, 21, left recurrent laryngeal nerve; 22, spinal-accessory communicating with cervical nerves; 23, trachea; 24, middle cervical ganglion of sympathetic; 25, middle cardiac nerve of pneumogastric; 26, phrenic nerve (cut); 27, left carotid artery (cut); 28, brachial plexus; 29, phrenic nerve (cut); 30, inferior cervical ganglion of sympathetic; 31, pulmonary plexus of pneumogastric; 32, [arch of the] thoracic aorta; 33, œsophageal plexus; 34, vena azygos superior; 35, vena azygos minor; 36, gangliated cord of sympathetic.

The Spinal Nerves.

The spinal nerves, arising from the spinal cord by two roots, unite within the spinal canal, and form a single cord on either side, and, after passing through the opening between the vertebræ divide into two trunks, one for the anterior, the other for the posterior surface of the body.



The anterior branches of the four upper cervical nerves unite with each other to form the *cervical plexus*, which gives off muscular branches to the side of the head, neck, shoulder, chest and diaphragm. The anterior branches of the fifth, sixth and seventh cervical nerves unite, the fifth receiving a branch from the fourth; the eighth cervical and first dorsal nerves unite; these two cords form the brachial plexus, and after sending nerve trunks to the muscles of the neck and sides of the chest, below the collar-bone, these two trunks each send off a branch which unite to form a third or posterior trunk, which divides into two branches, supplying the muscles and skin of the outside and back of the arm, forearm and hand. The inner and outer trunk are continued down the inside of the arm, and again each sends a branch to form a middle cord, the median nerve. The external cord then becomes the *musculo-cutaneous*, and the internal the *ulnar*.

FIGURE 65.—Deep dissection of the front of the forearm and hand: 1, supinator longus (cut); 2, ulnar nerve; 3, brachialis anticus; 4, biceps; 5, musculo-spinal nerve; 6, median nerve; 7, posterior interosseous nerve; 8, pronator teres and flexor carpi radialis (cut); 9, extensor carpi radialis longior (cut); 10, brachial artery; 11, supinator brevis; 12, flexor sublimis digitorum (out); 13, 13, radial nerve; 14, 14, flexor carpi ulnaris; 15, extensor carpi radialis brevior; 16, ulnar artery; 17, radial origin of flexor sublimis digitorum (out); 18, flexor profundus digitorum; 19, tendon of pronator teres (cut); 20, 20, dorsal branch of ulnar nerve; 21, 21, radial artery; 22, 22, deep branch of ulnar nerve; 23, flexor longus pollicis; 24, abductor minimi digiti; 25, anterior interosseous nerve; 26, digital branches of ulnar nerve; 27, tendon of supinator longus (cut); 28, one of the lumbricales muscles (cut); 29, pronator quadratus (cut open); 31, tendon of flexor carpi radialis (cut); 33, digital branches of median nerve; 35, abductor pollicis.

The median nerve crosses the brachial artery, and after giving off muscular branches in the arm, and branches to the skin of the hand, it divides into five digital branches, which supply the two sides of the thumb, and the contiguous sides of the second, third, and ring fingers. The *ulnar* nerve is placed on the inner side of the arm, and supplies the forearm, hand, and the outside of the ring and both sides of the little finger. The *musculo-cutaneous* supplies the skin and muscles of the forearm and wrist.

The twelve spinal nerves given off in the dorsal region send anterior branches along the ribs, and posterior branches to the muscles of the back.

The five lumbar nerves send posterior branches to the muscles of the back; the anterior branches of the first four unite to form a plexus, which sends branches to the muscles of the belly and the genital organs; the largest branch, the *crural* nerve, passes out of the abdomen to the outside of the femoral artery, and is distributed to the front of the thigh. The fifth lumbar nerve joins the sacral nerves to form the sacral plexus, which supplies the tissues in the vicinity; the largest branch, the *great sciatic* nerve, passes out of the pelvis behind the thigh bone, and down the thigh to the knee, where it divides into two cords, the *external* and *internal popliteal* nerves; these are continued down the leg as the *anterior* tibial and posterior tibial, to supply the tissues of the leg and foot.

The sympathetic system consists of *gan-*

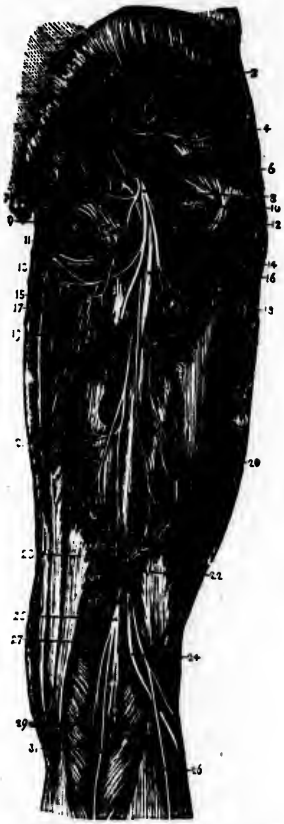


FIGURE 66.—Nerves of the thigh: 1, gangliated cord of sympathetic; 2, third lumbar nerve; 3, branches to iliacus internus; 4, fourth lumbar nerve; 5, anterior crural nerve; 6, lumbosacral nerve; 7, branch to psoas; 8, obturator nerve; 9, external cutaneous nerve (cut); 10, nerve to pectineus; 11, superficial division of anterior crural nerve (cut); 12, superficial division of obturator nerve; 13, 13, sartorius muscle; 14, 14, adductor longus; 15, branch to rectus; 16, deep division of obturator nerve; 17, branches to vastus externus and crureus; 18, adductor brevis; 19, branch to vastus internus; 20, adductor magnus; 21, vastus externus; 22, 22, internal saphenous nerve; 23, rectus femoris; 24, patellar branch of saphenous nerve; 25, vastus internus; 26, gracilis.

FIG. 67.

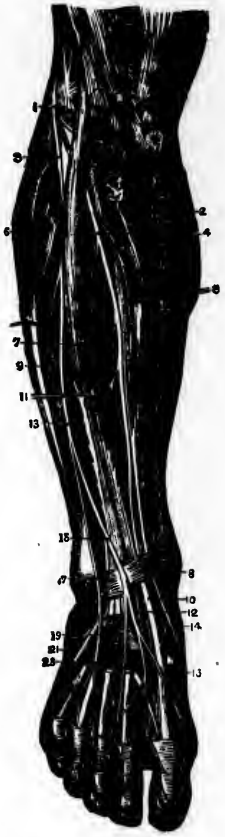


FIG. 67a.

FIGURE 67.—Buttock and back of the thigh : 1, gluteus maximus ; 2, gluteus medius ; 3, gluteal artery and nerve ; 4, gluteus minimus ; 5, nerve to obturator internus ; 6, pyriformis ; 7, pudic nerve ; 8, small sciatic nerve ; 9, great sacro-sciatic ligament ; 10, obturator internus and gemelli ; 11, inferior gluteal nerve from small sciatic ; 12, tendon of obturator externus ; 13, inferior pudendal nerve (Soemmering) ; 14, quadratus femoris ; 15, gracilis ; 16, great sciatic nerve ; 17, adductor magnus ; 18, insertion of gluteus maximus ; 19, united origins of semi-tendinosus and biceps ; 20, short head of biceps ; 21, semi-membranosus ; 22, tendon of biceps ; 23, tendon of semi-tendinosus ; 24, external popliteal nerve ; 25, internal popliteal nerve ; 26, communicans fibularis [or c. peronei] nerve ; 27, popliteal artery ; 29, gastrocnemius ; 31, communicans tibialis [or external saphenous] nerve.

FIGURE 67a.—Front of the leg ; 1, external popliteal nerve ; 2, anterior tibial artery ; 3, musculo-cutaneous nerve ; 4, anterior tibial nerve ; 5, peroneus longus ; 6, tibialis anticus ; 7, extensor longus digitorum ; 8, anterior annular ligament ; 9, peroneus brevis ; 10, tendon of extensor proprius pollicis ; 11, extensor proprius pollicis ; 12, dorsal artery of foot ; 13, point at which musculo-cutaneous nerve pierces the fascia and divides ; 14, tendon of tibialis anticus ; 15, internal branch of musculo-curtaneous nerve ; 16, cutaneous branch of anterior tibial nerve ; 17, external branch of musculo-cutaneous nerve ; 19, deep branch of anterior tibial nerve ; 21, external saphenous nerve ; 23, extensor brevis digitorum.

glia connected by nerve trunks, which send nerves to the digestive organs, the heart, lungs, bloodvessels, and communicate also with the cerebro-spinal system. They are found in pairs, except at the end of the spine, where there is but one. A *ganglion* consists of nerve cells and fibres going from them. These ganglia are found in the head, neck, and all along the spinal column. From these ganglia also go branches to form plexuses, of which there are two for the heart, and a large one for the digestive apparatus, the *solar plexus*, which consists of two semi-lunar ganglia. The physiology of the sympathetic is not clearly understood, as its branches are more or less mixed with those of the cerebro-spinal system, but its main function seems to be to carry on the processes of organic life.

THE DIGESTIVE APPARATUS.

The digestive apparatus consists of the alimentary canal from the mouth to the anus, and of various organs, whose secretions are used in the process of digestion and absorption. The alimentary canal is a tube lined by mucous membrane, about thirty feet long, consisting of the mouth, pharynx, gullet, stomach, small and large intestine. The accessory organs are the teeth, salivary glands, liver, pancreas and spleen.

FIGURE 68.—Salivary glands: 1, parotid gland; 2, duct of Steno; 3, submaxillary gland; 4, its duct; 5, sublingual gland.

The mouth is an oval cavity, containing the tongue and teeth. In front it is bounded by the lips, laterally by the cheeks, above by the hard palate, and below by the tongue, and behind by the pharynx and

soft palate. It is lined throughout by mucous membrane, containing many mucous glands. Into the mouth empty the salivary glands, which secrete saliva, a substance which not only moistens the food, but also changes the composition of starch, as we shall see later. These glands are six in number, viz.: The two *parotid* glands, which are situated behind the angle of the jaw-bone and in front of the ear; they empty into the mouth by means of *Steno's* duct, opposite the second upper molar tooth. They are the seat of inflammation in mumps. The two *submaxillary* glands, lying beneath the horizontal lower borders of the jaw, and the two *sublingual* glands lying beneath the tongue. The parotid saliva is thinner and more watery than the other. (For a description of the teeth see the chapter on Teeth.)

FIGURE 69.—Upper surface of the tongue: *a*, one of the circumvallate papillæ; *b*, one of the fungiform papillæ; *d*, conical papillæ; *e*, glottis and epiglottis.

The tongue, beside being the organ of taste, helps to mix the saliva with the food, and forces the food between the teeth to be divided. It consists principally of muscular tissue, spread out like a fan, and supported by numerous other muscles. It is covered by mucous membrane, which passes from its lower surface to form the floor of the mouth beneath it. The top of the tongue is covered with numerous mucous glands and elevations, the *papillæ*. These papillæ are supplied by loops of blood-vessels and nerves, and are the seat of the sense of taste. At the base of the tongue are from eight to ten large papillæ surrounded by a ridge, and by these we appreciate bitter tastes.

Behind the mouth is a muscular sac, about four and a half inches long, the *pharynx*, which is continuous with the gullet below. It is attached above to the skull, and communicates with the nose and ear; behind it is attached to the cervical vertebræ; in front it is continuous with the mouth; at the sides it is bounded by the muscles of the neck, and below is the opening of the larynx, opposite which it becomes the gullet, or œsophagus.

The *œsophagus* is a muscular tube, about nine inches long, extending from the pharynx to the stomach. It is lined by mucous membrane, and passing through an opening in the diaphragm, enters the stomach.

THE STOMACH.

The stomach is the principal organ of digestion, and is the largest part of the alimentary canal. Its form is conical, being curved upon itself, having a large rounded base turned toward the left side. It is situated beneath the diaphragm and liver, and above the intestines. When moderately full it is about twelve inches in length and four in diameter. It swings free in the abdominal cavity, being supported by its upper curved border. The opening of the œsophagus into its larger or cardiac end is called the *cardiac* orifice, and the opening from its lesser end into the intestines, the *pylorus*. The stomach is composed of four coats, viz.: a serous coat of peritoneum outside to prevent friction; a muscular coat consisting of fibres running circularly, longitudinally and obliquely; a cellular coat, which supports the blood-vessels, going to the mucous membrane, and, finally, it is lined by a thick red mucous membrane, which, when the organ is contracted, is thrown into folds and ridges. When examined by a lens, the surface of the mucous membrane is covered by numerous shallow depressions, separated by ridges. Into these depressions empty numerous little tubular glands, the *peptic*, or *gastric* glands, which secrete the fluid which is the active agency in digestion. The opening from the stomach into the intestines is guarded by a fold of mucous membrane. The small intestine is about twenty feet in length, one inch in diameter, and extends from the stomach to the cæcum, into which it empties. It is connected to the spine by a fold of peritoneum, the *mesentery*, and is contained in the lower and central portion of the abdomen. It is divided, beginning above, into the

FIGURE 70.—The Stomach.

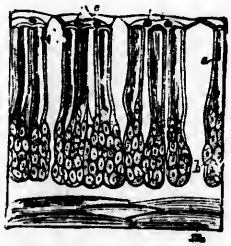


FIGURE 71.—Perpendicular section of gastric tubules; *a*, neck of a gastric tubule; *b*, fundus; *c*, orifices of tubules; *m*, muscular coat.

duodenum, the *jejunum*, and the *ileum*. Into the duodenum empty the ducts of the pancreas and the liver. The small intestine has four coats similar to those of the stomach. The mucous membrane is laid in

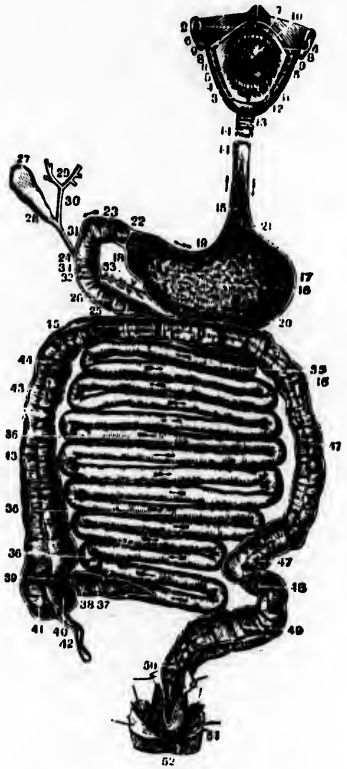


FIGURE 72.—Organs of digestion: 1, upper lip; 2, frænum; 3, lower lip; 4, frænum; 5, cheek; 6, duct of Steno; 7, roof of mouth; 8, half arches; 9, tonsils; 10, velum pendulum; 11, tongue; 12, papillæ; 13, trachea; 14, œsophagus; 15, its interior; 16, stomach; 17, its greater end; 18, its lesser end; 19, lesser curvature; 20, greater curvature; 21, cardiac orifice; 22, pylorus; 23, 24, 25, duodenum; 26, valvulæ conniventes; 27, gall bladder; 28, cystic duct; 29, 30, hepatic duct; 31, ductus communis choledochus; 32, its opening; 33, 35, jejunum; 34, opening of pancreatic duct; 36, 38, ileum; 37, v. conniventes; 39, ileo-cæcal valve; 40, 41, cæcum; 42, appendix vermiformis; 43–48, colon; 49, 50, rectum; 51, levator ani muscle; 52, anus.

transverse folds throughout its whole length, the *valvulæ Conniventes*, and thus increase its absorbing surface. From the surface project minute processes, the *villi*, which give to it its velvety appearance. A

villus consists of a process of loose areolar tissue, covered by epithelium and containing a loop of capillaries supplied by an artery, and emptying into a vein. From the meshes of the areolar tissue starts a small vessel, a *lacteal*, which empties into the thoracic duct, carrying the product of digestion. Beside these there are small glands which are found either alone, the "solitary glands," or together, forming "Peyer's patches;" and Brunner's gland, and Lieberkuhn's follicles, all of which together secrete the intestinal juice whose principal action is to lubricate the food.

The large intestine is about five feet in length, running from the enlarged pouch, the cæcum, into which the small intestine empties, to the anus, where it ends. It is about three times as large as the small intestine; has no villi, and its thin walls are thrown into folds or pouches. It consists of a dilated portion or pouch, the *cæcum*, which is situated in the right lower portion of the abdomen, the colon, sigmoid flexure, and rectum. Into the cæcum the small intestine empties, its orifice being closed by a valve-like fold of mucous membrane. From the cæcum arises a small piece of bowel about five inches long, and one-quarter inch in diameter, the worm-like or *vermiform appendix*. The *colon* extends from the cæcum up the right side, across the stomach and down the left side to end in the *sigmoid flexure*, or S-shaped curve, which, leaving the left side of the body, reaches the middle line and becomes the *rectum*, and runs along the hollow of the sacrum to end at the anus. In the mucous membrane of the large intestine are numerous solitary glands and simple follicles. The rectum is guarded by a sphincter muscle which is under the control of the will.

The *pancreas*, or sweetbread, is a long narrow gland lying behind the stomach, having an enlargement on the left extremity. It is about seven inches in length, and the extremity or head is about one and one-half inches wide. The tail is attached to the duodenum, into which it pours its secretion.

PHYSIOLOGY OF DIGESTION.

The food having been taken into the mouth, is broken up by the teeth, and at the same time thoroughly mixed with saliva, which is alkaline and by means of a ferment, *ptyalin*, changes the starch in the food into glucose or grape sugar. The mass of chewed food is pressed back into the pharynx by the tongue and muscles of the palate, and is there seized by the constrictors of the pharynx and forced down the gullet.

The larynx being drawn up, the epiglottis folds down over it, and prevents the food from getting into the air passages. This is especially useful in preventing fluids from entering the larynx. If a portion of food does find its way in, it irritates the vocal cords, and is immediately

FIGURE 73.—The lymphatics: *a*, receptaculum chyli, commencing the thoracic duct; *c*, descent of the latter to its termination; *v*, innominate vein.

expelled by coughing. During the passage of the food the soft palate swings back against the posterior wall of the pharynx and prevents any of it getting into the posterior nares. The food passes into the stomach, which begins to undergo movements to facilitate its passage, and at the

same time to secrete the gastric juice, which is thoroughly mixed with it. Sometime there is an hour-glass contraction of the stomach, caused by these muscular contractions. During digestion the two openings of the stomach are closed by muscular contraction, except that fluids and digested food may pass the pylorus into the small intestine. This gastric juice is acid, and contains a ferment, *pepsin*, which has the power of liquifying albuminous articles of food, forming fluid albumen or *peptone*. Upon starch it has no action, and none upon fat except to dissolve the little sacs in which it is contained and set free the fat to be digested in the intestine. Very little digested albumen is absorbed from the stomach by the blood. The partly digested food passes out of the stomach into the intestine, where the largest part of digestion and absorption takes place. Here it meets the pancreatic juice and the bile.

Pancreatic *juice* is alkaline; it changes starch into glucose, in which form it gets into the blood; it digests albumen and renders it fluid, and together with bile it emulsifies fats; that is, divides it up into minute globules, so that it can pass into the lacteals. Besides this action bile prevents the digested food from fermenting and aids the movements of the intestine. In the large intestine very little change takes place in the digested food, except that it becomes dryer by absorption until the refuse is expelled by the anus. How soon does the digested food get into the blood to nourish the body? By means principally of the intestinal villi, which we have described. These little projecting sponges take up the fat, sugar and albumen, as fast as they are digested, and squeeze them into the lacteal vessels, which run together to form the thoracic duct, which empties into the subclavian vein. Part of the food is also taken up from the mucous membrane by the veins in the intestines, and carried to the liver. The entire time for digesting a mixed meal would be from three to four hours. There is in health always more or less gas in the intestine, which is mostly the product of fermentation.

THE LIVER.

The liver is the largest gland in the body, weighing about four and one-half pounds. It is situated in the upper part of the abdominal cavity, on the right side, lying just beneath the diaphragm. Its upper surface is smooth and convex, and is divided into two unequal portions, or *lobes*, by the suspensory ligament, the right one being much the larger. Its under surface is concave, and is in relation with the duodenum and stomach. This surface is also divided into right

and left lobes by a deep fissure, the portal fissure, by which the vessels enter the liver. The liver is held in position by folds of peritoneum, forming ligaments, which go to the diaphragm and the abdominal walls, and also a round ligament which runs to the navel and is the remains of the vein which nourishes the child through fœtal life. The liver is covered by peritoneum, and beneath this by a thin fibrous coat. Its substance is made up of lobules measuring about one-twentieth of an inch in diameter, and held together by connective tissue, in which the vessels and ducts ramify. These lobules are made up of polygonal cells, bile ducts, veins, and probably nerves. The portal vein and hepatic artery run in the tissue between the lobules, the portal vein sending branches which form a plexus *about* the lobule (the interlobular veins). This blood is collected by minute branches, which start in the centre of each of the lobules, the *intra-lobular* veins, which run together to form the hepatic vein. From the centre of the lobules start the bile ducts, which coalesce to form two large ducts, one for each lobe, which unite to form the hepatic duct, a trunk about an inch and a half long, which unites with the *cystic* duct from the gall-bladder to form the common duct, which empties into the duodenum.

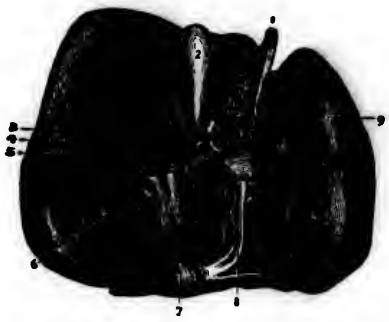


FIGURE 74.—Under surface of the liver: R, right lobe; L, left lobe; Q, lobus quadratus; S, lobus Spigelli; C, lobus caudatus; 1, umbilical vein in longitudinal fissure; 2, gall-bladder in its fissure; 3, hepatic artery in transverse fissure; 4, hepatic duct in transverse fissure; 5, portal vein in transverse fissure; 6, Line of reflexion of peritoneum; 7, vena cava; 8, obliterated ductus venosus; 9, ductus communis choledochus.

The *gall* bladder is a pear-shaped bag, lying on the under surface of the liver, which is lined by mucous membrane, and serves as a receptacle for the bile during the intervals of digestion. The function of the liver is to secrete bile, and to carry on certain changes in the absorbed products of digestion.

The amount of bile secreted in twenty-four hours is about two and one-half pounds. It is a thick, viscid fluid varying in color from a yellowish green to a reddish brown. It contains two coloring matters—*bilirubin* and *biliverdin;* taurocholate and glycocholate of soda and cholesterine. Its action upon digestion is to prevent fermentation and the formation of large quantities of gas, to aid in the digestion and

absorption of fats, to increase the movements of the intestines, and to excrete from the system cholesterine, which is a waste product of nerve force. The liver, besides the secretion of bile, has the power to form sugar from the absorbed food. This is known as its *glycogenic* or sugar-making function. The cells act upon the chyle which comes to them by the portal vein, and changes portions, especially those of vegetable origin, but also albumen, into glycogen or liver sugar, which is carried off by the blood to nourish the tissues.

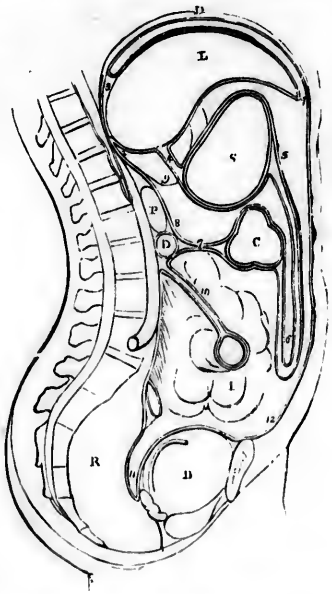
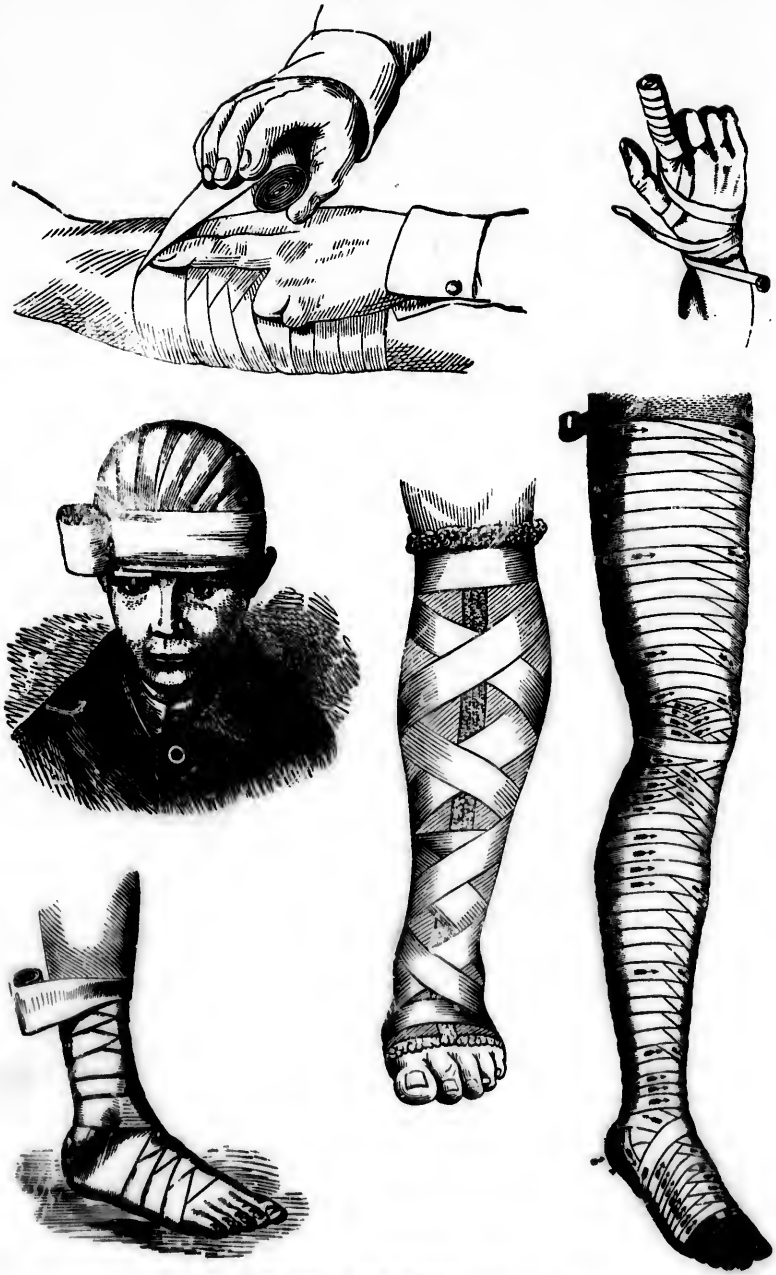


FIGURE 75.—The peritoneum: D, diaphragm; L, liver; S, stomach; C, transverse colon; D, transverse duodenum; P, pancreas; I, small intestines; R, rectum; B, bladder.

THE PERITONEUM.

All the contents of the abdominal cavity are covered by a serous membrane known as the *peritoneum*, containing between its two layers sufficient fluid to render the movements of the organs perfectly smooth. The omentum is a double fold which falls from the front of the stomach nearly to the bladder, and, rising again, is attached to the colon.

BUCHANAN BURR, M.D.



44 BANDAGES.—FIG. 1.

BANDAGING.

In caring for the sick it is very necessary to know how bandages should be applied.

Bandages are of various kinds, most of them having special names, either from their originators, from their shape, their use, or, perhaps, from a fancied resemblance to something.

Use.—Bandages are used to hold injured parts together, to apply dressings, to protect the parts, etc.

Method of Application.—They should be applied quickly, which can only be done after considerable practice; easily, by having everything ready; without pain to the patient; and lastly, so that they will make a good appearance on inspection.

The parts should not be *crowded* together by the bandage, but they should be nicely adjusted beforehand, the object of the bandage being merely to give *support*.

An endless variety of bandages has been invented and used in times past, but a few of the principal shapes include everything of practical value. The more important ones will be described.

The Roller Bandage.—This is made of bleached or unbleached muslin, which is torn into strips, varying from one-half to five inches in width, and up to ten yards long.

For the chest and abdomen, three to five inches is a suitable width; for the extremities, one and one-half to two inches is found to be the most convenient size; for the fingers, one-half to three-quarters of an inch is proper, depending a good deal on the size of the fingers. Bandages from two to five inches wide should be from five to ten yards long; bandages one and one-half inches wide and less should be from three to five yards long. No precise rule can be laid down in such matters, but the above sizes will be found to be very convenient.

After the muslin is *torn* in strips, these should be rolled up as tightly as possible; the tighter they are rolled, the more easily are they used.

This cut represents the simplest and best variety of machine for rolling bandages. It consists of a framework, through the upper part of which passes a *square* bar (rounded where it corresponds to the uprights) with a handle attached.

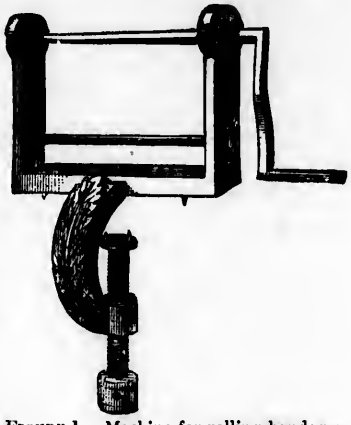


FIGURE 1.—Machine for rolling bandages.

The strip of muslin being spread out, one end is passed beneath the lower bar seen in the cut, and then over the upper one, which being turned by the other hand, soon rolls the whole bandage; care should be taken that it is rolled tightly, by keeping it tense. After it has been rolled up, it should be seized with the left hand, and held firmly, while the crank is turned in the same direction, so as to still more tighten up the bandage. After this has been done, several turns in the reverse direction may be made, which will allow the spindle to be withdrawn from the bandage.

Another method of rolling these bandages is to take one end and spread it on the right thigh, roll up a few inches, and then, applying the palm of the right hand to it, roll it up, passing down to the knee, the left hand keeping it tense as it is rolled. After a bandage has been started in this manner, it may be taken in the hands and finished.

Bandages rolled in this manner are never so tightly rolled as if the machine had been used.

The edges should be kept true, and, when finished, the loose threads should be picked off and the end of the bandage secured with a pin.

The T *Bandage.*—This, as its name implies, is made by sewing one piece of bandage at right angles to another. The ends may be of various lengths, according to the use to which they are to be put. The lower branch of the T may be split so as to form two ends. This bandage is very useful in retaining dressings, etc., on the groin, buttocks, and between the thighs. One part of the bandage passing around the waist is tied in front, the branch of the T passing down

from behind, between the thighs, and brought up in front, then torn in two strips, one passing on either side, is tied to the band about the waist. This bandage should be made of material three inches wide.

FIGURE 2.—The roller bandage.

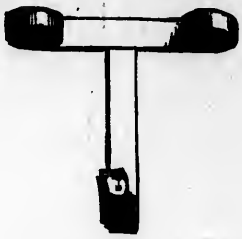


FIGURE 3.—The T bandage.

The Many-tailed Bandage.—This bandage may be made in two ways, either by taking a piece of muslin long enough to cover whatever part of the limb is necessary, and wide enough to go one and one-half times around it, and tearing it from each side toward the centre. The strips should be about two inches in width, and the tears should extend to within two inches of each other in the centre. Or, several strips of ordinary two-inch bandage may be laid along-side each other, overlapping slightly, and attached at the middle to a band crossing them at right angles. This latter form is better than the first, because each band can be made to overlap the previous one and thus support it.

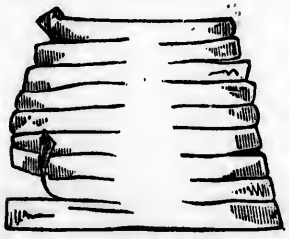


FIGURE 4.—Many-tailed bandage.

This bandage is principally used for the lower extremity, when dressings are to be removed and re-applied without disturbing the limb.

In applying it, the central portion is to be placed against the posterior surface of the limb, and the corresponding ends brought together in front and tied snugly over the dressing.

The Maltese Cross.—This bandage is made of any required size by simply taking a square piece of muslin and cutting slits from the four corners to within two inches of the centre. At the centre, a small opening the size of a dime should be made, to allow the discharges to escape. This bandage is mainly used for dressing the stumps of amputated limbs, as it folds around them smoothly, the ends overlapping each other.

FIGURE 5.—Maltese cross.

The Triangular Bandage.—In one shape or other this form of bandage has been used from time immemorial, but of late Dr. Esmarch, of Germany, has brought it into prominence. As recommended by him, it consists of a single or double thickness of cloth (muslin is to be preferred), the lower border of which is four feet long, the two sides each being about thirty-four inches in length. For many purposes this size is convenient, but it may be made of any convenient size. Several diagrams will be given, showing how it may be made use of for supporting the arm, etc.

METHOD OF APPLYING THE ROLLER BANDAGE.

As this is the bandage which is most often used, an endeavor will be made to give minute directions as to the various methods of applying it to the best advantage. We will suppose a leg is to be bandaged, beginning at the ankle. The bandage (previously tightly rolled) is to be taken in the right hand; the *outer* side of the initial end of the bandage should be placed against the side of the leg, and held there with the thumb of the left hand. The bandage is now to be unrolled until the right hand can go no farther (the bandage being kept tense all the time), when it can usually be seized by the fingers of the left hand, and brought around over the end of the bandage, which has now been held by the right hand. One or two turns may be made to confine the end of the bandage, and, then, as the leg begins to taper, it will be found that the lower edge of the bandage does not lie snugly against the limb. In order to obviate this, the bandage must be "reversed" at each turn. These "reverses" should always be made on the outer side of the limb, and never over hard prominences. The bandage should always be kept tense, except when turning it to make the reverses. Now, after the first few turns have been taken, and the leg begins to taper, as the bandage is brought under the limb, the fingers of the left hand should press on it, the right holding the roller and unrolling six to eight inches of it. When beginning the reverses, the unrolled portion should extend toward the knee in a slightly diagonal direction. After the bandage has been unrolled, it should be slackened, and by a sudden turn of the right hand, the *upper* edge of the bandage should be turned down so that it now

becomes the lower edge, the bandage being drawn tight, and passing in a *downward* direction under the leg, and up on the opposite side, when the same manœuvre is to be repeated, until the prominence just below the knee is reached. Each turn of the bandage should lap over at least one-half of the preceding turn. The bandage if applied in this manner, will present an appearance such as is shown in the cut.

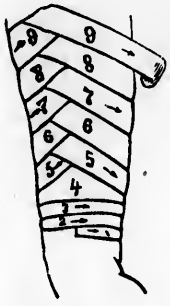


FIGURE 6.—Roller bandage, showing the method of reversing.

Another method of applying the roller is as a "figure of eight." The beginning is made as before, but instead of "reversing," the bandage is carried over the front of the shin in a diagonal direction, to the middle of the under-surface of the calf, then passing in a diagonal direction *downward*, overlapping the turns at the beginning. The following turns are made in the same manner, going diagonally upward, under the calf, and down over the front of the leg, each turn partly covering its predecessor. By this method more material is used, and the upper part of the "figure of eight" does not lie smoothly; but this is of no importance, as it is covered by the succeeding turns.

When put on in this manner the bandage will remain in position much longer than by the first method, and this is of considerable importance when used for bandaging an ulcer, perhaps on the leg of a person who is obliged to be about all day.

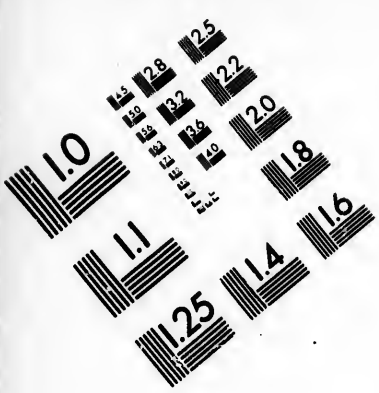
As a rule, the "figure of eight" is used about the joints, as will be explained later.

When bandaging the arm and forearm and the lower extremities of persons confined in bed, the "reverse" may be used, as it is just as effective and requires less material.

FIGURE 7.—Method of fastening the end of the bandage.

To confine the bandage the *end* should be folded on itself, its corners again folded under, a blunt-pointed shape being thus produced; a pin should be passed into it in the direction from which the end of the bandage has come, which will prevent the strain of the bandage and the rubbing of the bedclothes from loosening it. If the bandage be a wide one two pins may be required.

A brief description will now be given of special bandages for the various parts of the body, beginning at the head.



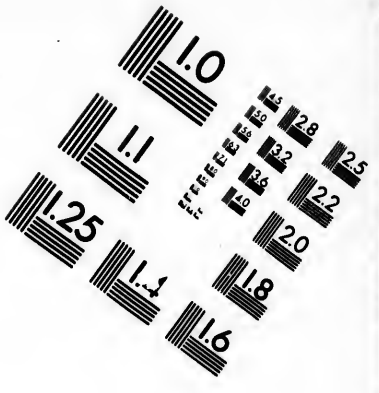
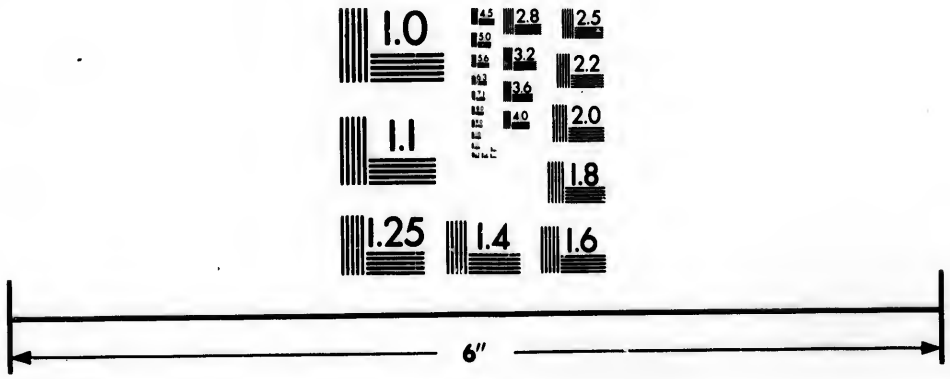


IMAGE EVALUATION TEST TARGET (MT-3)



Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

2.5
2.2
2.0
1.8
1.0

BANDAGES FOR THE HEAD.

The Skull-cap.—This bandage should be from one and one-half to two inches in width, and from five to ten yards long.

Application.—Begin by making several circular turns around the head, the lower edge of the bandage just touching the ears and eyebrows. After these turns have been taken, each successive turn should pass about one-half inch higher at the sides, but come down to the same level in front and behind. In this manner the sides of the head can be covered, and when the bandage cannot be drawn tightly without slipping, each turn may be fastened with a pin in front and behind, until the whole head is covered. The whole may be finished by taking several turns over the original ones, thus rendering the whole more secure.

Care should be taken not to draw the turns about the forehead too tight, else it soon causes discomfort and the whole must be removed. Several other methods may be adopted, as is shown in other cuts.

FIGURE 8.—The skull-cap.

This bandage is used for retaining dressings on any part of the head, especially the upper or top part of the skull. The great objection to it is, that the circular turns must be drawn quite tight to keep the others in place, this sometimes interfering with the circulation.

SIMPLE CIRCULAR BANDAGE OF THE HEAD.

This may be of the same width as the former, and from two to five yards long.

Application.—Place the end of the bandage at the centre of the forehead, confining it with the thumb of the left hand; make several circular turns about the forehead as before, and, if necessary, each succeeding turn may extend a little higher. If the temporal artery, for instance, be wounded, the bandage may include the ear, extending both above and below it on the injured side.

This bandage may be used for any wound of the side or back of the head, the forehead, ears, etc.

FIGURE 9.—Showing method of applying the ordinary four-tailed bandage to the head.

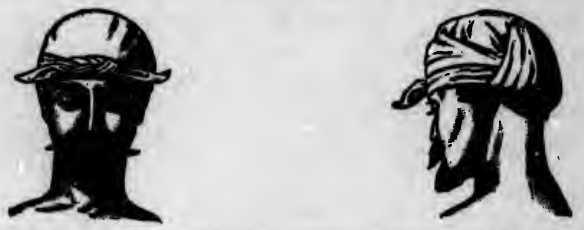


FIGURE 10.—Front and side view, showing application and use of the ordinary triangular bandage.

The Fillet or Head-band.—Take a piece of flannel twenty-five to thirty inches long and about ten inches wide. At the centre of the bandage, one-half inch from the lower edge, cut a triangular hole, large enough for the nose (see cut).

FIGURE 11.—The fillet or head-band.

Application.—Stand behind the patient and place the bandage over the face, the nose projecting through the hole, the remainder of the upper part of the face being covered. The ends are brought together behind, and pinned.

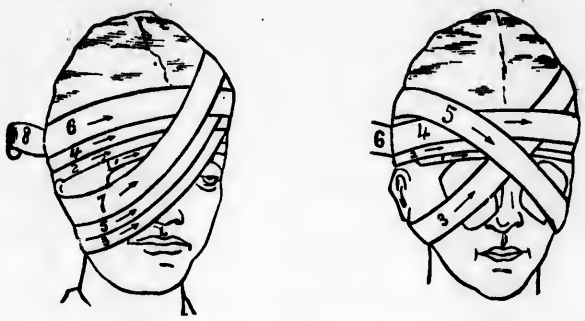
This is an admirable bandage for retaining dressings on the face and eyes, and it may also take the place of the following. It is especially useful in burns of the face.

BANDAGE FOR THE EYES (SINGLE)

The length and width of this is about the same as the circular one for the forehead.

Application.—If the right eye is to be bandaged, stand behind the patient, make several circular turns about the forehead, then, when the bandage is brought around behind again, it should pass downward

below the right ear, and up over the inner part of the eye, and around the head, partly covering the turns previously made. The bandage may



FIGURES 12 and 13.—Single and double eye-bandage.

be carried below the ear and back again, until the whole eye is covered. The end may then be confined by one circular turn.

Before applying this bandage, the eye should be covered with a compress of cotton.

When both eyes are to be covered, the bandage should be somewhat larger, and every other turn should be carried under the left ear, covering the left eye also. Pins may be used wherever the bandages cross each other, as the various turns are liable to slip on each other unless they are thus secured.

FIGURE 14.—Bandage for chin.

BANDAGE FOR THE CHIN.

This bandage should be one and a half inches wide and about nine yards long.

Standing at the back of the patient, the end of the bandage is placed just over the left eyebrow, and fastened by one horizontal turn around the head, then passing around to and below the right ear, underneath the chin, and upward over the left side of the face, just covering the left ear. Two more turns are to be made over the top of the head and underneath the chin, each turn in-

cluding a little more of the anterior part of the chin. The bandage is now to be continued around behind the neck, and, in a slanting direction, over the head and around the forehead, as before, and then again below the right ear and across the front of the chin and around the neck, drawing this part quite snug, and repeating; then passing under the chin and up on the left side of the face, bring the bandage to the top of the head and confine it by several circular turns. The various turns may be arranged to suit each individual case.

It is used for fracture of the lower jaw, and for holding poultices to the side of the face, etc.

FIGURE 15.—Sling for the chin.

If any turns be made about the neck, care should be taken that they be not drawn tight enough to interfere with the circulation.

SLING FOR THE CHIN.

Take a piece of muslin about four feet long and five inches wide, double it, and tear it from the middle of each end to within two inches of the centre. This forms a four-tailed bandage.

Standing at the back of the patient, place the centre of the bandage (the part not torn) on the point of the chin; bring the two *upper* ends backward, crossing at the nape of the neck and then passing forward on the side of the head to the forehead, where they are fastened. Now take the two *lower* ends, carry them upward and slightly backward, so they come just in front of the ears; carry them to the top of the head, where they meet and are fastened.

This bandage is much simpler than the one shown in the preceding figure, and answers the same purpose, but it is more apt to slip.

T BANDAGE FOR THE TEMPLE.

For this, two pieces of cloth are needed, one two to four inches wide and three feet long; ten to twelve inches from one end, at right angles to it, another bandage should be fastened, two inches wide and seven to eight feet long, one end only extending fifteen to eighteen inches beyond the point of junction.

Use.—Place the point of junction of the bandage over the temple

injured in such a manner that the wide part of the bandage is perpendicular as regards the head; the short end is to be brought to the top of the head, and the long end around under the chin and fastened to the opposite end. The narrow part of the bandage is now carried around the head horizontally, the short end being confined by the horizontal turns.

It is used for confining dressings to the side of the head and neck.

FIGURE 16.—T bandage for the temple.

DOUBLE T BANDAGE FOR THE NOSE.

Take a muslin bandage seven to eight feet long and one inch wide. At the centre of this, about one inch from each other, and at right angles to the first, stitch two other strips, each two and one-half feet long by three-quarters of an inch wide.

FIGURE 17.—Bandage for the nose.

Standing behind the patient, place the centre of the main bandage beneath the nose (the two shorter pieces passing up on each side, crossing at its base, and resting on the top of the head), carry the ends around to the back of the head, where they cross, and are again brought around to the forehead, where they may be confined, after taking several circular turns about the head. The ends passing over the top of the head may pass down behind and be pinned to the main bandage. This bandage is of special use in keeping dressings about the nose in position.

BANDAGE FOR THE NECK.

This is a bandage one and one-half inches wide and as long as may be necessary. One end is placed on the neck, low down, and circular turns are made, covering it, and gradually covering the neck up to the jaw.

Great care should be taken that the turns are not drawn too tight, so as to impede the circulation in the superficial veins of the neck. Its uses are obvious.

BANDAGES FOR THE HAND AND ARM.

For one Finger.—This should be not more than three-quarters of an inch wide and four to five feet long.

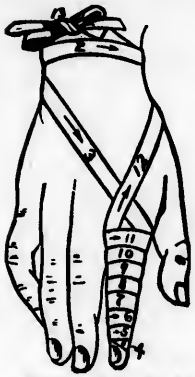


FIGURE 18. — Roller bandage for the finger.

We will suppose it is the right forefinger on which the bandage is to be applied.

Place one end of the bandage on the back of the wrist, confine it by a circular turn, and the bandage is then continued, as seen in the cut, over the back of the hand (coming from the side of the little finger) to the base of the first finger; it is wound about the finger in spiral turns until the tip is reached, when the whole member is again covered by regular turns; as the bandage comes between the cleft of the finger, it passes up to the base of the thumb, and then around the wrist, where it may be fastened to the preceding turns.

This bandage may be applied to any or all the fingers at the same time, and is used for holding the parts together, and for bandaging on splints.

BANDAGE FOR THE THUMB (SPICA).

This bandage should be six feet long and three-quarters of an inch wide.

Holding the hand so that the thumb shall point nearly upward, one end of the bandage is fastened at the wrist, as before. After this has been done, the bandage is brought up across the back of the hand, up to and around the outside of the thumb (at the second joint). The bandage then passes around the inside of the thumb, toward its base, and then around the wrist. Reference to the figure will make the method of application plain. By applying one layer after the other, each one covering one-half the previous turn, the thumb is soon completely covered, together with part of the wrist.

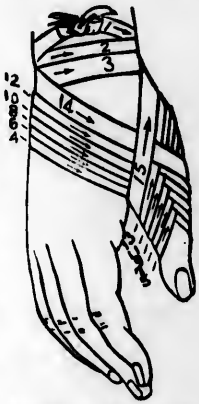


FIGURE 19.-Spica bandage for the thumb.

It may be used for keeping dressings on the thumb, and for keeping the latter in place after a dislocation has been reduced.

BANDAGE FOR HAND AND WRIST.

This bandage must be four to five feet long, and one and one-quarter inches wide.

Place the end of the bandage on the back of the wrist, and confine it by a circular turn; continue it around to the border corresponding to the thumb, when it is brought across the back of the hand to the junction of the hand and little finger, where it passes to the palm of the hand, one turn being made around the whole hand. After this has been done, the bandage passes from the base of the first finger across the back of the hand to the opposite side of the wrist. These turns may be repeated, slightly overlapping each other. The end of the bandage is confined as usual. It is used for holding dressings in place, etc.

FIGURE 20.—Showing method of binding up the hand by means of a folded handkerchief; very useful in emergencies.

FIGURE 21.—Bandage for the hand and wrist.

PERFORATED BANDAGE FOR THE HAND AND WRIST.

Reference to the figure will show the general arrangement of the bandage. Take a roller bandage eighteen inches long and one inch wide, and to the centre of this stitch a piece of linen one foot long and four inches wide, with five perforations at its middle, as shown. It is

applied by passing the thumb and finger through the openings and

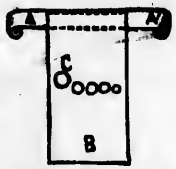


FIGURE 22. — Bandage before being applied.

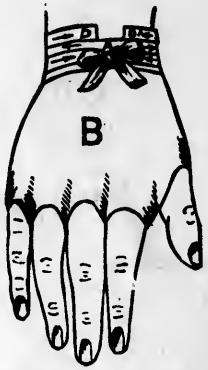


FIGURE 23. — Showing method of application.

bandaging the other parts down to the hand and taking several turns about the wrist. Its uses need not be explained.

SPIRAL FOR HAND AND WRIST.

This bandage should be three to four yards long and one and one-half inches wide.

Fasten the end of the bandage on the fingers, and confine by a circular turn. As seen in the figure, these turns are continued until the thumb is reached, when it is necessary to make several reverses (the method of which has been explained), to prevent the bandage from becoming loose and slipping off. Several circular turns should be taken about the wrist and lower arm.

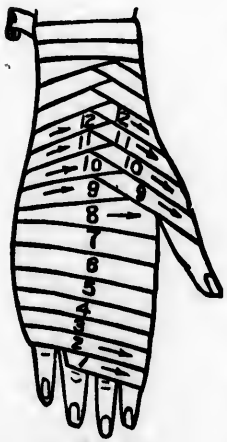


FIG.—24

This is a very useful bandage in cases of dislocation, or fracture of the bones of the hand, and also for holding on poultices, etc. Each finger may be bandaged separately, if necessary, before this bandage is applied.

Bandages for the forearm and arm are applied in various ways, as will be seen directly. The roller bandage is very useful here, and is the one usually employed. Figure 25 shows how the whole arm and hand may be bandaged. Each division of the arm may be taken separately, the figure still showing the correct mode of application.

For supporting the arm and forearm when injured, innumerable bandages have been devised, some of which are shown here, in which use is made of the square and the triangular bandages.

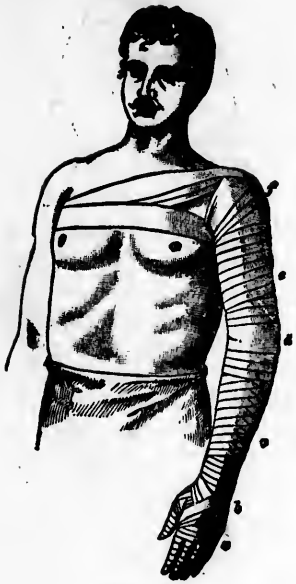


FIG. 25.

FIGURE 26.—Showing method of binding up the shoulder, hand, and elbow, and supporting the hand in a plain sling.

FIGURE 27.—Showing the application of support to the arm and elbow, the weight resting on the right shoulder only.

FIGURE 28.—Same bandage as the preceding, but applied so that the left shoulder supports the arm.

innumerable
re, in which

wing method of
lder, hand, and
g the hand in a

bandage as
plied so that
orts the arm.

BANDAGES.—FIG. 2.

FIGURE 29.—Bandage applied so that it cannot be removed by restless patients. Useful for children.

FIGURE 30.—Sling for arm, the weight being distributed on both shoulders.

FIGURE 31.—Showing various methods of applying the triangular bandages.

Figure 32 shows a very useful apparatus for applying continuous cold to an inflamed member; it may be just as easily applied to the head or lower extremity. It consists essentially of a vessel with ice-water, a rubber tube, and a support for the arm. It will be found necessary to bandage the arm to the support.

FIG 32.

BANDAGES FOR THE TRUNK.

Take a bandage two or two and one-half inches wide and eight to ten yards in length.

First method.—Place the beginning of the bandage over the front of the chest; pass it from the lower margin of the ribs in an obliquely upward direction to one or the other shoulder; pass the roller down over the shoulder behind to the level of the armpits, and begin making the usual spiral turns about the whole chest, drawing them snugly; each turn should overlap the preceding one by half its width. These turns should extend down as far as necessary, and should be pinned to one another, and also to the strip of bandage extending over the front of the chest. The end may be confined as usual.

A *second method* is used, in which the ordinary reverse is made use of, as is shown in the cut, which needs no explanation.

Uses.—These bandages are most often used in fractures of the ribs or their cartilages, fractures of the breastbone, spinal column, and to retain dressings on any part of the chest.

A very efficient chest bandage may also be improvised by making use of a strip of muslin of whatever width may be required, and pinning it snugly with safety-pins. The only objection to it being that it does not exert a regular pressure over the whole chest, unless it be very carefully applied.

In using this form of bandage, two narrow strips should pass over the shoulders, to prevent its slipping down on the abdomen.

Fig. 33.

BANDAGES FOR THE BREAST.

At times it is of great importance to support and bandage the breast, especially when the gland is swollen during the nursing period, and abscesses or other serious trouble is threatened.

For this purpose a roll of cotton batting and some safety-pins (large size) should be at hand, together with a roller bandage two and one-half or three inches wide and about twenty yards long.

We will assume the left breast is to be bandaged. It is first covered with a layer of cotton batting; then apply the end of the bandage about the centre of the back, holding it in place with one hand, and with the other bringing the roller under the arm and breast, then across

FIG. 34.

FIG. 35.

FIG. 36.

FIGURES 34, 35 and 36.—Showing method of application of bandages for the breast.

the chest and over the right shoulder, then under the arm and breast again, until it is covered; the bandage should now pass across the chest at the level of the lower end of the breastbone, below the opposite breast, and around behind, where it may be confined.

When both breasts are to be supported, the bandage should pass across the left shoulder also, and below the right breast in the same manner

In nursing women, this bandage may be applied so that the nipple is exposed.

When the breasts are very heavy, the shoulders also should be protected by pads of cotton. Safety-pins should be used wherever the various layers of bandage cross one another. Reference to the cuts will show how these forms of bandage are to be applied.

BANDAGES FOR THE LOWER EXTREMITY.

Bandages for the toes alone are applied in the same way as those for the fingers, except that the ends are confined without bringing them around the ankle. The following are the most useful and important bandages used in dressing the lower extremity.

FIGURE OF EIGHT FOR THE FOOT AND ANKLE.

This bandage should be about eight feet long and one and three-quarter inches wide.

If it be the left foot which is to be bandaged, proceed as follows: Begin at the front of the leg, a few inches above the ankle, and fasten the bandage by a few circular turns; when the inner ankle is reached, the bandage is carried across the foot to the base of the little toe, when it crosses the sole of the foot behind the toes, and is again carried across the dorsum of the foot to the outer ankle. Two or three more turns similar to this are made, and then several circular turns about the ankle complete the dressing. Reference to the figure will show how the bandage appears when applied.

FIG. 37.

FIG. 38.

SPIRAL BANDAGE FOR THE FOOT.

This bandage is a double spiral, and should be at least ten yards long by two inches wide.

Begin by a single turn about the whole of the toes, and then gradually cover the whole foot by alternate turns and reverses, as shown in the figure. Unless specially desirable, it is best not to cover the heel, as it is usually unnecessary, and unless very well done the bandage is apt to slip.

BANDAGES FOR THE THIGH.

Of these there are many varieties in use, but it is hardly necessary to describe all of them, as a great many are only intended for amputa-

tions, etc., and can only be applied by one experienced in the art. Dressings, etc., are easily held on by the plain roller bandage.

TRIANGLE FOR THE FOOT.

Cut a piece of cloth of a triangular shape, the base being twenty-four inches long, and the apex about ten inches from the base. Place the base of the triangle obliquely across the front of the instep; bring the upper end around the lower part of the leg, and pin it; then draw the lower end down across the foot just behind the toes, and confine it also. The remaining end, the apex, is to be brought down across the heel and pinned. Its use is principally to confine dressings on the sole of the foot, the ankle, or any other part. Another method of applying the same bandage is shown in the annexed cut.

FIG. 39.

FOUR-TAILED BANDAGE FOR THE INSTEP.

Make this bandage from eighteen to twenty inches long and from four to five inches wide. Double it, and tear down the centre, leaving a square piece untorn. Apply it by placing the central square portion across the instep; bring the two upper ends up around the leg, and tie them; the lower ends are to be brought about the lower part of the foot, and tied in a similar manner. This bandage is very effective in confining dressings to the instep and lower part of the leg. It may also be applied to the heel.

FIGURE 40.—The figures and arrows indicate the number and direction of each turn.

FIGURE OF EIGHT FOR THE KNEE.

This bandage should be four yards long and one and three-quarter inches wide. Place the end of the bandage somewhat above the middle of the back part of the

knee, and fasten by several circular turns. When the bandage again reaches the posterior part, it passes obliquely downward to the opposite side below the knee. Now make one circular turn, and then pass obliquely upward across the previous turn. Take another turn around the leg above the knee, and then repeat the whole procedure until the whole of the back of the knee is covered. This bandage is very useful for confining dressings to this part, or for exercising pressure on the large artery which passes down through the middle of this region. The bandage should not cover the front of the kneepan, as the continual motion of this part would be apt to dislodge it.

TRIANGLE FOR THE KNEE.

Take a triangle of muslin, about the same size as that described for the foot. Place the centre of the base across the front of the knee just above the kneepan; bring the ends around as many times as possible, and tie them.

Dressings are easily held on by this method, and much support is given in cases of fracture of the kneepan.

Fig. 41.

FOUR-TAILED BANDAGE FOR THE KNEE.

Take a strip of muslin eight inches wide and about thirty inches long; tear each end down the centre to within six inches of the middle. Apply the central part over the kneepan, bring the *upper* ends of the bandage around behind the knee, passing obliquely downward, and tie on the front of the leg *below* the kneepan; the *lower* ends should be crossed behind in a similar way, and tied on the front of the thigh *above* the kneepan. It is used for the same purposes as the preceding.

SPIRAL OF THE LEG.

This bandage should be from four to six yards long and two inches wide. Its application is easily understood by reference to the cuts.

FIGURE 42.—This shows the method of applying the roller bandage to the upper or lower extremity.

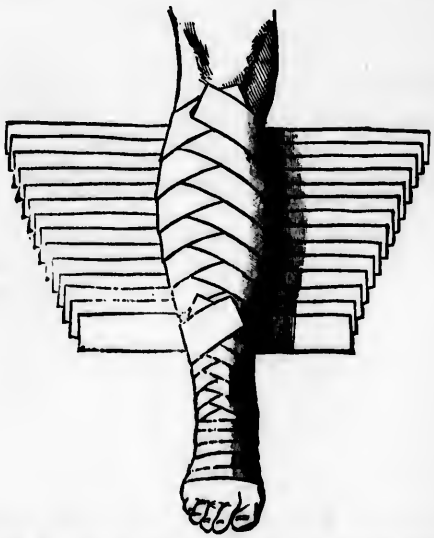


FIGURE 43.—Another method of bandaging the leg with bandage cut in strips, each one being longer than the preceding, and overlapping it. Strips of plaster may be applied in a similar manner.

BANDAGES FOR THE THIGH.

These can be applied very easily, the ordinary roller bandage being used most often. The spica bandage for the groin is of considerable importance, and will therefore be described.

SPICA BANDAGE FOR THE GROIN *(Cross of the Groin).*

This consists of a roller bandage, two or two and one-half inches wide and from nine to ten yards long. Place the end of the bandage on the front of the abdomen, and confine the same by a few turns around the body; then pass the bandage across the front of the groin from the outside of the leg inward, between the thighs; then bring it over in front of and around the body again. The same procedure is gone through with again and again until the space intended has been covered, when the end may be confined.

The first turn about the thigh should be made as low down as it is intended the bandage shall extend, each subsequent layer leaving one-half of the preceding one exposed. This bandage can be put on one or both sides at the same time. It is very efficient in retaining dressings on the groin, for applying pressure on enlarged glands in this region, and also in retaining a hernia or rupture. If used to retain a rupture, a thick, hard pad should be placed over the opening after the hernia has been replaced.

SLING FOR THE LOWER EXTREMITY.

Take a strip of heavy webbing about three inches wide and long enough to extend from the neck to the instep. The ends should be provided with a strap and buckle, so that it may be shortened or lengthened at will.

This bandage should be passed about the neck, the ends coming down in front of the shoulders on each side, and extending underneath the instep. It is used for supporting the injured leg when the patient is going about on crutches.

TRIANGLE FOR THE GROIN.

There are many methods of applying the triangular bandage to the lower part of the body—the manner in which the ordinary diaper

is pinned on the baby being a very good example. The various methods of application being so obvious, it is not necessary to describe them.

Two cuts are inserted below, showing how an injured leg may be put up so that it will not suffer damage until proper attention can be secured.

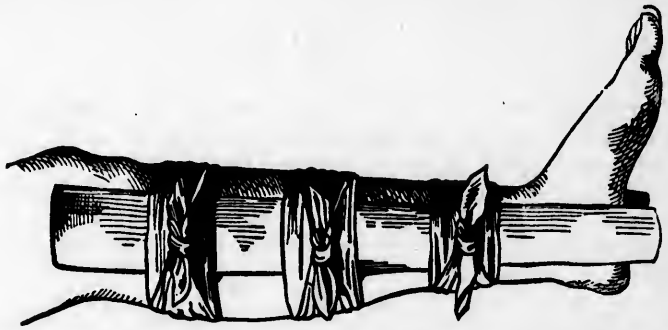


FIGURE 44.—Showing how a fractured limb may be put up temporarily by using two straight pieces of wood and several handkerchiefs. The limb should first be covered with cotton or some other soft substance.

FIGURE 45.—Showing construction and use of a very efficient apparatus for the leg, especially when the fracture is of the compound variety. (See article on Accidents and Emergencies).

MORRIS LEE KING, M.D.

Fissure of the Anus.

This painful affection consists in an ulceration at the anus, situated partly without and partly within the rectum. It may be produced by various causes, prominent among which are constipation, piles and falling of the womb

Symptoms.—Fissure of the anus, though producing marked and characteristic symptoms, is frequently overlooked; for the patient commonly supposes that he has piles, either external or internal. The act of emptying the bowel is accompanied with acute pain, which, instead of diminishing, as is the case with piles, increases in severity and lasts for a considerable time after the act, perhaps even three or four hours. With every movement of the bowel, a certain amount of blood—usually a small quantity—is lost; and there is apt to be a constant, though slight discharge of matter. These various symptoms may be only occasionally noticed while the fissure is small, but become more marked and constant as the ulcer increases in size

The nature of the affection can be definitely recognized only by an inspection of the parts; and for this inspection it is important that the bowel shall be first evacuated and cleansed and a good light employed; otherwise a small ulcer may be readily overlooked. Externally there may be nothing visible, except perhaps a small tumor or "pile;" and since such a tumor is usually found in cases of fissure, the patient is often treated for a long while for piles, the fissure remaining unsuspected. If the patient protrude the parts by bearing down as if at stool, an ulcer will be found at the base of the pile; by separating the parts thus protruded with the fingers, an ulcer, previously invisible, may be discovered. These are usually situated at the posterior border of the anus; they often extend an inch or more up into the bowel.

Treatment.—This varies with the extent and duration of the ulcer; those fissures which are situated external to the bowel, and are of slight

extent, can often be cured by securing regular daily evacuations, and by the occasional application of lunar caustic to the ulcer. The healing process can be hastened by the application of a lotion of the sulphate of zinc, one grain to the ounce of water, two or three times a day.

When the fissure extends upward into the bowel, or has existed for a long time, this treatment will scarcely suffice to effect a cure. It may always be tried; but if no benefit is derived within a week or ten days, the fissure must be divided with a blunt pointed bistoury. This operation must of course be undertaken only by a surgeon.

In the last few months, great relief has been secured in this as in other painful affections of the anus, by the application of muriate of cocoaine, dissolved in water. This substance has the power of benumbing the nerves to such an extent as to render the parts insensible to pain. Yet the benefit derived is, of course, only temporary, and does not obviate the necessity for a radical cure.

Aphonia.

This term, which means loss of voice, is not a disease, but a symptom of various disorders in the throat. It is observed whenever the throat becomes so swollen as to seriously interrupt the entrance of air into the lungs, as in scarlet fever and diphtheria. It is most frequently a symptom of disease of the larynx, tubercular, syphilitic or cancerous. The vocal cords, whose vibrations constitute the voice, become swollen, ulcerated and incapable of being properly stretched; the voice is therefore lost, and can be regained only when the disease in the larynx is so subdued as to permit the cords to resume their natural tension. This can often be accomplished by proper treatment when the disease is of syphilitic origin, but cannot be expected when the disease in the throat is tuberculous or cancerous. Aphonia from syphilis should be treated by giving the patient ten to fifteen grains of potassium iodide in a teaspoonful of water, three times a day, half an hour before meals, and by brushing the ulcers in the larynx with a solution of lunar caustic, ten to sixty grains to the ounce of water, the application being made once every day or every second day, as occasion requires.

Inflammation (Catarrh) of the Bladder.

Catarrh of the bladder is practically unknown before the age of puberty, except in cases where the bladder contains a stone, a tumor

or other foreign body. It is therefore essentially a disease of adult life. Inflammation of the bladder is either acute or chronic, the two differing as to cause as well as in the symptoms exhibited.

Acute Catarrh of Bladder.—This is produced by—1. Direct injury, either mechanical or chemical. 2. The extension of an inflammation previously existing in a neighboring organ, gonorrhœa for example. 3. The effect of drugs which are taken to the bladder from the kidneys in the urine.

Symptoms.—Whatever the cause may be, the symptoms produced by acute catarrh of the bladder are essentially the same. The desire to urinate is frequent and imperative, the patient being compelled to empty the bladder every half hour, or even oftener, by night as well as by day. The act of urination is accompanied with a heavy, burning pain, felt chiefly about the neck of the bladder, but often radiating to the genitals, the loins and the thighs. The urine contains pus and blood, and a few drops of blood are often passed at the end of urination. The patient has a chilly feeling, followed by considerable fever. The severity of these symptoms varies considerably with the cause and condition of the patient. In a mild form it is often seen during the second or third week of a gonorrhœa.

Treatment.—Acute catarrh of the bladder is a serious affection and should never be neglected. The patient should remain quietly in bed; at the very beginning of the attack a mustard leaf should be moistened and placed upon the perineum (the flesh in front of the anus) in the male, or over the bladder in the female, and allowed to remain until the skin becomes thoroughly reddened—usually five to ten minutes; after this cloths saturated with hot water should be kept folded over the region of the bladder. Injections of hot water into the rectum in the male, the vagina in the female, may be given every two or three hours; a hot hip bath for fifteen minutes, morning and night, is also serviceable. Opium should be administered in quantity sufficient to allay the pain and irritation in the bladder; probably five grains of Dover's powder will be needed every four or five hours by an adult. A better way to give opium is in the form of suppositories of cocoa butter—one of these containing a grain of opium being inserted in the rectum every five or six hours. The bowels should be moved once or twice daily by means of hot injections.

Internally the patient should take some remedy which will render the urine less irritating to the inflamed surface in the bladder; the most

popular of these are warm flaxseed tea and infusions of buchu; two or three pints of the former combined with five or six ounces of the latter, may be taken in twenty-four hours, a dose being administered every hour or two; in addition a half teaspoonful of baking soda, dissolved in a glass of water, should be drank three or four times in the day.

After the acute symptoms have subsided, the patient must take the greatest care to avoid exposure to cold, wet feet, etc.; for the catarrh of the bladder is liable to return again upon very slight provocation, even months or years after the first attack has subsided.

Chronic Catarrh of the Bladder.

This is a frequent complaint, especially in elderly men. It may be produced by the same causes as those which induce acute catarrh of the bladder; in fact, a chronic inflammation is sometimes a continuation of an acute attack. In most cases, however, chronic catarrh of the bladder is the result of a stricture of the urethra or an enlargement of the prostate gland; for these prevent a complete evacuation of the urine, some of which is habitually retained and undergoes fermentation within the bladder, causing inflammation.

Symptoms.—These vary with the intensity of the inflammation. Urination is unduly frequent and often painful; after a time the patient may be compelled to void urine every hour or two, day and night. The urine contains pus, sometimes scattered throughout the fluid, sometimes collected in long strings. It often emits an offensive odor

Treatment.—The first item of treatment of chronic catarrh of the bladder is to ascertain the cause. Sometimes this is found in a stricture, enlargement of the prostate or stone in the bladder; in the female it may be the result of a displacement of the womb. In some cases the cause can be removed by proper surgical measures; in others this is impossible. Certain general principles are applicable to nearly all cases; the urine should be diluted and thus rendered less irritating by drinking plenty of water, flaxseed tea and the infusion of buchu may be used as directed for the treatment of acute catarrh of the bladder. The irritation of the neck of the bladder can often be allayed by the following prescription: Liquor potassæ, three drachms; extract of hyoscyamus, two scruples; gum arabic mixture and water, each three ounces. Mix and take a tablespoonful in a glass of water every six hours.

The most important part of the treatment in many cases of chronic catarrh of the bladder, consists in washing out this organ through a soft catheter. This procedure must be very carefully and skilfully performed, and should be entrusted only to a physician. A rubber catheter, carefully cleansed and dipped in a five per cent. solution of carbolic acid in water, is smeared with castor oil and gently introduced into the bladder. After the urine has escaped, two ounces of tepid water are slowly injected by means of a syringe and then permitted to escape. This injection may be repeated two, three or four times in succession, until the water, as it escapes, seems quite clear; then an ounce of a saturated solution of boracic acid, one part to thirty of water, is injected and permitted to remain. This process may be repeated two or three times daily.

Tuberculosis or Consumption of the Bowels.

[This article is contributed by Dr. Wm. B. Atkinson, Philadelphia, Permanent Secretary of the Medical Society of North America.]

This affection occurs both in adults and children, but is more frequently seen in the latter. It very often is the result of hereditary predisposition, but may and frequently does originate from the want of proper hygienic surroundings, as living in close ill ventilated and filthy localities, or from the use of improper diet, as unripe or over-ripe fruit, decaying or diseased meats, etc. In short, anything which is calculated to interfere with the proper and ready assimiliation of the food is liable to cause the disease. Even where no heredity exists, the continual ingestion of food into the bowels which produces indigestion or fermentation is extremely likely to produce such a condition in the delicate organism of the alimentary canal as to cause the deposit in the glandular system thereof of tubercles which act as they do in other localities, irritate, soften, induce exhaustion, and speedily the characteristic symptoms diarrhœa, painful evacuations, eructations, often vomiting soon after eating, followed by death from exhaustion. The symptoms of consumption of the bowels are very similar to those of this affection as it occurs elsewhere. Almost the first symptom is a loss of vitality, the patient gradually appears to lose all desire for the performance of his usual occupations, he is easily fatigued, the countenance is marked with

great pallor, more or less swelling of the abdomen occurs, the bowels are affected by slight causes, and diarrhœa sets in after the ingestion of food of a slightly laxative nature, the evacuations being thin, watery, frothy, the tongue is furred or red with a white centre, the appetite soon becomes disordered, craving foods of an unusual character. The sleep now is restless, emaciation rapidly ensues, hectic fever comes on each afternoon, characterized by a bright flush on the cheek, thirst, but not high temperature. A special symptom is the putrid foul odor of the evacuations, and the eroding of the anus and adjacent parts from the acrid character of the discharges. This may extend to the inner surface of the thighs. As this goes on, the tongue becomes red and dry, and in the latter stages is generally covered with thrush. Now all the symptoms incident to rapid consumption make their appearance, the emaciation is painful to the beholder, the eyes are sunken, the cheeks are pale and flabby, the chin pointed, and a peculiar condition of the occiput appears: the occipital bone seems to force itself beneath the parietal bones and forms a step, the same to a less degree is seen with the frontal bone, the borders of which slide beneath the parietal. Of course these latter symptoms are seen only in children prior to the ossification of the sutures which unite the bones of the head.

The treatment is more likely to prove successful in the early stages, and particularly in children. At all ages, the diet from the outset must be of the most nutritious, and easily assimilated articles. Milk never in the uncooked state, in small and frequently repeated quantities, is the best that can be employed. Fermented milk, preferably that of the mare or ass, has long been regarded as of especially great value. Cream has proved in many instances the only food that would act to keep up the tone of the system. Cod-liver oil has been highly vaunted, and may be given either in the form of emulsion, or mixed with malt liquors, or in any way that it can be borne by the stomach. Animal food, iron and phosphorus may be regarded as the remedies most to be relied upon in this affection. As tubercular disease has been known to arise from meat and milk, neither should be used without being thoroughly boiled or cooked. Malt, as the extract, or ale, beer, porter may be given, especially in the case of adults. Care is always needed to prevent the too free action of the bowels, liable to result from this diet. In children, the syrup of the iodide of iron is particularly valuable, and is best given in small and frequently repeated doses, at intervals of two or three hours, day and night, unless the patient is sleeping naturally, then the repose must not be disturbed for the administration of the remedy. To a child of five years, the dose at the beginning should be three drops

each two or three hours, increased each third day by two drops a dose, up to fifteen, three or four times daily, and thus maintained till the good effects are evident. It must be remembered that this article colors the stools, and thus an apparently alarming symptom may be explained. This dose is to be increased as the age of the patient, but is preferable for children below the age of puberty.

For patients more advanced, the syrup of the hypophosphites is of great benefit, or the phosphate of iron in pill or solution, in the dose of three grains, increased to five three times a day.

To all cases, a change of air, especially to the sea-side, often is found a wonderful restorative. Under no circumstances should surf bathing be permitted, as it rarely fails to add to the trouble; but unfortunately surf bathing has long been regarded as of value, and many people seem to think this is one reason why the visit to the sea is made, and if neglected, a valuable remedy is lost. Warm salt baths are useful and may be employed with benefit in all instances. These are of more value to children of all ages. Here, too, the cinchona preparations are of real benefit, in young children; the ferrated elixir of cinchona in doses of one teaspoonful three times daily, and the compound tincture (or what is known as Warburg's tincture) is preferable for adults. Any of the forms of pepsin will prove useful where any kind of skin eruption is present, as is often observed in the quite young. In adults the iodides, as of sodium or potassium, or the syrup of hydriodic acid, say, five grains of either of the former, or a teaspoonful of the latter, given in free solution three or four times daily. The salts of arsenic also are of great benefit and may be given when other remedies appear to fail. An adult may begin with five drops of the solution of arsenite of soda or potassa three times a day, or the fiftieth of a grain of arsenious acid in pill. To children, these should be given in smaller doses, beginning with one or two drops thrice a day of the solution, and increased gradually, and this treatment continued for a number of weeks.

Should persistent diarrhœa occur, the subnitrate of bismuth, with or without the compound ipecac. powder, may be employed, as five grains of bismuth to three of the ipecac. compound every three or four hours in the case of a child of five years. Children are often benefited by the inunction of cod-liver oil over the surface of the abdomen every day, being careful to prevent exposure during the procedure.

W. B. ATKINSON.

January 2nd, 1892.

Chilblains.

This term is applied to local inflammations of the skin on those parts of the body most subject to variations in temperature. While most frequent on the feet, they exist in some cases on the hands, the fingers, the face and the lobes of the ears. There seems to be in certain families a predisposition to chilblains, which are most frequent during childhood; in adult life they are more common among women than men.

The cause of chilblains appears to be a feebleness of the general circulation. The sufferer is prone to have cold hands and feet, and the face and lips become livid when exposed to cold. This natural feebleness of the circulation is often aggravated by tight shoes or gloves, garters, bracelets, etc. After the feet or hands have been unpleasantly cold for a considerable time, and are then rapidly warmed, they become the seat of great itching with considerable tenderness upon pressure. Sometimes blisters are formed, after the breaking of which sores are found in the skin below.

After chilblains are once established, they are apt to recur, during cold weather, upon slight provocation; indeed, in many cases they recur every day, even though the patient remains in the house. Slight disturbances of the circulation, such as exposure of the parts to a warm fire, eating a hearty meal or going to bed in a cold room, are sufficient to produce tenderness, swelling and pain. They are apt to recur every winter until the patient attains middle life, and women may suffer from them throughout life.

Treatment.—The first object of treatment should be to secure, as far as possible, an active circulation; for this purpose, measures addressed to the general health—tonics, exercise, good air, etc.—are necessary. Secondly, great care should be taken to avoid any artificial interference with the circulation; the shoes should be roomy and loosely laced; no tight garments should be worn on the extremities. Particular care should be taken to clothe the affected part, as well as the body generally, during cold weather; extra underclothing, woolen stockings and fur-lined gloves will be of service in preventing the cooling of the parts and the consequent chilblains. The sleeping room and the bed should be warm, so as not to chill the skin upon retiring.

So long as the skin of the chilblain remains unbroken, various liniments may be employed with advantage; among these are equal parts of turpentine and copaiba; or one part of tincture of cantharides

to three parts of soap liniment. If the surface is very tender, it may be covered with adhesive plaster and chamois skin, or painted with a mixture of collodion, two ounces, castor oil, half ounce, and turpentine, one ounce. The itching may be relieved by putting the part into hot water, containing a little mustard.

Chlorosis (Green Sickness).

This disease occurs almost exclusively in females and during the period of sexual development—from the 13th to the 18th year. There seems often to be a hereditary tendency to this malady.

Symptoms.—The disease often begins with a derangement of the menstrual function; the monthly flow is either suppressed or excessive. Soon afterwards the girl becomes capricious and usually despondent; hysterical attacks are not infrequent. The skin becomes pale and waxy, the lips and mouth lose their color. The patient is listless and devoid of energy, slight effort inducing great fatigue. Exercise of any kind causes palpitation of the heart and often difficulty in breathing. There is often a dry, hacking cough, which, combined with the general pallor and loss of strength, cause the friends to fear that the girl is going into a "decline," or consumption. This disease is indeed developed in a considerable number of the cases; in others, an ulcer of the stomach is formed, often with a fatal result.

Treatment.—This must consist in good diet, moderate out-door exercise and interesting mental occupation; the following prescription should be given: Arseniate of iron, four grains; extract of cinchona, twenty grains; divide into twenty-four pills. Take one three times daily, after meals. If the patient be troubled with constipation, one grain of the pill of aloes and myrrh may be taken occasionally upon retiring.

Cholera Morbus.

This is an acute catarrh of the stomach and intestines, often caused by unripe fruits and vegetables or other irritating substances taken into the stomach; yet it frequently occurs without such apparent cause. It is especially frequent in summer and early autumn.

Symptoms.—Sometimes the attack is preceded for a day or two by a feeling of weakness and languor and some diarrhœa; more frequently it begins without any warning. The patient is awakened at night by a sense of coldness, sometimes amounting to a distinct chill; there is pain in the bowels and a feeling of nausea. In a short time vomiting and purging begin almost simultaneously; the matters discharged are at first the ordinary contents of the stomach and bowels, but later they consist of thin, whitish or watery liquid, sometimes containing a little blood. The evacuation from both stomach and bowel occurs in rapid succession; the face becomes pinched and wrinkled, the hands and feet shrivel, the lips, tongue, and even the breath are cold. The patient is tormented with thirst, but the stomach rejects water as soon as swallowed. Pain is felt at first in the bowels only (colic), but the muscles of the limbs soon become the seat of painful contractions or "cramps," which cause the patient to scream with pain.

The attack lasts from a few hours to several days; in nearly all cases the patient recovers, though remaining weak and suffering from some diarrhœa for several days after the acute symptoms subside. In rare cases death occurs in the cold stage, only a few hours after the beginning of the attack; in other instances this stage is followed by a fever resembling typhoid, which may last for a week or more, and during which the patient may die.

Treatment.—If the attack can be definitely traced to the consumption of unripe fruit or other irritating food, but little treatment is required; the trouble subsides after the stomach and bowels have been thoroughly evacuated. In these cases large mustard plasters may be applied to the abdomen and allowed to remain just long enough to produce a decided redness of the skin; small pieces of ice may be held in the mouth, and iced champagne given in small quantities, at short intervals—a tablespoonful every fifteen minutes, until improvement begins.

In the more severe cases and in those where no cause is apparent, more active treatment is required. The quickest and most efficient remedy consists in the hypodermic injection of morphine and atropine—one-eighth of a grain of the former and $\frac{1}{150}$ of a grain of the latter; this should be undertaken only by a physician. The next best means is chlorodyne, half a teaspoonful of which may be given every fifteen or twenty minutes, until improvement begins. If this cannot be obtained, two drops each of the dilute sulphuric acid and the tincture of opium may be given every half hour in a teaspoonful of iced water. Mustard

plasters should be applied to the abdomen and to the soles of the feet. Small doses of calomel—one-twelfth to one-sixth of a grain—may also be given every half hour.

After the acute symptoms have subsided, the patient should remain warmly covered for several days, and be careful to take no other food than milk, eggs and broth.

Cholera Infantum (Summer Complaint).

This is an acute catarrh of the stomach and intestines, occurring in children during the time of teething, therefore in the first two years of life.

It occurs chiefly during hot weather, and is caused especially by improper feeding, but also by bad hygiene—living in damp and ill-ventilated apartments, where the air is contaminated by foul gases from sewers, decomposing organic matters, etc.; it is, therefore, chiefly observed in cities.

Symptoms.—In most cases the attack is preceded for some days by slight fever, soon followed by diarrhœa; in other cases the severe symptoms begin without previous illness; the first symptoms are vomiting and purging; the matters vomited are at first food, curdled milk, etc., and afterwards a watery fluid mixed with mucus. The vomiting continues even though nothing be swallowed, and it often happens that the vomit becomes a yellowish green in color, indicating the passage of the intestinal contents into the stomach; the stools at first contain some fecal matter, but subsequently consist apparently of water, almost or quite devoid of odor, and leaving a greenish stain upon the napkin.

In consequence of the excessive loss of water, the body shrinks, the cheeks are hollow, the eyes sunken, the mouth dry and often cracked and bleeding. Yet, notwithstanding the pitiable appearance, the child makes but little complaint; it is, indeed, partially unconscious, taking but little notice of its surroundings, and exhibiting distress only during vomiting or purging. The pulse is very rapid and feeble and the temperature high.

Treatment.—The attack can often be averted if the child's food be properly regulated so soon as the first preliminary symptoms—slight fever and diarrhœa—are manifested. At this time the child is very thirsty, and desires to nurse frequently because of this thirst, and not because it is hungry. By frequent nursing, the stomach, whose diges-

tive power is already impaired, is overloaded with food; as a consequence vomiting or purging, or both ensue. The child should be allowed to nurse (or if already weaned, to take food) not oftener than once in two, three or four hours, according to age, and should not have more than two tablespoonfuls at once. The thirst should be allayed by permitting the child to suck pieces of ice. If the child is at the breast and the supply of milk is satisfactory in both quantity and quality, the simple regulation of the nursing, as above indicated, and the careful avoidance of other food—crackers, scraps from the table, etc.—may be, in itself, sufficient to effect a cure. If the child is weaned, or is largely dependent upon artificial food, the greatest care should be taken in feeding. No solid food should be given, even though the child may have been accustomed to eat it; the feeding bottle and tube must be carefully cleansed; if there be any joints in the apparatus, this should be discarded and another bottle obtained which has no joints nor cracks where the milk can collect and ferment. The best substitute for mother's milk is barley water of the same consistence as good milk; to this cream should be added, about a teaspoonful to half a glassful of barley water.

When the attack begins, efforts must be made to check the vomiting and purging, and to reduce the fever. From one-half to one teaspoonful of pure brandy, diluted with a tablespoonful of cold water, should be given (in divided doses) every two or three hours, according to the age of the patient. Small doses of calomel (one-twentieth to one-eighth of a grain) may be given every half hour or hour; if there be much straining at stool, rectal injections of starch and laudanum (15 drops to a teaspoonful of the latter in a tablespoonful of starch) may be given every two hours, immediately after an evacuation. Mustard plasters or hot cloths sprinkled with turpentine, should be placed over the abdomen and allowed to remain until the skin becomes red. To reduce the fever cold baths are most effectual. These must be given with great care; the room should be warm, and the child protected from draughts of air. At the beginning of the bath, the water should have a temperature of about 100° F., and cold water is gradually added until the temperature is reduced, in the course of ten minutes to 80 or 75° F.; the child is then removed, briskly rubbed with a coarse towel, and warmly clothed. Two, three or four baths are usually required in the course of the day until the fever subsides.

Hip-Joint Disease.

This consists in a chronic inflammation of the tissues which constitute the joint, resulting in the formation of pus and the destruction of

the surfaces of the joint. It is usually found in so-called "scrofulous" individuals; it may begin in early childhood, but is sometimes observed after puberty.

Symptoms.—There is first noticed an occasional pain and some stiffness in the joint, followed by slight lameness; the child is indisposed to walk and run, because of the distress occasioned by movement of the joint. After a time, the pain increases, but is now felt chiefly in the knee. In time the limb becomes emaciated and flabby, and apparently longer than the other leg. Pressure upon the outer side of the hip increases the pain, as does also the effort to push the thigh upward toward the body, while the patient lies upon his back.

A case of suspected disease of the hip-joint should be submitted at once to a competent surgeon; both the diagnosis and the treatment will tax to the uttermost his knowledge and skill, and should not be undertaken by any other.

Breakbone Fever.

This prevails as an epidemic in warm climates, including the southern parts of the United States.

Symptoms.—The onset of the disease is usually sudden; a previously healthy person complains of a severe headache and pain in nearly all the joints and in the back. Every movement increases the pain. There is some nausea and vomiting; the bowels are constipated, the tongue coated, and the fever high. A rash, much resembling that of scarlet fever, appears; doubtless the two diseases have been confounded. After a period varying from a few hours to three or four days, the fever subsides, leaving the patient weak and exhausted, and still suffering from pains in the joints. After two or three days the fever begins again, though the soreness in the joints is usually less severe than during the first fever. With the second attack of the fever, appears a peculiar rash, which may be a simple redness of the skin, or may resemble that of measles; it often begins on the palms and soles, and spreads over the body; at other times it is limited to certain portions of the body This rash is usually the seat of intense itching. This eruption disappears in two or three days, after which the fever gradually subsides; months may elapse before the patient's health is completely restored. The disease is rarely fatal, even among children.

Treatment.—At the beginning of the attack an emetic, such as

mustard and hot water, should be given; this is to be followed by a mild laxative, such as citrate of magnesia or one eighth grain doses of podophyllin every morning. The fever can be restrained by quinine, three to five grains three times a day, and by cool baths. The pains in the joints require the use of anodynes; five grains of Dover's powder may be given three times a day with the quinine. The itching can often be allayed by sponging with warm water containing five grains of carbolic acid to the ounce. After the fever subsides, tonics are required to build up the system; ten drops of the tincture of iron with the same quantity of dilute phosphoric acid and tincture of nux vomica, should be taken in a tablespoonful of water before each meal.

Hay Fever.

This is an acute catarrh of the upper air passages; it appears usually in the summer or autumn, lasts a certain time and subsides with or without treatment.

The exciting cause of hay fever seems to be the pollen of grasses, rye, barley and other grains, floating in the atmosphere. Yet it is only in certain individuals that the contact of these bodies produces a catarrh of the air passages; it is usually found in the subjects of what is termed the "nervous diatesis," while other individuals who may be exposed to precisely the same atmospheric influences, suffer no inconvenience.

Symptoms.—The first symptom is usually an itching in the nose, throat and eyes; this is followed by an unusual secretion of a watery fluid from these parts, after which sneezing begins. The sneezing is most persistent and violent; the lining of the nose and throat becomes swollen, sometimes to such an extent that the person can breathe only through the mouth; meanwhile the discharge becomes thicker and yellowish, or it may be streaked with blood; a sense of heat and fullness is felt in the eyes and nose, and sharp pains shoot through the nose and head.

In some instances the catarrh extends to the larynx and bronchial tubes, causing a hoarse, croupy cough, and a difficulty of breathing, similar to that of asthma. The disease usually lasts from one to two months, then subsides, but returns again the following year.

Treatment.—The individual who has once suffered from hay fever can feel sure of escaping it in subsequent years only by seeking a residence in a locality where the disease does not prevail, and by remaining

there until the usual time for the attack has elapsed. Many persons have escaped the disease by taking a sea voyage at the time of the expected attack; others have found immunity in mountainous regions —the Alleghanies, Adirondacks, Rockies, etc., many places along the Atlantic coast, and upon the Upper Lakes, the Isles of Shoals, Ste. Marie, Mackinaw, etc. Remedies are very uncertain in affording relief; the best plan consists in taking five grains of quinine three times a day for a week, after which twelve to fifteen grains of the iodide of potassium combined with five to ten of the bromide may be substituted for the quinine. Temporary relief can often be obtained by warming a small bottle containing a little tincture of iodine and inhaling the vapor.

Indigestion.

The following prescription is from one of England's most celebrated physicians, and is without doubt the very best remedy known, up to the present time, for that almost universal and troublesome complaint, *indigestion.* This prescription has been used in England, Australia, British India, the United States and Canada, and in every case, when the remedy was accurately prepared, it proved the very best; in fact, in all those places there was *not one failure.* The prescription contains nothing *startling* or *mysterious,* but is a simple and plain *tonic,* and can be used by any one with perfect safety. Care should be exercised in preparing it, and everything about it should be pure and accurate; if that is done, everyone will be satisfied with the results; if it is not *properly compounded, it is worthless.* The adult dose is one tablespoonful, but if the patient is weak or debilitated, one teaspoonful at a time will prove more beneficial at first, which can be gradually increased if required. If these directions are followed, the result will be satisfactory in every instance. In giving it to the public here, the authors feel that they are conferring a boon on suffering humanity.

℞—Twenty grains, Sulphate Quinine;
One ounce, Compound Tincture Gentian;
One ounce, Tincture Orange Peel;
One ounce, Glycerine;
Two drachms, Carbonate Bismuth,
Infusion Quassia to make eight ounces.—M.

Dose.—One tablespoonful after each meal.

Sore Mouth.

The mucous membrane lining the mouth and throat often becomes inflamed; when this inflammation produces ulcers or sores, the affection is commonly termed "canker sore mouth."

Inflammation and ulceration in the mouth may be produced by various causes, among them syphilis, mercury, catarrh of the stomach and intestines, improper food and bad hygiene, and by irritating substances, such as condiments, tobacco, very hot or cold liquids, etc.

The mouth is at first dry and hot, while subsequently an increased amount of liquid is secreted. The individual usually perceives an unpleasant taste and the mouth exhales a foul odor. The lining of the cheeks and the gums is intensely red and swollen; here and there a white patch or a distinct ulcer is seen. In children these patches are numerous upon the soft palate, while in adults they are found upon the cheeks, lips and end of the tongue. There is usually some constitutional disturbance; children are often quite feverish. In many cases there is nausea, perhaps vomiting; constipation, followed by diarrhœa, is frequent.

The sore mouth produced by syphilis does not generally induce any fever or other symptoms than the annoyance caused by the sores. The sore mouth produced by taking too much mercury is accompanied with extreme swelling and sponginess of the gums, which bleed easily upon pressure; sometimes the teeth are loosened and may even drop out. At the present time the mercurial sore mouth is but rarely seen, since physicians are now more careful in the use of the drug.

Treatment.—A judicious selection of the diet is most important for both prevention and treatment of sore mouth; substances which cause smarting and burning while in the mouth—acid fruits, condiments, medicated candies, etc.—should be avoided. Those articles, too, which, while producing no distress in the mouth, occasion indigestion, should likewise be eschewed. Foods containing much starch and sugar are especially prone to cause such indigestion. The mouth should be thoroughly rinsed every half hour or hour with a solution of borax (two drachms) in glycerine and water, three ounces of each. Any ulcers which may be discovered should be touched with a drop of pure carbolic acid or a stick of lunar caustic. If there be any irritation of the stomach, or diarrhœa, salicylate of sodium, three grains for an adult, should be given every four hours. The sore mouth caused by syphilis should be treated with full doses of potassium iodide.

Varicose Veins and Ulcers—Varicocele.

A varicose vein is generally of a blue color, sometimes of a brownish hue, is considerably increased in size, appears knotted, irregular, and winds in a serpentine manner beneath the skin. Sometimes several veins enlarge in this manner within a small space, and appear coiled up, or, as it were, interlaced with each other, so as to form an irregular dark blue-colored tumor under the skin. In other cases the enlargement or dilatation is partial; and round, circumscribed, elastic swellings or knots appear at irregular distances along the course of a vein. Varicose veins increase in size when the individual is engaged in any active exercise, or continues long on his feet; whereas, on the other hand, repose, the horizontal position, and pressure cause them to diminish, or disappear altogether.

All veins are not equally liable to this disease; those which are deeply seated in the limbs or in the internal parts of the body very seldom become varicose; this morbid alteration of structure is, on the contrary, very common in the veins situated immediately under the skin. The superficial veins of the legs and thighs are most subject to this disorder. Those on the fore-part of the abdomen and about the *scrotum* (*varicocele*) are not unfrequently affected; but it seldom attacks the veins of the arms. When the veins about the lower part of the rectum and anus become varicose, the disease is then called piles.

Symptoms.—At the commencement of the disorder, one or more veins, commonly one of the lower extremities, sometimes of both, are observed to be larger than natural, but not attended with pain or any inconvenience. The dilatation and change of structure of the vessels advance very slowly. A year or two, or even a much longer period, may elapse before the patient is induced to pay particular attention to the disease. At length he observes, after walking or remaining long on his feet, that the veins become considerably distended, while the skin over them feels hotter than natural. Resting in the recumbent position soon removes these symptoms, but they are readily brought on again by the same causes. The veins being frequently distended in this manner, at last become permanently dilated, acquire a tortuous appearance, and roll under the skin. As the disease advances, the patient, after any active exercise, experiences a painful sensation of tension in the dilated veins, accompanied with numbness, swelling, and perhaps shooting pains in the limb, which may render him for a time incapable of walking.

These symptoms are always aggravated towards night, and again diminished in the morning.

Nature alone sometimes subdues and expels this disease. In other cases again it continues to get worse, and occasions disorders of the limb of the most serious nature. But in the majority of cases it remains almost stationary; and, although it may give rise to considerable pain at times, is rather to be considered as an inconvenient and troublesome affection than important or dangerous.

The accidents to which this disorder may give rise are loss of blood from perforation or rupture of the veins, the formation of painful ulcers over the affected parts, and sometimes inflammation of the veins.

Treatment.—We know very little of the nature and causes of varicose veins, and are equally ignorant of any effectual method of curing them; but it has, nevertheless, been proved by experience that we have it greatly in our power to retard the progress of this affection, to alleviate the pain, and to reduce the swelling by a properly-regulated and permanent compression. For this purpose a laced stocking is generally employed; and this, with rest in the horizontal position, are the grand means of palliating the disorder.

When the veins or the adjacent parts become inflamed and painful, *leeches* should be employed, and *vinegar and water*, *Goulard water*, or any other cold lotion, ought to be constantly applied to the parts. Sometimes cold applications do no good; in such cases, bathing the part with a warm *decoction of poppy-heads*, or warm water with laudanum, will be found serviceable, and more agreeable to the feelings of the patient. The bowels should be freely opened by means of *calomel* and *jalap*, followed by *Seidlitz powders*, *Epsom salts*, or any other cooling saline purgatives. Low diet and quietude in the recumbent position are to be strictly enjoined until the inflammation be entirely subdued.

The treatment is the same as for other ulcers. (See Ulcers.)

Wakefulness.

Inability to sleep always results from some derangement of the bodily functions. Sometimes this consists in a disordered circulation produced by mental emotions; sometimes it originates in dyspepsia; at other times it is a constitutional disease whereby the nutrition of the body is impaired. In every case in which persistent wakefulness annoys the patient, careful inquiry should be made into his personal

habits, surroundings and physical condition, before recourse is had to drugs.

Sleeplessness is especially apt to afflict those who take but little bodily exercise, and whose occupations are chiefly mental. The liability to wakefulness increases if the occupation be pursued also during the evening up to the hour of retiring. In other cases physical fatigue, repeated day after day, induces wakefulness, a condition often seen in mothers of large families.

Treatment.—The treatment must be determined by the cause, so far as this can be ascertained. It usually demands attention to the habits of the individual, diminution in the hours of work, etc. Sometimes regularity in meals will accomplish the desired result; occasionally a nutritious but easily digested meal, shortly before retiring, will be followed by sound slumber. This is especially apt to be the case with business men who do an excessive amount of brain work and take but little time for meals. A glass or two of warm water or a warm bath, just before retiring, will in other cases induce sleep. Sometimes a good tonic, such as the compound syrup of the hypophosphites, taken regularly for a week or two, will succeed when other measures have failed. The various medicines which are directly instrumental in producing sleep—bromide of potassium or sodium, chloral and various forms of opium—should be used only temporarily while the cause of the sleeplessness is being removed in other ways. The habitual use of these drugs to cause sleep is not advisable; for they merely cover up and distract attention from the real difficulty, which meanwhile becomes worse. After a time the individual becomes a slave to their use and gradually requires more of the drug to produce the desired effect.

Frost Bites.

The results of exposure to cold vary with the extent of flesh involved, the time during which it remains frozen, and the general vigor of the individual.

The part frozen should be rubbed vigorously with snow or cold water, the patient remaining meanwhile in a cold room, or even out of doors. After the circulation is restored through the part, the individual experiences a stinging and burning sensation, during which time the member should be kept away from the fire. It may be enveloped in cotton; after a few hours it should be immersed for fifteen or twenty minutes in moderately warm water.

When, in spite of these measures, the frozen part remains blue or purple, it will be impossible to restore the circulation, and the part must be removed. In a few days a distinct line of demarcation becomes more apparent between the dead and the living flesh; and, after some time, the former can be readily separated, if it consists only of flesh—such as the lobe of the ear or the tip of the finger; if the frozen part contain bone, it must be amputated.

Intestinal Obstruction.

The intestinal canal becomes at times obstructed so that the contents are arrested at some point. Such obstruction is produced by various causes, among which may be mentioned an accumulation and hardening of fæces, a twisting of the intestine, an infolding or "telescoping" of the bowel, and the pressure of tumor upon the canal.

Symptoms.—These vary somewhat with the cause and with the location of the difficulty. In all cases there is pain, distension of the bowel with gas, and vomiting; the discharges from the bowel may continue for one or more days after the canal is obstructed, the evacuations consisting partly of the feces which were located below the point of obstruction, and partly of the secretions of the lower portion of the bowel. Meanwhile the patient's condition is one of great distress, which is exhibited not only by the rapid and feeble pulse, but also by the wan and livid countenance, the sunken eyes, cold and clammy surface and intense pain. Sometimes a distinct tumor can be perceived, although the patient's abdomen is usually so tender as to permit no manipulation.

The course of the case varies; sometimes relief occurs spontaneously; in other cases a rectal injection of warm water has been followed by copious evacuations and a subsidence of the symptoms. The danger depends largely upon the cause of the obstruction; if this be anything else than an accumulation of feces in the bowel, the condition is one of great peril.

Treatment.—A competent surgeon should be summoned immediately; meanwhile no remedies should be given except perhaps 15 drops of laudanum to quiet pain, which can also be relieved by the application of hot cloths or light mustard plasters to the abdomen.

Cathartics should never be given before the arrival of the surgeon. The danger is usually aggravated by the ignorant administration of laxatives before the physician arrives. All such violent measures must

be avoided; if the bowel can be restored to its natural condition, it will be by soothing and quieting treatment, and not by exciting it to futile contractions. Probably in no other condition has so much damage been done by the use of domestic remedies as has resulted from the administration of usually harmless laxatives in cases of intestinal obstruction. It should be remembered that this condition is far too serious to permit any tampering or delay. The only hope lies in early and skillful medical attendance.

Intussusception.

By this term is designated an infolding or telescoping of some portion of the intestinal canal, whereby a part is swallowed up, as it were by an adjacent portion of the intestine, just as one joint of the closed telescope is swallowed up or surrounded by the next section. The result is an obstruction of the bowel, producing the symptoms already described under this name. The condition is a most perilous one, which calls for prompt and skillful medical treatment. No time should be lost by experiments with domestic remedies.

Disorders of Urination.

Difficulty of Making Water.—Difficulty is experienced in emptying the bladder from numerous causes, some of which are often evident, while others can only be detected by a competent physician. The most common cause in men is a stricture; and in men over fifty years of age, an enlargement of the prostate—a body which is situated just at the neck of the bladder. Whenever a man who has had gonorrhœa observes that the act of urination is accomplished with some difficulty, or that the stream is small, or that a longer time than usual is required for the emptying of the bladder, he should suspect the existence of a narrowing or "stricture" of the urethra, and should at once submit himself for examination to a competent surgeon. *(See "Stricture.")* For a stricture can be easily managed if taken early—that is, before it becomes tight; while a narrow stricture requires somewhat painful treatment and is the source of danger, because it produces disease of the bladder and kidney.

Enlargement of the prostate gland is a frequent occurrence in elderly men, and is a common cause of the difficulty and pain in urination experienced by such men. It is not dependent upon a previous

gonorrhœa or other venereal disease, but occurs as an incident of old age. Enlargement of this gland causes a difficulty in making water; the individual finds that he must make a voluntary effort before the stream appears, and that this is less forcible than formerly; the bladder is incompletely emptied, and in consequence of this condition, the calls to urinate are more frequent than in the natural condition; after a time the patient is compelled to arise one or more times at night to urinate. This condition calls for the judicious use of a catheter, directions for which must be obtained from a physician.

Among the other causes which may produce difficulty in urination, are stone and tumor in the bladder, tuberculosis of the prostate glands, etc.; these are far less frequent than stricture and enlargement of the prostate, and they can be detected only by a competent surgeon.

Frequency in Making Water.—Undue frequency of urination is produced by the conditions just mentioned as causes of difficulty in making water—stricture, enlargement of the prostate, etc. It also occurs when an excessive quantity of urine is secreted by the kidneys; hence it is a symptom of diabetes, some forms of Bright's disease, etc. In the latter class of cases urination, though frequent, is not painful; while when it is produced by stricture or prostatic enlargement, stone or tumor, it is sooner or later accompanied with pain. Many persons of the so-called nervous temperament habitually empty the bladder at short intervals; and many others when laboring under extreme mental or emotional strain, are temporarily so affected. Various diseases of the kidney, and of the womb in women, cause unusual frequency in the evacuation of the bladder, though this organ itself is perfectly healthy.

Retention of Urine.—Inability to pass water usually results from some obstruction at the neck of the bladder or in the urethra; the most common causes are stricture and enlargement of the prostate. In such cases the individual has long noticed that the urine flows with difficulty and feebly; finally, after taking cold or indulging too freely in liquors, there suddenly occurs an inability to evacuate the urine at all. The bladder becomes distended and can be seen and felt as a swelling in the lower part of the abdomen. A few drops of the urine escape now and then in consequence of the extreme pressure of the distended bladder; the patient's clothing is wet with urine, but he is unable to make water. This condition is extremely seriously; towels wrung out in hot water should be applied over the lower part of the abdomen and a surgeon summoned immediately. Sometimes a skillful surgeon is enabled to introduce a small catheter into the bladder and thus withdraw the urine; in other cases this is impossible and an operation is necessary.

In these cases care should be taken not to regard the dribblings of urine which overflows from a distended bladder as incontinence or inability to hold the water. This mistake is often made; the physician is consulted because the patient fancies that he cannot retain his water, while the fact is that he cannot pass it, and that the bladder is immensely distended. It is extremely important that the actual condition be recognized.

In other cases retention of urine occurs temporarily without any mechanical obstruction in the urinary channel; thus it is observed after operations upon the rectum or genital organs, after childbirth, etc. It is also found repeatedly in cases of exhausting disease, such as typhoid fever; such patients often fail to evacuate the bladder, which becomes distended; and as a result of this distention there is a constant dribbling of urine, which is regarded by the friends and sometimes even by the physician, as inability to hold the water, while it is really a sign of inability to empty the bladder. In such cases of severe disease care should be taken that the bladder does not become distended; the catheter should be introduced when the patient fails to empty the bladder spontaneously.

Inability to pass water may depend upon one of two general causes—either a failure of the bladder to expel the urine, or a failure of the kidneys to secrete urine. The former is by far the more common condition; it occurs as the result of stricture, or (in elderly men) of enlargement of the prostate gland; in women it is often observed during a hysterical attack. If no water be passed the bladder gradually becomes distended and can finally be felt and even seen as a tumor in the lower part of the abdomen. The patient (if not hysterical) makes frequent and violent efforts to expel the urine, and suffers considerable uneasiness and finally pain around the bladder. If the kidneys fail to secrete urine, on the other hand, the patient makes no effort and experiences no desire to urinate. In any case the cause of the difficulty can be ascertained by the introduction of a catheter. If no urine escapes after this is passed into the bladder, it is practically certain that the trouble is located in the kidneys; if, on the other hand, the instrument is prevented by some obstacle from entering the bladder, this obstacle probably constitutes the cause of the retention.

Retention of the urine in the bladder can sometimes be relieved by having the patient take a warm bath or hip bath for ten minutes, or by placing cloths wet with hot water over the bladder and between the thighs. If these measures fail, a soft catheter should be gently intro-

duced into the bladder. The cause of the difficulty will require treatment at the hands of a competent surgeon.

Incontinence of Urine.—An involuntary escape of urine is rare among adults, except as a result of violent laughter, coughing, etc.; it is, on the other hand, common among children, especially at night. In many cases it can be remedied by merely causing the child to empty the bladder late at night and early in the morning, and by taking care that the bowels are regularly evacuated; in most instances, however, such measures are not successful. The child's person should then be carefully examined; occasionally there exists some local irritation—such as pinworms in the bowel, or a long foreskin, the removal of which will cause the difficulty to subside. If no cause can be found, minute doses of atropine—not more than $\frac{1}{120}$ of a grain—may be given at night. This should be undertaken only under the advice of a physician.

Ulcer of the Womb.

Ulceration of the mouth of the womb occurs as the result of various diseases of this organ—prolapsus, enlargement, displacements, etc. It can be detected only by an examination through the vagina. The treatment must be directed largely toward the condition of the womb which precedes and causes the ulceration; this can be undertaken only by a physician.

Scrofula.

By this term is understood, not a specific disease, but a constitutional condition which renders the individual especially susceptible to certain diseases and diminishes his power of recovery from the effects of disease or injury. The condition may be inherited or acquired; it is seen with especial frequency in the children of consumptive and syphilitic parents, and in those who in their youth have been exposed to unfavorable surroundings, such as poor food, bad air and damp apartments.

The scrofulous constitution is manifested in two distinct physical types. In one the skin is very fair and transparent, showing distinctly the superficial veins as blue stripes; the hair is usually of light color and fine texture; the eyes large and blue; the muscles poorly developed; the weight is small in proportion to the height; the intellect is precocious. The other type inclines to what is termed the "lymphatic" tem-

perament. The skin is dark and coarse, the features large and coarse; both physically and mentally the child is sluggish and inactive.

Evidences of the scrofulous constitution appear usually between the first and fifteenth year; as infants, the individuals are subject to discharges from the eyes and ears, to eruptions upon the skin, nasal catarrh, etc. In subsequent years it is noticed that slight wounds or injuries do not heal with the usual facility; matter is formed very profusely and for an unusually long time, and lymphatic glands in the vicinity of the wound become so enlarged as to be distinctly visible as lumps under the skin. These glands, under the ear and behind the jaw, often enlarge without any apparent cause; they form unsightly swellings which finally break, making sores from which an obstinate discharge of matter proceeds; these sores finally heal, leaving ragged and depressed scars. Between the ages of five and ten years, diseases of the bones, especially at the hip and knee-joint, often supervene. Tuberculosis may be developed in the brain or bowels, and after puberty it frequently appears in the lungs as "consumption."

The treatment of an individual who manifests a scrofulous tendency should begin at birth, or as soon thereafter as this tendency is discovered. A scrofulous infant should be nursed by a healthy breast, which, in many cases, necessitates the employment of a wet-nurse. The greatest care should be taken to supply the child with good air, sunlight and warm clothing. After the infant has ceased nursing, small doses (two to five drops) of the syrup of the iodide of iron and minute quantities of cod-liver oil should be given two or three times a day.

Rickets.

This is a constitutional condition manifested by a peculiar alteration in the structure of the bones. The ends of the long bones (thighs, legs, arms) become thickened; the bone tissue possesses less than the usual degree of hardness, and as a result deformities occur—bending of the spine, legs, arms, etc. The disease begins in early life, sometimes even before birth; it is manifested in infancy by a disposition to diarrhœa and vomiting, by persistent fever and intense thirst. Profuse perspirations occur on the head, neck and upper part of the chest, while the lower portion of the body feels hot and dry, impelling the child to kick the covers off even when the air is cold. The general health deteriorates perceptibly; finally the cause of the difficulty is made apparent by

the swelling of the wrists, knees and ankles. If the disease is developed during the first year of life, the teeth are very slow in appearing; sometimes they drop out soon after the teeth are cut. At this time the various deformities of the bones are developed—bow-legs, pigeon-breast, curvature of the spine, etc.

The treatment consists in surrounding the child with the best hygienic influences—good air, sunshine, warm clothing and nutritious food. Unless the mother be perfectly healthy, the child should be nourished by a healthy wet nurse; if this be impracticable, the food should consist of cow's milk mixed with one-quarter of lime-water, or barley-water with one-quarter cream. After weaning, cod-liver oil and lime-water should be given—one-fourth to one-half a teaspoonful of the former three times a day, and a teaspoonful of the lime-water with milk three or four times daily. Five to ten drops of the syrup of the iodide of iron will often be found useful when administered after meals.

Cold in the Head (Nasal Catarrh).

"Taking cold" consists in the starting of an inflammation somewhere in the body, as the result of exposure of the neck and chest to a draught, of getting the feet wet, of passing suddenly from a warm to a cold atmosphere, etc. Sometimes the inflammation originated in this way is located in the lungs, resulting in pneumonia; sometimes it affects the kidneys, producing Bright's disease; or it may attack other portions of the body. In by far the greater number of cases, however, the inflammation originated by exposure to cold is located in the mucous membrane of the nose or of the throat, or of both.

The symptoms of a "cold in the head" are familiar. The affection subsides in two weeks or less, leaving the parts in their natural condition; when, however, the attack is repeated frequently and at short intervals, there remains after each cold a certain amount of swelling and discharge from the membrane of the nose and throat, constituting the familiar and obstinate "nasal catarrh."

The treatment of a cold in the head is ineffectual unless instituted immediately; so soon as the attack is indicated by sneezing and the other familiar symptoms, the individual should take a hot bath for ten or fifteen minutes, followed immediately by Dover's powder (ten grains) and quinine (five grains); he should then be warmly covered in bed or otherwise until perspiration is freely established. In this way a cold in

the head can often be cut short. When however (as is usually the case), the individual cannot or will not take the time and trouble to adopt these measures, he must expect that this affection will last from twelve to fourteen days in spite of all that can be done. During this time he should take especial care to keep himself warmly clothed, avoid draughts and secure regular evacuations. Medicine will accomplish but little after the first twenty-four hours; the most relief can be obtained by taking half a drop of the tincture of aconite every hour. Or the following mixture may be taken: Tincture of aconite, one-half drachm; tincture of belladonna one drachm; syrup of orange peel and water enough to make four ounces. Mix and take a teaspoonful every two hours.

Chronic Catarrh of the nose and throat is an extremely obstinate affection, the symptoms of which are familiar. It is especially frequent in localities where sudden changes of temperature are frequent; in such places the disease is practically incurable, since the cause is constantly active, and the catarrh is aggravated by frequent colds. Removal from such a locality to an even climate is often necessary for recovery.

In treating chronic catarrh of the nose, it is important to ascertain whether or not any constitutional disease is present; thus sometimes the individual is syphilitic, in which case treatment rarely avails, unless the remedies adapted to the relief of syphilis are given. If the patient be scrofulous, cod-liver oil and the syrup of the iodine of iron must be administered in addition to local treatment.

In the treatment of the nose itself, the widely used nasal douche should be avoided, for it frequently induces inflammation of the ears, and causes considerable pain over the eyes and bridge of the nose. The nasal passages should be cleansed with warm water containing a little salt, which can be sprayed into the nostrils from behind by means of an atomizer with a curved nozzle. If the passages contain thickened crusts, these can be softened by warm water thrown into the nostrils through a coarse atomizer. After the passages are thus cleansed, the nostrils should be sprayed through the atomizer with the following solution: Carbolic acid, 1 drachm; bicarbonate of sodium and borax, each 2 drachms; glycerine and water, each 5 ounces. This spray should be continued from two to five minutes at a time, and used once a day or every second day as occasion requires.

In many cases it is desirable to employ simple inhalations of steam, which is drawn up into the nostrils and sprayed into the throat for five minutes every day. After a few days, half a teaspoonful of the tincture of iodine may be placed in a pint of hot water, and the mixture used instead of simple water for inhalation.

The inhalation of powders, while temporarily lessening the discharge, rarely accomplishes any permanent benefit.

La Grippe.

[This article is contributed by Dr. Wm. B. Atkinson, Philadelphia, Permanent Secretary of the Medical Society of North America.]

The Grip is also known as the Epidemic Catarrh, or Influenza, and has also received a variety of equally fanciful names. Although it has only recently received the name of La Grippe, yet this disease has been known in nearly all parts of the world for many centuries. It is believed by many authorities to have occurred as a widespread epidemic even in ancient times, and certainly the symptoms related as occurring in so many cases very closely resemble those observed in the recent epidemics. A singular thing is, that while it is not of itself directly the cause of excessive mortality, yet its effects produce such a lowering of the forces of the system, that it leaves the patient ready to fall an easy victim to many other maladies. It truly decreases the vital powers, so that the mortality from every form of illness becomes very much greater, and, in the death reports, the number of deaths in proportion to the cases of illness is always largely increased. In addition, a singular circumstance is, that a similar malady at the same time attacked other animals as well as man. The most careful researches fail to show that it is governed by any of the usual laws of epidemics, but that it travelled with the most wonderful rapidity over seas, deserts, and even was seen to attack two widely separated countries, simultaneously. Again, the disease attacked equally the poor and the rich, old and young, all temperaments alike. The investigations of those engaged in meteorological observations showed no apparent relation between these conditions and the prevalence of the disease. Perhaps the only condition that was positively seen to precede an epidemic was a continuance of dampness of the atmosphere. Although claims have more than once been made that a microbe of the disease had been discovered, yet the best bacteriologists deny the assertion.

While there has been in various places a wide discrepancy as to the exact nature of the epidemic, yet we believe that it may be regarded as a true epidemic catarrh, affecting specially the mucous membranes of the air passages and speedily involving the entire nervous system. The usual invasion is heralded by a chilliness more or less marked, in some instances amounting to severe rigors, even causing the peculiar sensation

known as breakbone fever. After this has continued for a longer or shorter time, there follow the usual symptoms of coryza. Others, in place of chilliness, are attacked by a marked dizziness, perhaps a sudden falling as in a faint, the lower extremities giving way as if paralyzed; the back aches, the head aches, and some are affected by a sudden diarrhœa. Others have great drowsiness, apparently exhausted, with a tendency to comatose condition.

The majority have from the outset all the symptoms of a severe cold, sneezing, coughing, the eyes and nose discharging freely, and all the time accompanied with severe rheumatic pains and great mental depression. Some attacks are ushered in by a terrible retching, usually sweating is present from the first. In some the throat and tonsils are inflamed, and this may extend into the Eustachian tube and cause earache.

Unlike many other affections, the patient may have renewed attacks in subsequent epidemics, or even in the course of the same epidemic. Careful observation would seem to show that an attack averages about four to six days, when convalescence begins, and this may be protracted, or during it some other form of disease occurs and often proves fatal speedily. Where a tendency is present to lung trouble, consumption or pneumonia follows and proves fatal. Or when the heart is known to be a weak one, death is liable to ensue from heart exhaustion.

During such an epidemic, all other affections assume markedly the characteristics of this, hence it is generally difficult to say whether the attack is one purely of grip, or some other affection assuming its characteristics.

In no disease has there been more diversity of views as to the appropriate treatment. In each epidemic have been seen physicians loudly proclaiming great benefits from very diverse remedies. Perhaps in no affection is needed more care as to the avoidance of heroic treatment. Active or powerful medicines are best prohibited from the very beginning. The sole object of the medicinal treatment should be to relieve urgent symptoms by the mildest remedies. It is believed that in the recent epidemics, many deaths were caused by too active medication, as in many cases the most indiscriminate and reckless use of powerful drugs was had recourse to, and that under the advice or suggestion of the most ignorant pretenders. Many recent additions to the armament of the physician are of a powerful and dangerous character, their exact effect or power not being understood, and in many patients these are especially liable to result in evil. Yet, incredible as it may appear, these

were the remedies first employed, and it is believed that they were in many instances productive of the worst results.

The best plan is to place the patient at once in bed, even though the attack be a light one. This will often greatly aid the system in recovering from the nervous condition or shock into which it has been thrown. If much heat and other symptoms of fever are present, it will be well to relieve the bowels by the use of mild purgatives, and administer solution of acetate of ammonia in teaspoonful doses, to which may be added one drop of tincture of aconite, and twenty drops of sweet spirits of nitre. This dose should be repeated every two or three hours till the symptoms abate

To relieve the intense neuralgic pains, small and frequently repeated doses of morphia, tincture of gelseminum, the bromide of soda or potassa, in short any of the well-known remedies which are known to relieve pain of this character.

The following formulæ are useful :—

Take of morphia one grain, solution of acetate of ammonia two ounces, simple syrup one ounce. Mix. Dose, one teaspoonful every one, two or three hours, according to the urgency of the symptoms and age of the patient.

Take of tincture of gelseminum three to five drops in each dose of the above, omitting the morphia. In very severe cases both may be given.

Take of bromide of potassa five grains, or bromide of soda eight grains, every hour or two in cinnamon water, one teaspoonful, till the pains are relieved. As soon as sleep occurs the patient should not be disturbed for the medicine, but allowed to obtain the benefit of the rest. For want of sleep, chloral in five grain doses, repeated every hour or two, may be given in the last mixture. Where evidence of great depression exists, this must be watched and discontinued, should the patient exhibit any signs of an increase in the depression.

It must be remembered that the best authorities agree in the belief that the morbific influence, whatever it may be, acts directly upon the nerve centres, and all remedies of a depressing character must be employed with great caution.

One writer says: "Nearly all phenomena which distinguish influenza (la grippe) from other similar affections can be readily accounted for by this theory; the excessive nervous prostration, so entirely out of proportion to the catarrhal disturbance, the emotional depression, causing the victim to weep incessantly without consciousness of any reason for so doing, the sense of constriction about the larynx, the strident

cough, piping voice and occasional aphonia, the sudden congestion of the lungs, the pain and stiffness in the dorsal muscles, especially along the nucha, the gastric and intestinal disturbances, the intense headache, and transient manias, all can be accounted for by the supposition that the great balance wheel of organic life has become deranged."

Remembering this, and knowing that the tendency of the disease is to health, unless some complication arises, the effort should be in the line of care as to rest and recuperation of the patient from the poisonous effects of the disease. Perhaps in no disease is it more important to watch the symptoms and treat them as they occur. What is known as the *expectant treatment* in thus indicated.

The fever at the outset having been broken by the remedies as given above, the strength must be kept up by good easily digested food, tonics, the most positive rest. The intense pains of a rheumatic character, or perhaps more correctly, neuralgic, as shown by the agonizing headache, aching of the bones, etc., must be relieved. For this indication, many physicians use preparations of salicylic acid, as the salicylate of sodium, in doses of five or even three grains, in free solution, at intervals of two or three hours. Where the agony is more intense or persistent and this method does not relieve, small and frequently repeated doses of morphia, say, one-twelfth of a grain every two hours, or extract of hyoscyamus one-sixth grain at the same interval, or combining morphia with extract of belladonna, in doses of one-twelfth of the morphia and one-sixth of the latter, every two or three hours till relief is obtained. In some instances great good is obtained with tincture of nux vomica, in three-drop doses, every two or three hours. This acts to tone up the circulation and relieve the tendency to congestion, which is a characteristic of the disease.

For these reasons, it must not be forgotten that bloodletting is never under any circumstances to be employed, as the general depression will thus be made more dangerous. For the same reason, brisk purgation is rarely to be used. Only in patients who had been, prior to the attack, in very vigorous condition. Then this means should be used with care, lest too free evacuations from the bowels induce such prostration as to result in such complication as diarrhœa, or the like. Also, the antimonials, or other specially depressing medicines, are to be omitted. In many instances, the treatment outlined on a previous page, with positive rest, will, in the course of from four to eight days, terminate in a cure, when the patient will be able to return to active life, always being careful to avoid the danger of exposure to drafts, or to exhausting efforts.

In severe cases still without complications of any kind, when the mild treatment does not relieve the pain, headache, etc., then employ the opiates or similar remedies in moderate doses. Usually, these are soon followed by sleep, and the patient awakes almost or wholly free from aches and pains, and needs only a mild tonic to complete the cure. Quinine, two grains three or four times a day, dilute phosphoric acid in doses of ten to fifteen drops in free solution and syrup three times a day, tincture of bark or compound tincture of gentian, one teaspoonful three times daily, and later, if the nervous depression is not rapidly dissipated, the compound syrup of the hypophosphites, in teaspoonful doses at each meal, will tone up the system.

Where complications occur, as pneumonia, acute bronchitis, dysentery, the treatment should be followed according to indications, as (see those subjects under the appropriate headings). One indication should ever be remembered: when the attack shows a great tendency to stagnation of the blood in the capillaries, as evinced by the lividity of skin or mucous membranes, opium should be omitted, or used only with great caution. Here ammonia, as the carbonate, in three to five grain doses, freely diluted with water and mucilage, repeated every two or three hours, will soon relieve this alarming condition. Or the aromatic spirit of ammonia, fifteen to thirty drops in two teaspoonfuls of water, may be given. When the hysterical element is marked, as demonstrated by nervous excitement, a feeling as of a ball or lump in the throat preventing swallowing, etc., then the elixir of the valerianate of ammonia is very useful, in doses of one or two teaspoonfuls, repeated every hour or two, or oftener in an emergency.

In several epidemics, the use of a tea of eupatoria perfoliata (boneset) has been found very useful. Cascarilla and similar articles have been similarly lauded; but after all, the indications are best met by the remedies already mentioned. Should the feebleness continue, iron in some form added to the quinine or other tonics, will rarely fail to complete the return to health. We may mention the citrate of iron and quinia, in doses of three grains thrice daily in pill or solution, the potassio tartrate of iron in the same dose, the ammonio citrate of iron, two to four grains three times a day, or, what has proved so often valuable in many diseases, the tincture of the chloride or muriate of iron, ten to twenty drops with syrup and water, each a teaspoonful, three time a day. The two latter forms of iron are especially valuable where the nerve depression persists.

Finally, it is of great importance to keep constantly in mind, the need of complete rest even in the very mild cases, and also in convales-

cence, and for two or even four weeks after the great tendency to relapse, when all the symptoms are sure to be aggravated and the danger of a fatal result largely increased. Hence the patient is not to return too early to the usual duties, but should slowly feel the way, so to speak, back to the daily routine. In the event of a relapse, the patient must at once return to bed and remain in the recumbent position, and the most positive tonics are to be employed.

January 2nd, 1892. W. B. ATKINSON.

Pasteur's Treatment of Hydrophobia.

Pasteur's experiments with hydrophobia, or rabies, as the disease is also called, were undertaken for the purpose of trying to isolate the poison which produces the disease, whatever it may be, for its nature is not yet known, and when isolated injecting it into dogs in small doses, with the hope that they would thus be protected from the possibility of acquiring the disease, in the same manner as vaccine, the weakened poison of small-pox, protects from that disease.

It was reasonable to suppose that this could be accomplished, for it was known that the poison of hydrophobia exists in various degrees of strength, inasmuch as previous investigation had shown that if a mad dog be made to bite a healthy one, this in turn when mad, a third, and so on, the period which elapses before any symptoms show themselves will become longer with each successive dog, until the fourth or fifth dog fails to take the disease.

The symptoms of hydrophobia are of such a nature as to lead to the belief that the poison which causes the disease attacks especially the nervous system. Microscopical examinations of the brain and spinal cord of those who had died of the disease strengthen this view.

Investigators had tried to produce the disease by inoculating healthy animals with brain matter taken from animals which had died of the disease, but without success; they had also tried to produce the disease by inoculations of blood taken from animals which were suffering from the disease, with an equal want of success. In a word the only known means of conveying the disease was through the saliva.

Pasteur's first experiments were made in the year 1881, with saliva obtained from a child dying from the disease in one of the hospitals of Paris.

He injected the saliva into dogs and rabbits, and produced in them

a new and fatal form of disease, which he supposed to be the form which human hydrophobia assumes in animals.

These experiments with the child's saliva taught him that, before any progress could be made in the study of this disease, means must be devised for producing it with certainty, and for lessening the time which elapses after inoculation before symptoms are observed. As long as he had to wait two months or more before the disease showed itself after an inoculation, and as long as it did not show itself at all in fully one-half of the animals inoculated, there was not much hope of gaining more knowledge of the nature of the disease.

After trying many other methods, he finally succeeded in accomplishing his object by trephining, or making an opening in the skull, and inoculating portions of diseased brain matter directly into the brain of healthy animals.

By this method symptoms of the disease appeared with certainty after one or two weeks had elapsed, and the animals died by the end of the third week.

There are two forms of hydrophobia, both of which occur in man—the furious form, which is the one ordinarily known, and the dumb form, in which paralysis is the chief symptom. Which form will follow the bite of a mad dog depends upon what portion of the brain or spinal cord the poison finds lodgment in, for Pasteur showed that these are different forms of the same disease, by producing the one from the other.

Pasteur next produced the severest form of the disease, the dumb form, by injecting a large amount of diseased brain substance into animals, and the milder form, the furious form, or ordinary street hydrophobia, by injecting a less amount, while injections of a still smaller amount produced no effect.

The poison of rabies, carried from the dog to the monkey and then from monkey to monkey, grows weaker with each passage. If after it has passed through several monkeys it be carried back to the dog or rabbit, it still remains weakened. A few passages from monkey to monkey are sufficient to decrease its strength to such a degree that when diseased brain substance is inoculated into the brain of a dog, which is a never-failing means of producing the disease, the animal remains healthy, and is protected from the disease in the future.

Successive passages from rabbit to rabbit, and from guinea-pig to guinea-pig increases the power of the poison, until in the rabbit it attains and continues to remain at a very high degree of virulence; and if after attaining this degree of virulence it be inoculated into dogs,

they show a much severer form of disease than the ordinary street hydrophobia.

These facts gave a clue to a sure method of protecting dogs from rabies. It was first accomplished in this manner: A portion of the brain of a rabbit which had perished of rabies of a mild grade was inoculated into the brain of a healthy rabbit; when mad, a portion of this rabbit's brain was inoculated in the same manner into a third; the poison had grown stronger by each inoculation. Each time it was inoculated into a rabbit it was inoculated into the same dog. The dog after the third inoculation could stand a dose of the poison which would ordinarily kill him, and he was refractory to ordinary canine rabies.

After attaining this result Pasteur requested the Minister of Public Instruction of France to appoint a committee before whom he might bring his dogs and experiment in their presence.

He proposed to take twenty dogs which had been protected, and twenty dogs which had not been protected, and subject them all to the bite of a mad dog; if the conclusions at which he had arrived were correct, the twenty protected dogs would not contract the disease, while the twenty unprotected ones would.

The commission was appointed and experimented in various ways, but not one of the protected dogs acquired the disease while most of the unprotected ones did.

The progress made so far was more scientific than practical. Not more than three dogs out of four could be protected in this manner. It was advisable to end the treatment by final powerful inoculations in order to make it doubly sure that the animal was protected. Furthermore, simple prudence demanded that the dogs should be kept under observation from three to five months. These drawbacks lessened the value of Pasteur's discovery, and hence he set to work to simplify his methods.

He had inoculated fifty dogs by an improved process without a single failure, when, without previous notice, Joseph Meistner, a boy nine years old, who had been bitten by a mad dog two days before, came to consult him as to what he had better do to avoid having the disease.

Pasteur did not wish to assume the full responsibility of the case, and, therefore, called in consultation two of the best authorities in France on the subject of hydrophobia. They expressed the opinion that the dog which had bitten the boy was certainly mad, and that there was no doubt but what the boy would develop rabies. After hearing an account of the experiments which Pasteur had made, and learning that he could

now protect dogs from acquiring the disease, they concluded that it would be justifiable to inoculate the boy.

The first inoculation was made sixty hours after the bite and each successive day additional inoculations were made. During ten days he made, in all, thirteen inoculations. In subsequent cases he found a fewer number would suffice.

At the same time two healthy rabbits were inoculated with the same poison used in each successive inoculation of the boy, in order to be able to estimate the strength of each dose of poison administered to the boy. These inoculations showed that the poison used for the first five injections was not sufficiently powerful to produce disease in rabbits, but the following inoculations did do so, and the two final inoculations caused the severest known form of rabies. The boy never had the disease.

After this, Pasteur was called upon to treat a large number of cases, and his treatment, he states, has failed but in one case—that of a little girl who died of hydrophobia after being treated. The inoculations were made thirty-seven days after she was bitten. The bites were deep and large, and some were on the head. Although she had been under a doctor's care all the time, some of the bite wounds had not healed when the inoculations were begun. The unfavorable conditions of this case were such as to lead one to suppose that treatment could hardly be successful, but Pasteur wished to give the child every chance for life, and hence yielded to the entreaties of the parents, and made the inoculations.

Pasteur's treatment soon grew to be a matter of great importance, and those engaged in the work were surprised to see how many persons were bitten by mad dogs or dogs supposed to be mad. In fact, their number was so great that the two or three rooms in which Pasteur had worked became totally inadequate to his needs. Hence, through public subscription and the aid of the French government, a fund was raised sufficient to erect a building, where he could experiment and where patients could be treated. This institution is called the "Pasteur Institute."

Within a short time branch institutions for inoculations of hydrophobia cases were established in all civilized countries. In the United States there are two—one in New York and one at Rush Medical College, Chicago, where inoculations are constantly being made.

Pasteur's treatment has certainly added materially to our knowledge of hydrophobia and great credit is due him for the thoroughness of his research and the careful manner in which he has investigated this disease.

But grave doubts are entertained by many as to the efficacy of his

treatment, and many incline to the opinion that his treatment has conveyed the disease to many people who would otherwise never have had it.

An English commission appointed to investigate Pasteur's treatment reported that they carefully considered his first ninety cases, and had concluded that only twenty-four of these cases had been bitten by dogs which were really mad, and that of these twenty-four, eight were fatal, a proportion far in excess of that which existed before the introduction of this mode of treatment.

A good many cases which were inoculated have subsequently died of hydrophobia, some after a few days, others after an elapse of two years.

Pasteur claims that these are cases in which his treatment was not successful, while others hold that many of these cases were due directly to the inoculations.

Piles or Hemorrhoids.

This form of disease is one of the most common of all diseases to which the human race is liable. Piles, or hemorrhoids, usually present themselves in the shape of small, round tumors, of a red or bluish color, and consist of a dilatation of the veins of the rectum. Several are very apt to appear together. If they are situated inside the anus they are called *internal* piles, and if they appear like a fringe about the margin of the anus they are known as *external* piles. They are also divided into *open* and *blind*, depending on whether they bleed or not. The treatment varies according to their situation.

Causes.—General ill-health, with relaxation of the tissues; constipation, with straining at stool; indolent habits, combined with high living and not much exercise; other diseases of the rectum and organs of this region; obstruction to the return of the blood through the venous system, this probably being the most fertile cause. The venous circulation may be obstructed by the pressure of masses of hardened fæces in the large intestine, by liver disease, by abdominal tumors, by the enlarged womb, etc., etc.

Symptoms of External Piles.—When of small size, and of recent appearance, they do not give rise to pain, but there is a feeling of heat, with itching and pricking; when they are large and inflamed, there is a dull, aching pain in the pile and up along the rectum. After some hours or days these symptoms disappear, the blood becoming partly absorbed, leaving a brownish, indurated lump. In other cases matter forms.

Symptoms of Internal Piles.—This form of pile is found inside the anus, one to two inches from the margin. It consists of a fold of mucous membrane projecting into the rectum, either in the form of a ridge or a small globular tumor. There is a sensation of heat, with itching and pricking about the anus, and a feeling as if there were some foreign body in the rectum. When at stool these elongated piles sometimes pass partially out of the anus, and when the latter contracts on them a peculiar sickening sensation is produced. Such tumors should be replaced immediately, as there is great danger of their becoming strangulated. Ulceration may also take place, followed by the discharge of blood.

It is this form of hemorrhoids in which bleeding is most common, and often dangerous. It varies very much in amount; there may be only a drop or two at first, coming away with the stools, or several teaspoonfuls may be lost at one time. When the bleeding is not very copious, it is followed by relief, as the congestion disappears for a time; but, on the other hand, slight bleeding, if often repeated, soon exhausts the system, and is followed by alarming symptoms.

A thick, glairy fluid is sometimes discharged from the rectum, this being the altered secretion from the minute glands in the substance of the mucous membrane.

Treatment.—In many cases piles are only symptomatic of some other disease, such as have been mentioned under the head of causes of piles. In such cases one of the first things to do is to treat the original disease, and then to treat the piles locally.

General Treatment.—All cases of piles are benefited by the use of some mild laxative, for the purpose of removing fæcal accumulations and keeping the bowels open. This tends to prevent congestions of the venous system. Castor-oil and flowers of sulphur are very useful for this purpose; the dose for each person must be ascertained by experience.

Local Treatment.—External piles should be sponged night and morning with cold water, and if any inflammation be present the patient should remain in bed. An astringent ointment, such as tannic acid and vaseline, is occasionally very beneficial. If much pain be present, a poultice, with a teaspoonful of laudanum sprinkled on it, is very grateful. The pain caused by the passage of fæces may be greatly lessened by the use of cold-water injections just before going to stool.

Internal piles are benefited by astringent injections: four grains of the sulphate of iron to four ounces of water, or ten grains of tannic acid to the ounce of water may be used. One to two ounces of such a

mixture may be injected at night and left in the rectum. Astringent ointments may be introduced and left in place.

Operations for Piles.—While in the majority of cases the above treatment by astringents, etc., will cure, or at least relieve the disease, in many cases it is necessary to resort to the removal of the enlarged veins. There are several modes of treatment by this method, but none of them should be attempted while the patient's general health is poor, or while there is any local inflammation. Piles may be cut off with a knife or scissors; there is usually not much bleeding, but even in exceptional cases it can easily be controlled by pressure.

Internal piles are, as a rule, removed by the ligature. This form being more liable to bleed excessively, and being difficult of access, it follows that great care should be taken in their removal. Caustics have been used in both forms of disease, but the results attained are not so good as in the other methods mentioned, and their use is not advised.

All operations about this part should be conducted under ether, by a physician expert in this department. In a large majority of cases the operation is followed by complete relief, and by speedy recovery from the immediate effects of the operation; but death has taken place from blood poisoning and other causes.

Koch's Lymph

Ever since it has been known that tuberculosis is caused by a fungus, efforts have been made to find something which, when taken into the system, will destroy these fungi without injury to the patient, and thus cure the disease.

Most of those who endeavored to accomplish this result made their observations directly on patients, administering to them first this and then that substance, with the hope that they would finally find something which would check the growth of these fungi.

Dr. Koch, Professor of Hygiene in the University of Berlin, Germany, who had already distinguished himself by discovering the fungus of tuberculosis, proceeded in a more thorough and scientific manner.

He first studied the substances which destroy the fungi when grown on gelatine, and then, administering these substances to animals suffering from the disease, he could form an opinion as to their power of destroying the fungi when lodged in various parts of the animal's system. Of all the substances which he found which would destroy a gelatine cul-

ture of the fungi, not one of them had the power of destroying the fungi when present in the system of an animal.

He next tried to produce something from the fungi themselves which would prevent their growth. In this he was successful; and during the summer of 1890 he announced that he had obtained a fluid or lymph which, when injected under the skin of guinea-pigs would protect them from the disease, if healthy, and would restore them to health if diseased, and that he next intended to study the effect of this lymph on the disease in man.

It was his original intention to complete his experiments in regard to the use of this lymph on man, to gain sufficient experience in the mode of its administration, to decide how and when it should be employed, and provide for its production in large amounts, so as to meet the demand which would certainly be made for it before making public the results of his investigations.

But, in spite of all precaution, the nature of his experiments gradually became known, and such exaggerated reports of the results obtained were published that he deemed it advisable to give the public a general idea of what he was accomplishing, before he had completed his studies.

He therefore published an account of his work.

It was decided advisable to use the lymph only in hospitals at first, so that patients could be closely watched and records kept.

When taken into the stomach it produces no effect, hence it is administered by injections under the skin.

In making injections under the skin, abscesses form if great care is not taken to have the syringe and hollow needle, through which the injection is made, absolutely clean.

After various trials it has been decided that the injections should be made in the back, between the shoulder blades, as no local reaction then follows and no pain is produced.

Action of the Lymph on Man.—From the very first it was obvious that this lymph has an entirely different action on man from what it has on guinea-pigs

Man is far more sensitive to its influence than animals. A guinea-pig can take one hundred times as large a dose as a man.

If the person on whom the lymph is used be healthy, a much larger dose is required to produce an effect than if he have the disease. For purposes of study Koch injected a large dose into his own arm and experienced its effect. The smallest dose which will produce an appreciable effect in a healthy man causes slight pain in the extremities and some

lassitude, in some cases a little fever. If a somewhat larger dose be given, the patient will have a chill, fever, pain in the extremities, cough, rapid breathing, and a feeling of lassitude, many times vomiting, and in some cases jaundice, in a few cases an eruption on the neck and chest resembling measles.

The attack begins four or five hours after the injection, and lasts twelve to fifteen hours; in a few cases it comes on later and is not so severe. After the attack, or reaction, the patient usually feels better than he did before the injection was made.

Its use in Lupus.—When the fungi which cause tuberculosis find lodgment in the skin, they produce a disease which for ages has been called Lupus, and which is now thought to be tuberculosis of the skin; this is denied however by some good authorities. The discovery of the lymph is an additional proof.

In order to observe directly what occurred in diseased parts when the lymph was injected, cases of Lupus were taken, and it was observed that a few hours afterward, and usually just as the chill begins, the pimples which constitute the disease swell and turn red; during the duration of the fever this increases, in some cases it attains a very severe degree, and even ulceration has been known to result.

When the fever subsides the swelling decreases, and after two or three days it may entirely disappear. Then the fluid exudes from the Lupus pimples, and, coming in contact with the air, dries and forms a crust which falls off in two or three weeks, leaving a smooth red scar.

Usually several injections are required to cure a case of Lupus. The skin surrounding the pimples shows no change; but often pimples, which were so small that they could not be previously seen, become visible after an injection.

Consumptive patients are so sensitive to its action that a very small dose must be used in the beginning and repeated until no reaction follows, and when this result is obtained the dose may be gradually increased until the same dose as is used in the other forms of tuberculosis is attained. Under this plan of treatment the cough and expectoration increases after the first few injections, then begin to diminish, and in favorable cases cease; the expectorated matter no longer contains pus, but has a more mucous character. The fungi which are always found in the expectoration of consumptives gradually diminish in numbers, but are still to be found as long as there is any expectoration. The night sweats cease, the patient looks better, and the weight gradually increases. If patients are taken in the beginning of the disease they can be cured in from four to six weeks.

The results obtained in advanced cases have been so unfavorable that it is no longer advised to try it, except in the very beginning of the disease.

One of the greatest advantages which it is hoped will be derived from this lymph will be that by using it we can find out whether a given patient has or has not the disease, for, as we have already seen, a small dose administered to a patient suffering from the disease will produce a reaction, while the same dose administered to a healthy person, or one with any other disease, will produce no effect; hence, in doubtful cases, if we make an injection and a reaction follows we know that the patient must have tuberculosis.

How the Lymph Acts.—As already stated, this discovery was made through efforts at trying to find something which would kill the fungi of tuberculosis, but investigations show that the lymph does not cure in this manner, but that its beneficial action is due to the fact that it provokes an inflammation around the parts which have been invaded by the fungi, which inflammation corrals them, as it were, prevents their dissemination and multiplication, and cuts off their nutrition, as a result of which they soon perish.

If this inflammation which the lymph excites be very severe, then the part will die, an ulcer will be produced, and finally a scar will result.

Koch observed that when live or dead fungi are injected into a part where tuberculosis is present, they remain where they are injected and generate a something, an effective substance, the nature of which is not known. If the fungi be injected in large amounts the effective substance is generated so rapidly and in such large amounts that it shortly kills the animal. If the number of fungi injected be fewer, then less of the effective substance is generated, and the skin in the neighborhood is destroyed. If still fewer be injected, conseqnently still less of the effective substance is generated, the animal improves in health and the tuberculosis heals.

Inasmuch as tuberculosis exists in parts of the body where it is impossible to introduce these fungi and set them to work making the effective substance which causes the healing, an effort must be made to have them generate it outside of the body, and then, if injected under the skin, it will be absorbed and carried by the blood to all parts of the body, and hence come in contact with the diseased parts and produced the desired result.

This took time and toil to accomplish, but finally the distinguished scientist succeeded with a 40% solution of glycerine in obtaining this effective substance from the fungi.

Shortly after the publication of this last paper, Virchow showed that in many cases it seemed to cause the disease to spread and advance more rapidly; careful and impartial trial showed that the disease returned in most of the cases which were benefited at first. Hence its use was quickly discontinued, even in Berlin.

In lupus, where Koch supposed it would be of greatest value, long observation of cases proved that it accomplished nothing more than could be accomplished by older and safer means.

As a means of diagnosis it is of undoubted value and will probably always be used in hospitals for this purpose.

All recognize the fact that it is a great discovery, and hope that it will lead the way to our finding something which will effectually cure tuberculosis, the most fatal of all diseases.

MEDICAL DICTIONARY OR GLOSSARY.

NOTE.—In the pronunciation of the following words, Webster has been followed as authority.

In several cases the words have been re-spelled according to the pronunciation, in which cases it is given in parenthesis, thus, ( ).

AB-DO'-MEN. The belly, or the lower part of the body below the diaphragm.

AB-LU'-TION. Cleansing by water, washing of the body externally.

AB-NOR'-MAL. Unnatural; not according to rule; irregular.

A-BOR'-TION. Birth of a child before the proper time.

A-BRA'-SION. A superficial wound produced by the rubbing off of the skin.

AB-SORB'-ENT. Glands and vessels which absorb or suck up substances from within or without; also medicines which absorb, or combine with acid matter in the stomach or bowels.

AC-COUCH-EUR' (ak-koosh-ur'). A man who attends women in childbirth.

AC-E-TAB'-U-LUM. The socket that receives the head of the thigh bone.

A-CHO'-LIA. Deficiency of bile.

A-CID. Acrid; sour, sharp, pungent, bitter or biting to the taste.

AC'-TUAL CAU-TER-Y. Burning or searing with a hot iron; used in surgery.

AC-U-PUNC'-TURE (ak-u-punk'-ture). Pricking with needles; one of the operations of surgery.

A-CUTE'. Diseases of short duration, attended with violent symptoms; the reverse of chronic.

AD-HE'-SIVE. Tenacious, sticky, apt or tending to adhere.

AD-HE'-SIVE PLASTER. Sticking-plaster.

AD'-I-POSE. Matter, membrane or tissue; fat.

AD'-JU-VANT. A substance added to a prescription to aid the operation of the principal ingredient.

A-DULT' AGE. A person grown to full size or strength; manhood or womanhood.

AF-FEC'-TION. Disorder, disease, malady.

AL-BU'-MEN. The white of an egg. It is an essential constituent of animal bodies.

AL-BU'-MI-NOSE. A substance produced in the stomach during digestion.

AL'-I-MENT. Nourishment, nutrition; anything necessary for the support of life.

AL-I-MENT'-A-RY CA-NAL. The tube by which aliments are conveyed through the body; it is composed of the mouth, pharynx, esophagus, stomach, and intestines.

AL'-KA-LI (lī or le). A substance which, when united to acids, neutralizes them.

AL'-TER-A-TIVE. A remedy which slowly changes the condition of the system.

AL-VE'-O-LAR. Relating to the sockets of the teeth.

AL'-VINE. Relating to the intestines.

AM-AUR-O'-SIS. A loss or decay of sight, produced by various causes.

A-MEL'-I-O-RA'-TION. Becoming better; improvement in the stages of a disease.

AM-EN-OR-RHE'-A. An obstruction of the menstrual discharges.

AM-NI-OT'-IC LIQUID. The fluid surrounding the fœtus in the womb.

AM-PU-TA'-TION. The operation of cutting off a limb or other part of the body.

A-NA-SAR'-CA. A dropsy of the whole body; a general dropsy.

A-NAS'-TO-MOSE. To communicate with each other; applied to arteries and veins.

A-NAT'-O-MY. Study of the structure of the body.

AN-CHY-LO'-SIS (ank-y-lo'-sis). Stiffness of the joint.

AN-EM'-I-A. Poverty of blood; a comparatively bloodless state.

AN-ES-THE'-SIA. Numbness or paralysis of sensation.

AN'-EU-RISM. A soft tumor, caused by the rupture of the coats of an artery.

AN-I-MAL'-CULES. Animals so small as to be visible only with a microscope.

AN'-O-DYNE. Any medicine which allays pain and induces sleep.

ANT'-A-CID. A substance which neutralizes acids; alkalies are ant-acids.

AN'-THEL-MIN-TIC (an'-thel-min-tik). A medicine that destroys worms.

AN'-THRAX. A dusky red or purplish kind of tumor, occurring in the neck.

AN-TI-BIL'-IOUS (an-ti-bĭl'-yus). A medicine counteractive of bilious complaints.

AN'-TI-DOTE. A protective against, or remedy for, poison or any disease.

AN-TI-DYS-ENTER'-IC (an-ti-dys-in-ter'-ik). A remedy for dysentery.

AN-TI-E-MET'-IC (an-ti-e-met'-ik). A remedy to check or allay vomiting.

AN-TI-LITH'-IC (an-ti-lith-ik). A medicine to prevent or remove urinary calculi or gravel.

AN-TI-MOR-BIF'-IC. Anything to prevent or remove disease.

AN-TI-SCORBU'-TIC. A remedy used for the scurvy.

AN-TI-SEP'-TIC (an-ti-sep'-tik). Whatever resists or removes putrefaction or mortification.

AN-TI-SPAS-MOD'-IC. Medicines which relieve cramps, spasms, and convulsions.

A-NUS. The orifice of the alimentary canal, of which it is the outlet.

A-OR'-TA. The great artery from the heart.

AP'-A-THY. Insensibility to mental or bodily pain.

A-PE'-RI-ENT. A mild purgative or laxative.

A'-PEX. The top or summit.

A-PHA'-SI-A. A lack of the power of speech, caused often by an attack of apoplexy.

A-PHO'-NIA. A loss of the voice.

AP'-PE-TITE. A desire for food or drink.

A-RO'-MA. Agreeable odor of plants and other substances.

AR-O-MAT'-IC. A fragrant, spicy medicine.

AR' TE-RY. A vessel that conveys the blood from the heart to the organs.

AR-THRO'DI-A. A joint movable in every direction.

AR-TIC-U-LA'-TION. The union of bones with each other, as at the joints.

AR-TIC'-U-LATED. Having joints.

AS-CAR'-I-DES. Pinworms or threadworms found in the lower portion of the bowels.

AS-CI'-TES. Dropsy of the abdomen.

AS-PHYX'-IA. Suspended animation; apparent death as from drowning.

AS-SIM-I-LA'-TION. The process by which the food is changed into tissue.

AS-THEN'-IC. Debilitated.

AS-TRIN'-GENT. A medicine which contracts or puckers up the tissues of the body, thereby checking discharges.

AT'-O-NY. Debility; want of tone; defect of muscular power.

AT'-RO-PHY. A wasting of flesh and loss of strength without any sensible cause.

AT-TEN'U-ANTS. Medicines for reducing the body.

AU'-RI-CLE. A cavity of the heart.

AUS'-CUL-TA-TION. The art of detecting disease by listening to the sounds of the lungs, heart, etc.

AX-IL'-LA. The armpit; hence axillary, pertaining to the armpit.

AX'-IL-LA-RY GLANDS. Situated in the armpit, secreting a fluid of peculiar odor.

BAL-SAM'-ICS. Medicines employed for healing purposes.

BI-EN'-NI-AL. Continuing alive for two years.

BILE OR GALL. A fluid secreted by the liver, which promotes digestion.

BLIS'-TER. A thin watery bladder on the skin.

BOU'-GIE (boo-zhē'). A taper body introduced into a passage or sinus to keep it open or enlarge it.

BRIGHT'S DISEASE. A serious disease of the kidneys.

BRON'-CHI-AL. Pertaining to the branches of the windpipe in the lungs.

BUL'BOUS. Round or roundish.

CA-CHEX'-Y (ca-kĕks'-y). A bad state of the body. It may be caused by blood poisons.

CAL'-CU-LI. Gravel and stone found in the kidneys and bladder.

CAL'-LOUS. Hard or firm.

CA-LOR'-IC. Heat.

CAP'-IL-LA-RY. Fine, hair-like.

CAP-'SULE. A dry hollow vessel containing the seed or fruit.

CAR'-BON. Charcoal.

CAR-BON'-IC ACID GAS. A gas of two parts of oxygen and one part of carbon.

CA'-RI-ES. Ulceration of a bone.

CAR-MIN'A-TIVES. Medicines which allay pain by expelling wind from the stomach and bowels.

CA-ROT'-ID ARTERY. The great arteries of the neck that convey blood to the heart.

CAR'-TI-LAGE. A hard elastic substance of the body; gristle.

CAT-A-ME'-NI-A. The menses, or monthly discharges of women.

CAT'-A-PLASM. A poultice.

CA-TARRH' (ka-tär'). A discharge from the head or throat.

CA-THAR'-TIC. Purgative; a medicine that cleanses the bowels.

CATH'-E-TER. A curved instrument introduced into the bladder through the urethra for drawing off the urine.

CAUS'-TIC. Burning; a substance which burns or corrodes living tissues.

CAU'-TER-Y. A burning or searing any part of the animal body.

CELL. A small elementary form found in vegetable and animal tissue.

CER'-E-BEL'-LUM. The lower and back part of the brain.

CER'-E-BRAL. Relating to the brain.

CER'-E-BRUM. The upper and front part of the brain.

CER'-E-BRO-SPI'-NAL. Pertaining to the brain and spinal cord.

CE-RU'-MEN. The ear wax.

CHA-LYB'-E-ATE (ă-lib'-ē-ate). Containing iron in solution, as occurring in mineral springs.

CHAN'-CRE (shank'-er). A venereal or syphilitic sore.

CHOL'-A-GOGUES. Medicines that increase the flow of bile, as calomel and podophyllin.

CHOL'-ER-IC (kol'-er-ic). Easily irritated; irritable.

CHOR-DEE'. A painful drawing up of the penis. It occurs in gonorrhea.

CHRON'-IC. Continuing for a long time, and becoming a fixed condition of the body.

CHYLE (kīl). A milky fluid, separated from the ailment in the intestines, mixing with and forming the blood.

CHYLE (kīm). The pulp formed by the food after it has been for some time in the stomach, mixed with the gastric secretions.

CI-CA'-TRIX. A scar that remains after a wound.

CIR-CU-LA'-TION. The motion of the blood, which is propelled by the heart through the body.

CLAV'-I-CLE (klăv'-i-kl). Collar-bone.

CLI'-MAC'-TER-IC. A term generally applied to the time at which the menses finally cease.

CLYS'-TER. An injection; a liquid substance thrown into the lower intestine.

CO-AG'-U-LA'-TION. A change from a fluid to a solid condition, as in the coagulation of the blood.

CO-AG'-U-LUM. A clot of blood.

CO-A-LESE' (kō-a-lēs'). To grow together; to unite.

COL-LAPSE'. Sudden failure or prostration of the vital functions.

COL-LIQ'-UA-TIVE (kol-lik'-wa-tiv). Excessive discharges from the body which weaken the system.

Co'-LON. A portion of the large intestine.
Co-LOS'-TRUM. The earliest secretion of milk.
Co'-MA, COM'-A-TOSE. Lethargy; disposed to sleep; stupor.
COM'-PRESS. Several folds of linen rags; a bandage.
CON-CUS'-SION (kon-kush'-un). A violent shock, as of the brain.
CON'-FLU-ENT. Running together.
CON-GEN'-I-TAL. From birth, or born with.
CON-GES'-TION (kon-jĕst'-yun). Distention of any part by an accumulation of blood.
CON-JUNC'-TI-VA. The membrane which lines the eyelid and covers the eye.
CON-STI-PA'-TION. Costiveness; obstruction or hardness of the contents of the intestines.
CON-TA-GIOUS. Catching, or that may be communicated by contact.
CON-TU'-SION. A bruise.
CON-VA-LES'-CENCE. Gradual return to health after sickness.
CON-VUL'-SIONS. Involuntary and violent movements of the body.
COR'-DIAL. A medicine that mildly stimulates and raises the spirits.
COR'-NE-A. The transparent membrane in the forepart of the eye.
CORPSE. The dead body of a human being.
COR-ROB'-O-RANTS. Tonics or strengthening medicines.
COR-RO'-SIVE. Substances that consume or eat away.
COUN'-TER-IR-RI-TA'-TION. Drawing disease from one part by irritating another part.
CRA'-NI-UM. The skull.
CRI'-SIS. The turning-point of a disease.
CRU'-DI-TY. Rawness; indigestion.
CU-TA'-NE-OUS. Pertaining to the skin, as cutaneous diseases.
CU'-TI-CLE (kū'-ti-kl). The outer or scarf skin.
CYST. A bag or sac containing matter or other fluid.

DE-BIL'-I-TY. Weakness.
DE-COC'-TIONS (dē-kok'-shuns). Medicines prepared by boiling.
DEG-LU-TI'-TION. The act of swallowing.
DEL-E-TE'-RI-OUS. That which is hurtful.
DE-LIQ'-UI-UM (dē-lik'-we-um). Fainting.
DE-LIR'-I-UM. Wildness or wandering of the mind.
DE-MUL'-CENTS. A mucilaginous medicine which soothes diseased mucous membranes.
DEN-TI'-TION. Teething.
DE-OB'-STRU-ENT. A mild laxative; an aperient.
DE-PLE'-TION. Diminution of the quantity of blood by blood-letting or other process.
DEP'-U-RA-TION. Cleansing from impure matter.
DERM. The natural tegument or covering of an animal.
DES-QUA-MA'-TION. Separation of the skin in scales; scaling off.
DE-TER'-GENT. A medicine that cleanses from offending matter.
DI-AG-NO'-SIS. The act of distinguishing diseases by symptoms.
DI-A-PHO-RET'-ICS. Medicines which promote perspiration or sweating.
DI'-A-PHRAGM (dī'-a-fram). The muscular division between the chest and abdomen.
DI-ATH'-E-SIS. Tendency of the body to any form of disease, as scrofulous diathesis.

DI-E-TET'-IC. Relating to diet or regimen.

DIL-A-TA'-TION. Act of expanding or spreading in all directions.

DIL'-U-ENTS. That which thins, weakens, or reduces the strength of liquids.

DI-LUT'-ING. Weakening.

DIS-CU'-TIENTS. Medicines which scatter a swelling or tumor, or any coagulated fluid or body.

DIS-IN-FEC'-TANTS. Articles which cleanse or purify infected places.

DIS-LO-CA'-TION. The displacement of a bone out of its socket.

DIS-PO-SI'-TION. Tendency.

DI-U-RET'-IC. A medicine which promotes the flow of urine.

DOR'-SAL. Pertaining to the back.

DRAS'-TICS. Active or strong purgatives.

DU-O-DE'-NUM. The first of the small intestines.

DYS-CRA'-SIA. A bad habit of body producing generally a diseased condition of the system.

DYS-PEP'-SIA. Indigestion or difficulty of digestion

DYS-PHA'-GI-A. Difficulty of swallowing.

DYSP-NŒ'-A. Difficulty of breathing.

DYS-U'-RI-A. Difficulty in discharging urine, attended with pain and heat.

EB-UL-LI'-TION. The motion of a liquid by which it gives off bubbles of vapor as in boiling.

EF-FER-VES'-CENCE. The escape of gas from a fluid, as in the so-called "soda-water."

EF-FLO-RES'-CENCE. Eruption or redness on the skin, as in measles, scarlet fever, etc.

EF-FLU'-VI-A. Exhalations from substances, as from flowers or decaying matter.

EF-FU'-SION. An escape of the fluids of the body from their natural position into the tissues or cavities of the body

E-LEC-TRI-ZA'-TION. Medical use of the electric currents.

E-LEC'-TU-ARY. Medicines mixed with honey or syrup.

E-LIM-I-NA'-TION. Discharged from the body, as by the pores of the skin.

E-MAC-I-A'-TION. Wasting away of the flesh.

EM'-BRY-O. The early stage of the fœtus.

EM'-E-SIS. Vomiting.

E-MET'-ICS. Medicines given to cause vomiting.

EM-MEN'-A-GOGUE. A medicine which promotes the menstrual discharges.

E-MOL'-LI-ENT. A softening application which allays irritation.

E-MUL'-SION. A mixture; as oil and water mixed with mucilage or sugar.

EN-AM'-EL. The outside covering of the teeth.

EN-CEPH'-A-LON. The whole of the brain.

EN-CYST'-ED. Enclosed in a cyst or sac.

EN-DEM'-IC. A disease peculiar to a certain district.

E-NE'-MA. An injection.

EN-ER-VA'-TION. A loss of nervous tone and reduction of strength.

EN-TE-RI'-TIS. Inflammation of the bowels.

EN-TO-ZO'-A. Intestinal worms living in some part of an animal body.
E-PHEM'-E-RAL. Of short duration.
EP-I-DEM'-IC. A disease that prevails.
EP-I-DERM'-IS. The scarf-skin; the cuticle.
EP-I-GAS'-TRIC. Pertaining to the upper and anterior part of the abdomen.
EP-I-GLOT'-TIS. A leaf-shaped cartilage, whose use is to prevent food or drink from entering the larynx and obstructing the breath while eating.
EP-I-LEP'-TIC. Subject to epilepsy or the falling sickness.
E-PIPH'-O-RA. An over-abundant secretion of tears, causing what is termed a watery eye.
EP-I-SPAS'-TIC. An application for blistering.
EP-IS-TAX'-IS. Bleeding from the nose.
EP-I-THE'-LI-UM. A layer of cells covering membranes.
ER'-E-THISM. Morbid energetic action or irritability.
E-RO'-SION. Eating away; corrosion.
ER'-RHINE (er'-rin). A medicine for snuffing up the nose to promote the discharge of mucus.
ER-UC-TA'-TION. Belching; gulping of wind from the stomach.
E-RUP'-TION. A breaking out on the skin.
ES'-CHAR (es'-kär). The dead part, killed by caustic or mortification, which falls off.
ES-CHA-ROT'IC. Caustic; an application which sears or destroys the flesh.
EU-STA'-CHI-AN TUBE (yū-stā-kĭ-an). A narrow canal connecting the middle ear and throat.
E-VAC-U-A'-TION. Movement of the bowels, or passing of urine from the bladder.
EX-AC-ER-BA'-TION (egz-ăs-er-bā'-shun). Increase of severity in a disease.
EX-AN-THE'-MA. An eruptive disease, with fever, as small-pox, measles.
EXCI'-SION. Cutting out of a part.
EX-CIT'-ANT. A stimulant.
EX-CO'-RI-ATE. To abrade or scrape off the skin in any way.
EX-CRES'-CENCE. An abnormal or unnatural growth of a part, as a wart or tumor.
EX-CRE'-TION. Waste matter thrown off from the system, as the perspiration, fæces, etc.
EX-FO'-LI-ATE. Scaling or peeling off; separation of decayed from living bone.
EX-HA-LA'-TION. Emission of vapor, air, gas, etc.
EX-OS-TO'-SIS. An unnatural growth from a bone; a bony tumor.
EX-PEC'-TO-RANT. A medicine which aids the discharge of phlegm from the bronchial tubes or lungs.
EX-PEC-TO-RA'-TION. Discharge of phlegm, mucus, or saliva from the mouth.
EX-PI-RA'-TION. The act of breathing out the air from the lungs.
EX-TRAV-A-SA'-TION. Effusion; emptying or forcing a fluid out of its proper vessels.
EX-U-DA'-TION Perspiration; the discharge of moisture on the surface of bodies.

FÆ'-CAL (fe'-kal). Pertaining to the fæces.
FÆ'-CES (fē'-seez) The natural discharges from the bowels.
FAR-A-DIZ-A'-TION. The use of the Faradaic current.
FAR-I-NA'-CEOUS. Containing starch, as *farinaceous food*, starchy food.
FAU'-CES. The back part of the mouth, at the entrance of the throat.
FEB'-RI-FUGE. A medicine which assuages fever and produces perspiration.
FE'-BRILE. Having the symptoms of fever; feverish.
FE'-MUR. The thigh-bone. FEMORAL, pertaining to the femur.
FET'-ID. Having a rank, disagreeable odor.
FI'BRINE. Animal matter found in the blood.
FI'-BROUS. Composed of small threads or fibres.
FIL'-TER. A strainer.
FIL-TRA'-TION. Straining.
FIST'-U-LA A deep, narrow, crooked ulcer.
FLAC'-CID (flăk'-sid). Soft and weak, lax, limber; as a flaccid muscle.
FLAT'-U-LEN-CY, FLA'-TUS. Wind in the stomach and intestines, causing uneasiness.
FLEX'-I-BLE. Easily bent; yielding to pressure.
FLOOD'-ING. Profuse flow of blood.
FLUSH. A sudden flow of blood to the face.
FLUX. An unusual discharge from the bowels.
FŒ'-TUS (fē-tŭs). The child in the womb.
FO-MEN-TA'-TION. Bathing by means of flannels dipped in hot water or medicated liquid.
FOR-MI-CA'-TION. A sensation like the creeping of ants.
FOR'-MU-LA. A prescription.
FRACT'-URE. A broken bone.
FRIC'-TION. The act of rubbing.
FU-MI-GA'-TION. A vapor raised by burning.
FUNC'-TION. The work or office performed by any part or organ of the body.
FUN'-DA-MENT. The seat; the lower extremity of the large intestine.
FUN'-GUS. A spongy excrescence, as proud flesh.

GAL-VAN-I-ZA'-TION Use of the galvanic current.
GAN'-GLI-ON (gang'-gli-on). An enlargement in the course of a nerve.
GAN'-GRENE. Mortification or death of a part.
GAR'-GLE. A wash for the mouth and throat.
GAS'-TRIC. Belonging to the stomach
GAS-TRI'-TIS. Fever or inflammation of the stomach.
GES-TA'-TION. The period of pregnancy.
GLAND. A soft body, the function of which is to secrete some fluid.
GLOT'-TIS. The opening into the windpipe, covered by the epiglottis.
GLU'-TE-US. A name given to the muscles of the hip.
GRAN-U-LA'-TION. The healing of a wound or ulcer by the formation of grain-like fleshy masses.
GRU'-MOUS. Thick; clotted; concreted; as grumous blood.
GUT'-TUR-AL. Pertaining to the throat.

HAB'-IT. A particular state or temperament of the body.
HEC'-TIC. A remitting fever, which chills, heat and sweat.
HEM-A-TO'-SIS. An excessive or morbid quantity of blood.
HEM-I-PLE'-GI-A. Paralysis of one side of the body.
HE-MOP'-TY-SIS. A spitting of blood.
HEM'-OR-RHAGE. Bleeding; a flow of blood, as from the lungs, nose, etc.
HEM'-OR-RHOIDS. The piles; tubercles from which blood or mucus is discharged.
HE-PAT'-IC. Pertaining to the liver.
HER-BA'-CEOUS (her-bā'-shus). Pertaining to herbs.
HE-RED'-I-TA-RY. Descended from a parent; inherited.
HER'-PES. An eruption on the skin, as tetter, ringworm, etc.
HER'-NI-A. A rupture, and protrusion of some part of the abdomen.
HU'-MORS (yū'-mors). The fluids of the body.
HY'-DRA-GOGUE (hy'-dra-gŏg). A purgative that produces a watery discharge from the bowels.
HY'-DRO-GEN. One of the elementary principles, always existing in water, of which it composes the ninth part.
HY-DRO-PHO'-BI-A. A dread of water; the rabid qualities of a mad dog.
HY'-GI-ENE. The art of preserving health.
HY-PER-ES-THE'-SI-A. Excessive and abnormal sensibility.
HYP-O-CHON-DRI'-A-CAL. Melancholy; very dejected; low-spirited.
HYP-NOT'-ICS. Medicines which cause sleep.
HY-PO-DER'-MIC. Under the skin.
HYS-TER'-IC-AL. Nervous; subject to hysteria.

I'-CHOR (i'-kor). A thin, watery, and acrid discharge from an ulcer.
ID'-I-OP'-A-THY. A morbid condition not preceded by any other disease.
ID-I-O-SYN'-CRA-SIES. Peculiarities of constitution or temperament.
IL'-E-UM. The lower part of the small intestines.
IL'-I-AC. Pertaining to the small intestines.
IM-BE-CIL'-I-TY. Feebleness; weakness of mind or intellect.
IM-MER'-SION. Plunging under water.
IN-A-NI'-TION (in-a-nish'-un). Emptiness; weakness; exhaustion.
IN-CI'-SOR. A front tooth that cuts or divides.
IN-DIG'-E-NOUS. Native to a country.
IN-DI-GEST'-I-BLE. Difficult of digestion.
IN-DIS'-PO-SI-TION. A disorder of health.
IN-FEC'-TION. Contagion.
IN-FLAM-MA'-TION. A redness or swelling of any part.
IN-FU'-SION (in-fū-zhun). Medicine prepared by boiling or steeping.
IN-GES'-TION. (in-jĕst'-yun). Throwing into the stomach.
IN-JEC'-TION (in-jĕk'-shun). Liquid sent into some part of the body by means of a syringe.
IN-OC-U-LA'-TION. Communicating a disease to a person in health by inserting contagious matter in the skin.
IN-SPI-RA'-TION. Drawing or inhaling air into the lungs.
IN-SPIS-SA'-TION. Rendering a fluid thicker by evaporation.
IN-TEG'-U-MENT. A covering; the skin.
IN-TER-COS'-TAL. Between the ribs.

IN-TER-MIT'-TENT. Ceasing at intervals.
IN-TES'-TINES. The bowels.

JOINT. The junction of two or more bones; articulation.

LAC'-ER-A'-TED. Torn asunder.
LACH'-RY-MAL (lăk'-ri-mal). Pertaining to the tears.
LAC-TA'-TION. Act of nursing or sucking.
LAN'-CI-NA-TING. Piercing, as with a sharp-pointed instrument; hence lancinating pain.
LAN'-GUOR (lăng'-gwur). Feebleness, weakness, lassitude of the body.
LAR'-YNX, The upper part of the windpipe.
LAX'-A-TIVE. A mild purgative; a medicine that loosens the bowels.
LE'-SION. A rupture or tearing of the flesh; a wound.
LETH'-AR-GY. Unusual or excessive drowsiness.
LEU-COR-RHE'-A. A white or yellowish discharge from the womb.
LIG'-A-TURE. A thread for tying blood-vessels to prevent homorrhage.
LI-GA'-TION. The art of tying a vessel.
LIN'-I-MENT. A medicated lotion or wash; a soft ointment.
LITH'-ON-TRIP-TIC. A solvent of the stone or gravel in the bladder.
LI-THOT'-O-MY. The operation of cutting for stone in the bladder.
LIV'-ID. Black and blue; of a lead color.
LO'-CHI-AL. Pertaining to discharges from the womb after childbirth.
LUM-BA'-GO. Rheumatic pains in the loins and the small of the back.
LUM'-BAR. Pertaining to the loins.
LYMPH (limf). A whitish fluid contained by the lymphatic vessels.
LYM-PHAT'-IC (vessels). Fine tubes pervading the body; absorbents.

MAC-ER-A'-TION. Dissolving or softening with water.
MAC'-U-LAR. Colored spots; blemishes.
MA-LA'-RI-A. Bad air; air which tends to cause disease.
MAL-FOR-MA'-TION. A wrong formation or structure of parts.
MA-LIG'-NANT. Virulent; dangerous; tending to produce death.
MAR'-ROW. A soft substance in the bones.
MAS-TI-CA'-TION. The act of chewing.
MAT-U-RA'-TION. The formation of pus or matter in any part of the body.
ME-DUL'-LA OBLONGATA. A nervous mass in the lower part of the brain.
MEN'-SES, MENSTRUATION. The monthly courses of women.
MEN'-STRU-UM. A solvent; any liquid used to dissolve solid substances.
ME-PHIT'-IC. Suffocating; noxious; pestilential.
MET-A-CAR'-PUS. The hand between the wrist and fingers.
ME-TAS'-TA-SIS. A change of disease from one part of the body to another.
MET-A-TAR'-SUS. That part of the foot between the ankle and the toes.
MI'-AS-MA, MIASMATA. Malaria; exhalations from swamps and decaying matter.
MOR'-BID. Diseased; corrupt.
MOR-BIF'-IC. Causing disease.

MU'-CI-LAGE. A glutinous, viscid fluid substance.
MU'-CUS. The ropy, lubricating, tenacious fluid secreted by the mucous membrane.
MUS'-CLES (mŭs'-sls). The organs of motion; they constitute the flesh.

NAR-COT'-ICS. Medicines that cause sleep, relieve pain, or stupefy.
NAU'-SE-A (naw'-she-a). Sickness at the stomach, with a desire to vomit.
NE'-GUS. A liquor made of wine, water, sugar, nutmeg, and lemon-juice.
NE-PHRIT'-IC. Pertaining to the kidneys.
NER'-VINE. A medicine that acts on the nerves.
NEU-RAL'-GI-A. Pain of a nerve, without apparent inflammation.
NEU-RAS-THE'-NIA. Nervous exhaustion.
NOR'-MAL. Natural, regular.
NOS'-TRUM. A quack or patent medicine.
NU-TRI'-TIOUS (nū-trĭsh-us). A substance which nourishes or feeds the body.

OB'-LONG. Longer than broad.
OB-TUSE'. Dull, not acute.
Œ-DE'-MA. A watery swelling.
OL-FAC'-TORY NERVES. The nerves of smell.
O-MEN'-TUM. The caul or covering of the bowels.
OPH-THAL'-MI-A (of-thăl'-mi-a). Inflammation of the eyes.
O'-PI-ATES. Medicines which promote sleep.
OP'-TIC NERVE. The nerve which enters the back part of the eye.
OR-THOP-NŒ'-A. Great difficulty of breathing, caused by disease of the heart or diaphragm, or asthma.
OS'-SI-FY. To change flesh or other soft matter into a hard, bony substance.
O'-VATE. Oval, egg-shaped.
O'-VUM. An egg.
OX'-Y-GEN. A gas that forms one-fifth of the atmosphere.

PAL'-ATE. The partition separating the cavity of the mouth from that of the nose.
PAL-PI-TA'-TION. Unnatural action of the heart, in which it beats too rapidly and strongly.
PAN-A-CE'-A. A cure-all; a universal medicine.
PA-PIL'-LA. A red, elevated point upon the tongue or elsewhere.
PAR-A-CEN-TE'-SIS. Puncturing the chest or abdomen for the purpose of drawing off water.
PA-RAL'-Y-SIS. Palsy; a loss of the power of motion in any part of the system.
PAR-A-LYT'-IC. One affected with or inclined to palsy.
PAR-A-PLE'-GI-A. Paralysis of the lower half of the body
PAR'-OX-YSM. A fit of disease taking place periodically.
PAR-TU-RI'-TION. Child-birth.
PEC'-TOR-AL. Pertaining to the chest.
PEL'-VIS. A bony cavity forming the lower part of the trunk of the body.
PEP'-SIN. An important element of the gastric juice.

PER-I-CAR'-DI-UM. The sac inclosing the heart.
PER-SPI-RA'-TION. Sweat, insensible evacuation of the fluids through the pores of the skin.
PER-I-NE'-UM. The space between the anus and testicles.
PER-I-OS'-TE-UM. A thin, hard membrane covering the bones.
PER-I-TO-NE'-UM. The membrane lining the abdomen and covering the bowels.
PE-TE'-CHI-Æ. Purple spots which appear upon the skin in low fevers.
PHAG-E-DEN'-IC. Corroding; eating; applied to ulcers.
PHA-LAN'-GES. The bones of the fingers and toes.
PHLEG-MAT'-IC. Abounding in phlegm; cold; dull; sluggish; heavy.
PHAR'-YNX. The upper part of the throat.
PHLO-GIS'-TIC. Inflammatory.
PHTHYS'-IC-AL (tiz'-ik-al). A condition of the system tending to pulmonary consumption.
PHLEGM (flĕm). A stringy mucus of the respiratory and digestive passages.
PLE'-THOR-IC. Of a full habit of body.
PLEU'-RA. A membrane that lines the inside of the chest and covers the lungs.
PLEU'-RI-SY. Inflammation of the pleura.
PNEU-MO-NI-A (nū-mō-nī-a). Inflammation of the substance of the lungs.
POL'-Y-PUS. A pear-shaped tumor.
PRE-SCRIP'-TION. The formula for the preparation of medicines.
PROBE. An instrument for examining the depth of a wound.
PROG-NO'-SIS. The art of foretelling the termination of a disease.
PROPH-Y-LAC'-TIC. A medicine to prevent disease.
PTY'-A LISM (ty'-a-lism). A copious flow of saliva; salivation.
PU-BES'-CENT. Covered with down or very short hairs.
PUL'-MO-NA-RY. Pertaining to or affecting the lungs.
PULP. A soft mass.
PULSE. The beating or throbbing of the heart or blood-vessels, especially of the arteries.
PUN'-GENT. Sharp, piercing, biting, stimulating.
PUR'-GA-TIVE. A medicine acting on the bowels to loosen them.
PU'-RU-LENT. Consisting of pus or matter.
PUS. Yellowish white matter, found in abscesses, etc.
PUS'-TULES. Elevations of the skin having an inflamed base and containing pus.
PU-TRES'-CENT. Becoming putrid; pertaining to the process of putrefaction.
PY-RO'-SIS. A peculiar disease of the stomach called water-brash.

REC'-TUM. The termination of the large intestine.
RE-FRIG'-ER-ANT. Medicines which lessen the heat of the body.
REG'-I-MEN. The regulation of diet in order to preserve or restore health.
RES-O-LU'-TION. Dispersion of an inflammation before pus is formed.
RE-SOLV'-ENTS. Medicines to dissipate inflammation.
RES-PI-RA'-TION. The process of breathing.
RE-SUS-CI-TA'-TION. Reviving from apparent death, as drowning.

RET'-I-NA. The semi-transparent, internal nervous tissue of the eye.
RU-BE-FA'-CIENTS (shents). Applications that cause redness of the skin.
RU-BIF'-IC. Making red.

SAC'-CHA-RINE (rīn). Sugary; having the qualities of sugar.
SA-LI'-VA. The spittle; the secretions of the salivary glands of the mouth.
SAL-I-VA'-TION. Increase of the secretion of saliva.
SAN'-A-TIVE. Healing or tending to heal.
SAN'GUINE (sang-gwin). Abounding in blood, or having the color thereof.
SA'-NI-ES. A thin, often purulent discharge from wounds or sores.
SCAB. A crust formed over a sore in healing.
SCARF SKIN. The outer skin of the body.
SCIR'-RHOUS (skir'-rus). Hard, knotty.
SCOR-BU'-TIC. Pertaining to, or partaking of the nature of scurvy.
SCRO'-TUM. The bag containing the testicles.
SE-CRE'-TION. The separation of any substance from the blood for a special purpose.
SED'-A-TIVE. A quieting medicine which allays irritation and soothes pain.
SED'-EN-TA-RY. Accustomed to, or requiring much sitting; inactive.
SEM'-I-NAL. Pertaining to or contained in seed.
SE'-ROUS. Thin, watery, like whey.
SE'-RUM. The watery parts of the blood, or of milk.
SI-AL'-O-GOGUES. Medicines that promote the flow of saliva.
SIN'-A-PISM. A mustard plaster.
SIN'-EW (sin'-yū). That which unites a muscle to a bone.
SLOUGH (slŭf). The part that separates from a wound.
SLOUGH'-ING (sluff'-ing). The separation of the dead flesh from a sore.
SO-LU'-TION. A liquid in which a solid substance has been dissolved.
SOL'-VENT. Having the power to dissolve solid substances.
SOR'-DES. The dark matter deposited upon the lips and teeth in low fevers.
SPASM. An involuntary contraction of the muscles.
SPE-CIF'-IC. An infallible remedy.
SPI'-NAL COL'UMN. The back-bone.
SPI'-NAL CORD. The nervous marrow in the spinal column.
SPLEEN. The milt; it is situated in the abdomen and attached to the stomach.
SQUA'-MOUS (squā'-mŭs). Scaly; having scales.
STER'-NUM. The breast-bone.
STER'-TOR. Noisy breathing, as in apoplexy; snoring.
STER-TO'-ROUS. Snoring.
STIM'-U-LANTS. Medicines that excite.
STO-MACH'-IC. A cordial for the stomach, exciting its action.
STOOL. A discharge from the bowels.
STRAN'-GU-RY. Difficult and painful expulsion of urine.
STRICT'-URE. Unnatural contraction of any passage of the body.
STRU'-MA. Scrofula.
STU'-POR. Insensibility; numbness.

STYP'-TIC. A medicine which coagulates the blood, and stops bleeding.
SUB-CU-TA'-NE-OUS. Under the skin.
SU-DOR-IF'-ICS. Medicines that cause sweating.
SUP-POS'-I-TORIES. Medicinal substances introduced into the rectum to favor or restrain evacuations, or to ease pain.
SUP-PU'-RA-TION. Forming of pus.
SUT'-URE. The peculiar joint uniting the bones of the skull.
SYMP'-TOM. A sign or token; the peculiar marks of any disease.
SYN'-CO-PE. Fainting or swooning.
SYN'-O-CHA. Inflammatory fever.
SYPH-I-LIT'-IC. Pertaining to the venereal disease or pox.
SYR'-INGE. An instrument for injecting liquids into the bowels, ear, throat, or other cavities of the body.

TEM'-PER-A-MENT. Individual constitution; a peculiar habit of body.
TEN'-DON. A fibrous cord attached to the extremity of a muscle.
TE-NES'-MUS. A painful bearing down sensation in the lower bowels.
TENSE, TENSION. Rigid, hard, stiff; drawn tightly.
TEP'-ID. Warm, but not hot.
TER'-TIAN (ter-shun). Occurring every other day.
TES'-TI-CLES. Two glandular bodies situated in the scrotum, belonging to the male organs of generation.
TET'-A-NUS. Locked jaw.
TIB'-I-A. The large bone of the leg below the knee.
TINCT'-URE. Medicine dissolved in alcohol.
THO'-RAX. The cavity of the chest.
TO'-MEN-TOSE. Downy; nappy; covered with the finest hairs or down.
TOR-MI'-NA. Severe griping pains.
TON'-ICS. Remedies which give tone and strength to the system.
TON'-SILS. Glands situated on each side of the throat.
TOR'-PID. Dull, stupid.
TRA'-CHE-A. The windpipe.
TRE'-MOR. Involuntary shaking.
TU'-BER-CLE (tu'-ber-kl). A pimple, swelling, or small tumor.
TU-ME-FAC'-TION. The act of swelling or forming a tumor.
TU'-MOR. A distention or enlargement of any part of the body; a swelling.
TY'-PHOID. Resembling typhus; weak; low.
TY'-PHUS. A form of low nervous fever, malignant, infectious, etc.

UL'-CER. A sore, discharging pus.
UM-BIL'-IC. The navel, or partaining to the navel.
U'-REA. A substance found in the urine.
U-RE'-TER. The duct or tube through which the urine passes from the kidneys to the bladder.
U-RE'-THRA. The canal of the penis through which the urine passes from the body.
U'-RINE. Water evacuated from the bladder.
U'-TE-RUS. The womb.
U'-VU-LA. The small conical body projecting from the middle of the soft palate.

VAC'-CI-NATE (văk'-sin-nate). To inoculate with the cow-pox by inserting the vaccine in the skin.
VAC'-CINE (văk'-sin). Belonging to, or matter of, the cow-pox.
VA-GI'-NA. The passage that connects the vulva with the womb.
VAG-IN-IS'-MUS. Spasm of the vagina, caused by morbid irritability.
VAL-E-TU-DI-NA'-RI-AN. A person of a weak, infirm, or sickly constitution.
VA-RI'-O-LOUS. Pertaining to or denoting small-pox.
VE'-HICLE (vē'-hĭ-kl). A liquor in which to administer medicines.
VEN'-E-RY. Sexual intercourse.
VE'-NOUS. Relating to the veins.
VEN-TI-LA'-TION. A free admission or motion of air
VER'-MI-FUGE. A medicine that expels worms.
VER'-TI-GO. Dizziness; swimming of the head.
VES'-I-CA-TING. Blistering.
VES'-I-CLE (vĕs'-i-kl). A little bladder of water formed under the skin.
VIR'-U-LENT. Extremely injurious; malignant poisonous.
VI'-RUS. Active, contagious matter.
VIS'-CE-RA. The internal organ of the body.
VIS'-CID. Glutinous; sticky; tenacious.
VIT'-RE-OUS HUMOR. One of the fluids of the eye, resembling glass.
VOL'-A-TILE. Easily evaporated; substances that waste away on exposure to the atmosphere.
VUL'-NER-A-RY. Pertaining to wounds
VUL-VA. The external parts of the female organs of generation.

ZY-MOT'-IC Contagious; infectious; such diseases as may be inoculated.

PRESCRIPTION REGISTER.

EXPLANATION.—The design of this Register is to record prescriptions and remedies that have been proved valuable, which would otherwise be irreparably lost, or necessitate the expense of a duplicate. A proper entry, in each case, will give the disease it is intended to relieve, the date when the Physician was called, or when the medicine was used; by whom prescribed; the required dose; the Druggist compounding it, and the prescription number. Their preservation for future use will be found not only a convenience, but will often prove "a friend in need," making this an invaluable feature of the work. See annexed blank filled out.

THE PUBLISHER.

Jan. 1st, 1880.

Doctor Geo. F. Jackson.

Remedy for Asthma.

℞ Tincture of Lobelia,
Tincture of Henbane,
Compound Spirits of Ether,
Syrup of Tolu,
One Ounce (33 Grams) each.

Dose One Teaspoonful.

How often Every Half Hour.

Remarks Well shaken before taken.

Johnson, Druggist. No. 3778.

_____ 18

Doctor _____

Remedy for _____

℞

Dose _____

How often _____

Remarks _____

_____ Druggist. No. _____

_____ 18

Doctor _____

Remedy for _____

℞

Dose _____

How often _____

Remarks _____

_____ Druggist. No. _____

_____ 18

Doctor _____

Remedy for _____

℞

Dose _____

How often _____

Remarks _____

_____ Druggist. No. _____

_____ 18

Doctor _____

Remedy for _____

℞

Dose _____

How often _____

Remarks _____

_____ Druggist. No. _____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ Druggist. No._____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ Druggist. No._____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ Druggist. No._____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ Druggist. No._____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ Druggist. No._____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ Druggist. No._____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ Druggist. No._____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ Druggist. No._____

________ 18

Doctor ________

Remedy for ________

℞

Dose ________

How often ________

Remarks ________

________ 18

Doctor ________

Remedy for ________

℞

Dose ________

How often ________

Remarks ________

________ 18

Doctor ________

Remedy for ________

℞

Dose ________

How often ________

Remarks ________

________ Druggist. No. ________

________ 18

Doctor ________

Remedy for ________

℞

Dose ________

How often ________

Remarks ________

________ Druggist. No. ________

________ 18

Doctor ________

Remedy for ________

℞

Dose ________

How often ________

Remarks ________

________ Druggist. No. ________

________ 18

Doctor ________

Remedy for ________

℞

Dose ________

How often ________

Remarks ________

________ Druggist. No. ________

______18

Doctor______

Remedy for______

℞

Dose______

How often______

Remarks______

______18

Doctor______

Remedy for______

℞

Dose______

How often______

Remarks______

______18

Doctor______

Remedy for______

℞

Dose______

How often______

Remarks______

______Druggist. No.______

______18

Doctor______

Remedy for______

℞

Dose______

How often______

Remarks______

______Druggist. No.______

______18

Doctor______

Remedy for______

℞

Dose______

How often______

Remarks______

______Druggist. No.______

______18

Doctor______

Remedy for______

℞

Dose______

How often______

Remarks______

______Druggist. No.______

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ Druggist. No._____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ Druggist. No._____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ Druggist. No._____

_____ 18

Doctor_____

Remedy for_____

℞

Dose_____

How often_____

Remarks_____

_____ Druggist. No._____

_______________18

Doctor_______________

Remedy for_______________

℞

Dose_______________

How often_______________

Remarks_______________

_______________18

Doctor_______________

Remedy for_______________

℞

Dose_______________

How often_______________

Remarks_______________

_______________18

Doctor_______________

Remedy for_______________

℞

Dose_______________

How often_______________

Remarks_______________

_______________**Druggist. No.**_____

_______________18

Doctor_______________

Remedy for_______________

℞

Dose_______________

How often_______________

Remarks_______________

_______________**Druggist. No.**_____

_______________18

Doctor_______________

Remedy for_______________

℞

Dose_______________

How often_______________

Remarks_______________

_______________**Druggist. No.**_____

_______________18

Doctor_______________

Remedy for_______________

℞

Dose_______________

How often_______________

Remarks_______________

_______________**Druggist. No.**_____

________ 18

Doctor ________

Remedy for ________

℞

Dose ________

How often ________

Remarks ________

________ 18

Doctor ________

Remedy for ________

℞

Dose ________

How often ________

Remarks ________

________ 18

Doctor ________

Remedy for ________

℞

Dose ________

How often ________

Remarks ________

________ **Druggist. No.** ________

________ 18

Doctor ________

Remedy for ________

℞

Dose ________

How often ________

Remarks ________

________ **Druggist. No.** ________

________ 18

Doctor ________

Remedy for ________

℞

Dose ________

How often ________

Remarks ________

________ **Druggist. No.** ________

________ 18

Doctor ________

Remedy for ________

℞

Dose ________

How often ________

Remarks ________

________ **Druggist. No.** ________

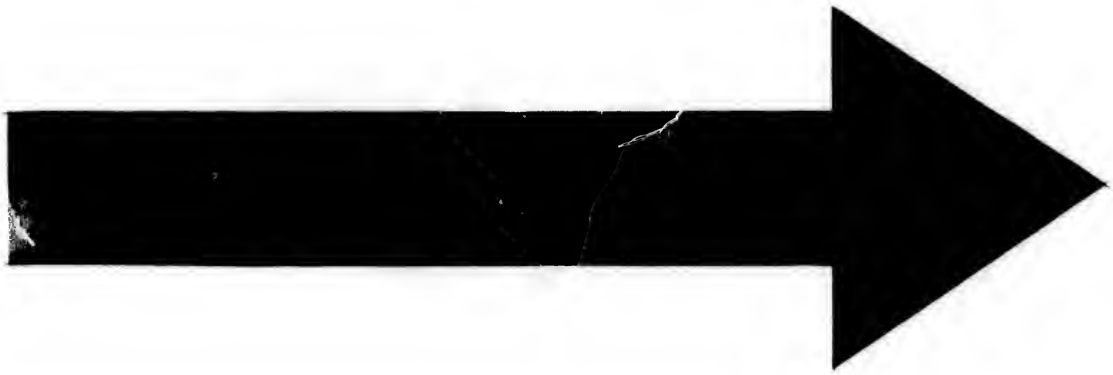
INDEX OF SYMPTOMS.

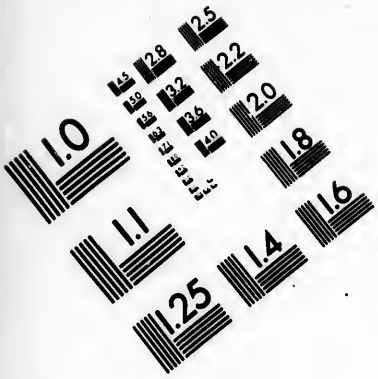
INDEX.

A.

B.

C.





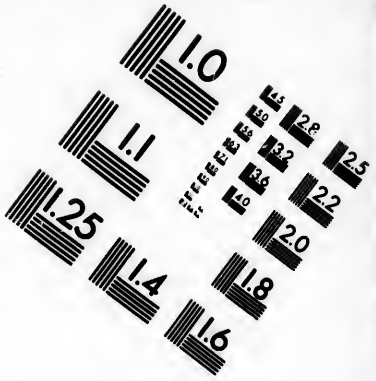
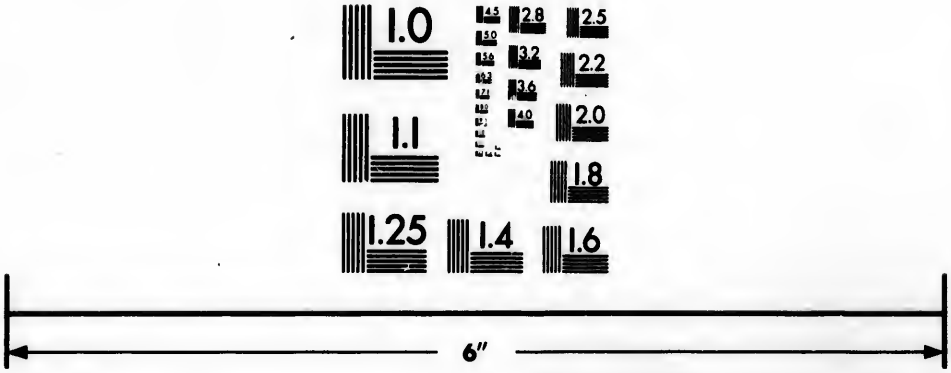


IMAGE EVALUATION TEST TARGET (MT-3)



Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

2.5
2.2
2.0
1.8
1.0

D.

E.

F:

G.

H.

I.

J.

K.

L.

M.

N:

O.

P.

Q.

R.

S.

INDEX TO ADDENDA.