ceptacles for immediate or future use. The next step is the inoculation of a suitable animal with the toxin. Of all animals the horse has been found to meet nearly every requirement. Such an animal, in a state of perfect health, receives an injection of 20 cubic centimeters of toxin, along with 10 or 15 of standard antitoxin, beneath the skin of the neck or forequarters, upon three separate occasions at intervals of five days. After this it receives increasing doses of toxin, alone, at intervals of six to eight days, until at the end of two months it is able to stand with little discomfort doses of such strength that if given in the first stage these doses would have quickly caused death.

At this period the horse is bled to a small extent and its serum tested to ascertain if prospects are good for the production by the animal of a high grade of antitoxin. If satisfactory progress has been made, the injections are continued for another month, when, as a rule, the maximal degree of antitoxic power in the serum will have been attained.

The horse is now bled to the proper extent, the blood being received in a sterile jar and placed in an icebox. Here it coagulates and the serum separates from it. When the preparation of clot and serum is complete, the latter is drawn off, taken to the laboratory and standardized. This being finished, an antiseptic fluid is added to preserve the serum from decomposition. It is then bottled, labeled and sent out for use.

In similar fashion tetanus antitoxin is prepared; and quite recently Calmette has produced an antitoxic serum for use in snake bite by injecting horses with minute increasing doses of snake venom. His experiments have given some remarkable results, not only in laboratory work, but also in actual cases of snake bite occurring in man. Thus bacteriological scientists after years of laborious work, in the face of much criticism and severe denunciation, may confidently announce that they have in their possession a magic key to one of nature's secret doors. The lock has been turned. The door stands partly open, and we are permitted a glimpse of the future possibilities to be attained in the great fight against disease.

PREVENTIVE MEDICINE.

The following are some of the diseases which have been remarkably controlled through preventive medicine:

SMALLPOX.

While not a scourge of the first rank like the plague or cholera, at the outset of the century variola was one of the most prevalent and dreaded of all diseases. Few reached adult life without an attack. Today, though outbreaks still occur, it is a disease thoroughly controlled by vaccination. The protective power of the inoculated cowpox is not a fixed and constant quantity. The protection may be for life or it may only last for a year or two. The all-important fact is this: That efficiently vaccinated persons an be exposed with impunity, and among large bodies of men (e. g., the German army), in which revaccination is practiced, smallpox is unknown. Of 100 vaccinated persons exposed to smallpox, possibly one might take the disease in a mild form; of 100 unvaccinated persons so exposed one alone might escape, from 25 to 30 would die. To be efficient vaccination must be carried out systematically, and if all the inhabitants of this country were revaccinated at intervals, smallpox would disappear (it it has from the German army) and the necessity for vaccination would cease. The difficulty arises from the constant presence of an unvaccinated remnant, by which the disease is kept alive. The Montreal experience of 1885 is an object lesson never to be forgotten.

For eight of ten years vaccination had been neglected, particularly among the French-Canadians. On Feb. 28, 1885, a Pullman car conductor, who came from Chicago, where the disease had been slightly prevalent, was admitted into the Hotel Dieu. Isolation was not carried out, and on the 1st of April a servant in the hospital died of smallpox. Following her death the authorities of the hospital sent to their homes all patients who presented no symptoms of the disease. Like fire in dry grass the contagion spread, and within nine months there died of smallpox 3,164 persons. It ruined the trade of the city for the winter and cost millions of dollars. There are no reasonable objections to vaccination, which is a simple process, by which a mild and harmless disease is introduced. The use of the animal vaccine does away with the possibility of introduction of other disorders, such as syphilis.

TYPHUS FEVER.

Until the middle of the present century this disease prevailed widely in most of the large cities, particularly in Europe, and also in jails, ships, hospitals and camps. It was more widely spread than typhoid fever and much more fatal. Murchison remarks of it that a complete history of its ravages would be the history of Europe during the past three centuries and a half. Not one of the acute infections seems to have been more dependent upon filth and unsanitary conditions. With the gradual introduction of drainage, and a good water supply, and the relief from overcrowding, the disease has almost entirely disappeared, and is rarely mentioned now in the bills of mortality, except in a few of the larger and more unsanitary cities. The following figures illustrate what has been done in England within 60 years: In 1838 in England 1,228 persons died of fever (typhus and typhoid) per million of living. Twenty years later the figures were reduced to 918; in 1878 to 306 of typhoid and to 36 of typhus fever. In 1892 only 137 died of typhoid fever and only 3 of typhus per million living.

TYPHOID FEVER.

While preventive medicine can claim a great victory in this disease also, it is less brilliant, since the conditions which favor its prevalence are not those specially relating to overcrowding as much as to imperfect water supply and the contamination of certain essential foods, like milk. It has been repeatedly demonstrated that with a pure water supply and perfect drainage, typhoid fever almost disappears from a city. In Vienna, after the introduction of good water, the rate of mortality from typhoid fever fell from 12 per 10,000 of the inhabitants to about 1. in Munich the fall was still more remarkable, from above 29 per 10,000 inhabitants in 1857 it fell to about 1 per 10,000 in 1887. That typhoid fever in this country is still a very prevalent disease depends mainly upon two facts: First, not only is the typhoid bacillus very resistant, but it may remain for a long time in the body of a person after recovery from typhoid fever, and such persons in apparent good health may be a source of contamination. With many of the conditions favoring the persistence of growth of the bacillus outside the body we are not yet familiar. The experience in the Spanish-American war illustrates how dangerous is the concentration together of large numbers of individuals. But, second, the essential factor in the widespread prevalence of typhoid fever in the United States, particularly in country districts, is the absence of anything like efficient rural sanitation. Many counties have yet to learn the alphabet of sanitation. The chief danger results from the impure water supplies of the smaller towns, the local house epidemics, due to infected wells, and the milk outbreaks, due to the infection of dairy farms.

The importance of scrupulously guarding the sources of supply was never better illustrated than in the well-known and oft-quoted epidemic in Plymouth, Pa. The town, with a population of 8,000, was in part supplied with drinking water from a reservoir fed by a mountain stream. During January, February and March, in a cottage by the side of and at a distance of from 60 to 80 feet from this stream, a man was ill with typhoid fever. The attendants were in the habit at night of throwing out the evacuation on the ground toward the stream. During these months the ground was frozen and covered with snow. In the latter part of March and early in April there was considerable rainfall and a thaw, in which a large part of the three months' accumulation of discharges was washed into the brook not 60 feet distant. At the very time of this thaw the patient had numerous and copious discharges. About the 10th of April cases of typhoid fever broke out in the town, appearing for a time at the rate of 50 a day. In all about 1,200 were attacked. An immense majority of the cases were in the part of the town which received water from the affected reservoir.

The use of boiled water and of ice made from distilled water, the systematic inspection of dairies, the scrupulous supervision of the sources from which the water is obtained, an efficient system of sewage removal, and, above all, the most scrupulous care on the part of physicians and of nurses in the disinfection of the discharges of typhoid fever patients—these are the factors necessary to reduce to a minimum the incidence of typhoid fever.

CHOLERA.

One of the great scourges of the present century made inroads into Europe and America from India, its native home. We have, however, found out the germ, found out the conditions under which it lives, and it is not likely that it will ever again gain a foothold in this country or Great Britain. Since the last epidemic, 1873, the disease, though brought to this country on several occasions, has always been held in check at the port of entry. It is communicated almost entirely through infected water, and the virulence of an epidemic in any city is in direct proportion to the imperfection of the water supply. This was shown in a remarkable way in the Hamburg epidemic of 1892. In Altona, which had a filtration plant, there were only 516 cases, many of them refugees from Hamburg. Hamburg, where the unfiltered water of the Elbe was used, had some 18,000 cases, with nearly 8,000 deaths.

YELLOW FEVER.

The cause of this disease is still under discussion. It has an interest to us in this country from its continued prevalence in Cuba, and from the fact that at intervals it makes inroads into the Southern States, causing serious commercial loss. The history of the disease in the other West India Islands, particularly Jamaica, indicates the steps which must be taken for its prevention. Formerly yellow fever was as fatal a scourge in them as it is today in Cuba. By an efficient system of sanitation it has been abolished. The same can be done (and will be done) in Cuba within a few years. Gen. Wood has already pointed out the way in the cleansing of Santiago.

THE PLAGUE.

One of the most remarkable facts in connection with modern epidemics has been the revival of the bubonic plague, the most dreaded of all the great infections. During the present century the disease in Europe has been confined almost exclusively to Turkey and Southern Europe. Since 1894, when it appeared at Hong Kong, it has gradually spread, and there have been outbreaks of terrible severity in India. It has extended to certain of the Mediterranean ports, and during the past summer it reached Glasgow, where there has been a small outbreak. On this hemisphere there have been small outbreaks in certain of the South American ports, cases have been brought to New York, and there have been, to Nov. 1, 21 cases among the Chinese in San Francisco. Judging from the readiness with which it has been checked and limited in Australia, and in particular the facility with which the recent outbreak in Glasgow has been stamped out, there is very little risk that plague will ever assume the proportions which gave to it its bitter reputation as the "black death" of the middle ages. As I have already mentioned, the germ is known, and prophylactic inoculations have been made on a large scale in India with a certain measure of success.

TUBERCULOSIS.

In all communities the white plague, as Oliver Wendell Holmes calls it, takes the first rank as a killing disease. It has been estimated that of it 120,000 people die yearly in this country. In all mortality bills tuberculosis of the lungs (or consumption) heads the list, and when to this is added tuberculosis of the other organs, the number swells to such an extent that this disease equals in fatality all the other acute infective diseases combined if we leave out pneumonia. Less than twenty years ago we knew little or nothing of the cause of this disease. It was believed to be largely hereditary. Koch discovered the germ, and with this have come the possibilities of limiting its ravages.

The following points with reference to it may be stated. In a few very rare instances the disease is transmitted from parent to child. In a large proportion of all cases the disease is "caught." The germs are widely distributed through the sputum, which, when dry, becomes dust, and is blown about in all directions. Tubercle bacilli have been found in the dust of streets, houses, hospital wards and much-frequented places. A single individual may discharge from the lungs countless myriads of germs in the 24 hours. Dr. Nuttall estimated from a patient in the Johns Hopkins Hospital, who had only moderately advanced consumption, that from one and one-half to four and one-third billions of germs were thrown off in the 24 hours. The consumptive, as has been well-stated, is almost harmless, and only becomes harmful through bad habits. The germs are contained in the sputum, which, when dry, is widely scattered in the form of dust, and constitutes the great medium for the transmission of the disease. If expectorated into a handkerchief, the sputum dries quickly, particularly if it is put into the pocket or under the pillow. The beard or mustache of a consumptive is smeared with the germs. Even in the most careful the hands are apt to be soiled with the germs, and in those who are dirty and careless the funiture and materials which they handle readily become infected. Where the dirty habit prevails of spitting on the floor, a room, or the entire house, may contain numbers of germs. In the majority of all cases the infection in tuberculosis is by inhalation. This is shown by the frequency with which the disease is met with in the lungs, and the greater prevalence of tuberculosis in institutions in which the residents are restricted in the manner of fresh air and a free, open life. The disease prevails especially in cloisters, in jails and in asylums. Infection through milk is also possible; it is doubtful whether the disease is transmitted through meat. So widespread are the germs that post-mortem examination has shown that a very large number of persons show slight signs of the disease who have never during life presented any symptoms; in fact, some recent investigations would indicate that a very large proportion of all persons at the age of 40 have somewhere in their bodies slight tuberculous lesions. This shows the importance of the individual predisposition, upon which the older writers laid so much stress, and the importance of maintaining the nutrition at its maximum.

One of the most remarkable features of modern protective medicine is the widespread interest that has been aroused in the crusade against tuberculosis. What has already been accomplished warrants the belief that the hopes of even the most enthusiastic may be realized. A positive decline in the prevalence of the disease has been shown in many of the larger cities during the past ten years. In Massachusetts, which has been a hotbed of tuberculosis for many years, the death rate has fallen from 42 per 10,000 inhabitants in 1853 to 21.8 per 10,000 inhabitants in 1895. In the city of Glasgow, in which the records have been very carefully kept, there has been an extraordinary fall in the death rate from tuberculosis, and the recent statistics of New York city show, too, a similar remarkable diminution.

In fighting the disease our chief weapons are: First, education of the public, particularly of the poorer classes, who do not fully appreciate the chief danger in the disease. Secondly, the compulsory notification and registration of all cases of tuberculosis. The importance of this relates chiefly to the very poor and improvident from whom, after all, comes the greatest danger, and who should be under constant surveillance, in order that these dangers may be reduced to a minimum. Thirdly, the foundation in suitable localities by the city and by the state of sanatoria for the treatment of early cases of the disease. Fourthly, provision for the chronic, incurable cases in special hospitals.

DIPHTHERIA.

Since the discovery of the germ of this disease and our knowledge of the conditions of its transmission, and the discovery of the anti-toxin, there has been a great reduction in its prevalence and an equally remarkable reduction in the mortality. The more careful isolation of the sick, the thorough disinfection of the clothing, the rigid scrutiny of the mild cases of throat disorder, a more stringent surveillance in the period of convalescence, and the routine examination of the throats of school children—these are the essential measures by which the prevalence of the disease has been very markedly diminished. The great danger is in the mild cases, in which the disease has perhaps not been suspected, and in which the child may be walking about and even going to school. Such patients are often a source of widespread infection. The careful attention given by mothers to the teeth and mouths of children is also an important factor. In children with recurring attacks of tonsilitis, in whom the tonsils are enlarged, the organs should be removed. Through these measures in the incidence of the disease has been very greatly reduced.

PNEUMONIA.

While there has been a remarkable diminution in the prevalence of a large number of all the acute infections, one disease not only holds its own, but seems even to have increased in its virulence. In the mortality bills pneumonia is an easy second to tuberculosis. It attacks particularly the intemperate, the feeble and the old, though every year a large number of robust, healthy individuals succumb. So frequent is pneumonia at advanced periods of life that to die of it has been said to be the natural end of old men in this country. In many ways, too, it is a satisfactory disease, if one may use such an expression. It is not associated with much pain, except at the onset, the battle is brief and short, and a great many old persons succumb to it easily and peacefully.

We know the cause of the disease; we know only too well its symptoms, but the enormous fatality (from 20 to 25 per cent), speaks only too plainly of the futility of our means of cure; and yet in no disease has there been so great a revolution in treatment. The patient is no longer drenched to death with drugs, or bled to a point when the resisting powers of nature are exhausted. We are not without hope, too, that in the future an antidote may be found to the toxines of the disease, and of late there have been introduced several measures of great value in supporting the weakness of the heart, a special danger in the old and debilitated.

HYDROPHOBIA.

Rabies, a remarkable, and in some countries a widespread, disease of animals, when transmitted to man by the bite of rabid dogs, wolves, etc., is known as hydrophobia. The specific germ is unknown, but by a series of brilliant observations Pasteur showed (1) that poison has certain fixed and peculiar properties in connection with the nervous system; (2) that susceptible animals could be rendered refractory to the disease, or incapable of taking it, by a certain method of inoculation, and (3) that an animal unprotected and inoculated with a dose of the virus sufficient to cause the disease may, by the injection of proper anti-rabic treatment, escape. Supported by these facts Pasteur began a system of treatment of hydrophobia in man, and a special institute was founded in Paris for the purpose. When carried out promptly the treatment is successful in an immense majority of all cases, and the mortality in persons bitten by animals proved to be rabid, who have subsequently had the anti-rabic treatment, has been reduced to less than one-half per cent. The disease may be stamped out in dogs by careful quarantine of suspected animals, and by a thoroughly carried out muzzling order.

MALARIA.

Among the most remarkable of modern discoveries is the cause of malarial fever, one of the great maladies of the world, and a prime obstacle to the settlement of Europeans in tropical regions. Until 1880 the cause was quite obscure. It was known that the disease prevailed chiefly in marshy districts, in the autumn, and that the danger of infection was greatest in the evening and at night, and that it was not directly contagious. In 1880 a French army surgeon, Laveran, discovered in the red blood corpuscles small bodies which have proved to be the specific germ of the disease. They are not bacteria, but little animal bodies resembling the amoeba—tiny little portions of protoplasm. The parasite in its earliest form is a small, clear, ring-shaped body inside the red blood corpuscle, upon which it feeds, gradually increasing in size and forming within itself blackish grains out of the coloring matter of the corpuscle. When the little parasite reaches a certain size it begins to divide or multiply, and an enormous number of these, breaking up at the same time, give off poison in the blood, which causes the paroxysms of fever. During what is known as the chill, in the intermittent fever, for example, one can always find these dividing parasites. Several different forms of parasites have been found, corresponding to different varieties of malaria. Parasites of a very similar nature exist abundantly in birds. Ross, an army surgeon in India, found that the spread of this parasite from bird to bird was effected through the intervention of the mosquito. The parasites reach maturity in certain cells of the coats of the stomach of these insects, and develop into peculiar thread-like bodies, many of which ultimately reach the salivary glands, from which, as the insect bites, they pass with the secretion of the glands into the wound. From this as a basis numerous observers have worked out the relation of the mosquito to malaria in the human subject.

Briefly stated, the disease is transmitted chiefly by certain varieties of the mosquito, particularly the Anopheles. The ordinary culex, which at present exists in the Northern States, does not convey the disease. The Anopheles sucks the blood from a persons infected with malaria, takes in a certain number of parasites, which undergo development in the body of the insect, the final outcome of which is numerous small, thread-like structures, which are found in numbers in the salivary glands. From this point, when the mosquito bites another individual, they pass into his blood, infect the system, and in this way the disease is transmitted. Two very striking experiments may be mentioned. The Italian observers have repeatedly shown that Anopheles which have sucked blood from patients suffering with malaria, when sent to a non-malarial region, and there allowed to bite perfectly healthy persons, have transmitted the disease. But a very crucial experiment was made a few months ago. Mosquitoes which had bitten malarial patients in Italy were sent to London and there allowed to bite Mr. Manson, son of Dr. Manson, who really suggested the mosquito theory of malaria. This gentleman had not lived out of England, and there is no acute malaria in London. He had been a perfectly healthy, strong man. In a few days following the bites of the infected mosquitoes he had a typical attack of malarial fever.

The other experiment, though of a different character, is quite as convincing. In certain regions about Rome, in the Campania, malaria is so prevalent that in the autumn almost everyone in the district is attacked, particularly if he is a newcomer. Dr. Sambron and a friend lived in this district from the 1st of June to the 1st of September, 1900. The test was whether they could live in this exceedingly dangerous climate for the three months without catching malaria, if they used stringent precautions against the bites of mosquitoes. For this purpose the hut in which they lived was thoroughly wired, and they slept with the greatest care under netting. Both of these gentlemen at the end of the period had escaped the disease.

The importance of these studies cannot be over-estimated. They explain the relation of malaria to marshy districts, the seasonal incidence of the disease, the nocturnal infection, and many other hitherto obscure problems. More important still, they point out clearly the way by which malaria may be prevented: First, the recognition that any individual with malaria is a source of danger in a community, so that he must be thoroughly treated with quinine; secondly, the importance of the draining of marshy districts and ponds in which mosquitoes breed, and, thirdly, that even in the most infected regions persons may escape the disease by living in thoroughly protected houses, in this way escaping the bites of mosquitoes.

VENEREAL DISEASES.

These continue to embarrass the social economist and to perplex and distress the profession. The misery and ill health which they cause are incalculable, and the pity of it is that the cross is not always borne by the offender, but innocent women and children share the penalties. The gonorrheal infection, so common, and often so little heeded, is the cause of much disease in parts other than those first affected. Syphilis claims its victims in every rank of life, at every age and in all countries. We now treat it more thoroughly, but all attempts to check its ravages have been fruitless. Physicians have two important duties: the incessant preaching of continence to young men, and scrupulous care in every case, that the disease may not be a source of infection to others, and that by thorough treatment the patient may be saved from the serious late nervous manifestations. We can also urge that in the interests of public health venereal diseases like other infections shall be subject to supervision by the State. The opposition to measures tending to the restriction of these diseases is most natural; on the one hand from the women, who feel that it is an aggravation of a shocking injustice and wrong to their sex; on the other, from those who feel the moral guilt in a legal recognition of the evil. It is appalling to contemplate the frightful train of miseries which a single diseased woman may entail, not alone on her associates, but on scores of the innocent—whose bitter cry should make the opponents of legislation to feel that any measures of restriction, any measures of registration, would be preferable to the present disgraceful condition, which makes of some Christian cities open brothels and allows the purest homes to be invaded by the most loathsome of all diseases.

LEPROSY.

Since the discovery of the germ of this terrible disease systematic efforts have been made to improve the state of its victims and to promote the study of the conditions under which the disease prevails. The English leprosy commission has done good work in calling attention to the widespread prevalence of the disease in India and in the east. In this country leprosy has been introduced into San Francisco by the Chinese, and into the Northwestern States by the Norwegians, and there are foci of the disease in the Southern States, particularly Louisiana, and in the Province of New Brunswick. The problem has an additional interest since the annexation of Hawaii and the Philippine Islands, in both of which places leprosy prevails extensively. By systematic measures of inspection and the segregation of affected individuals the disease can readily be held in check. It is not likely ever to increase among native Americans, or again to gain such a foothold as it had in the middle ages.

PUERPERAL FEVER.

Perhaps one of the most striking of all victories of preventive medicine has been the almost total abolition of so-called childbed fever from the maternity hospitals and from private practice. In many institutions the mortality after childbirth was 5 or 6 per cent—indeed, sometimes as high as 10 per cent, whereas today, owing entirely to proper antiseptic precautions, the mortality has fallen to .3 to .4 per cent. The recognition of the contagiousness of puerperal fever was the most valuable contribution to medical science made by Oliver Wendell Holmes. There had been previous suggestions by several writers, but his essay on the "Contagiousness of Puerperal Fever," published in 1843, was the first strong, clear, logical statement of the case. Semmelweis, a few years later, added the weight of a large practical experience to the side of the contagiousness, but the full recognition of the causes of the disease was no reached until the recent antiseptic views had been put into practical effect.

IV. THE NEW DISPENSATION IN TREATMENT.

The century has witnessed a revolution in the treatment of disease, and the growth of a new school of medicine. The old schools—regular and homeopathic—put their trust in drugs, to give which was the alpha and omega of their practice. For every symptom there were a score or more of medicines—vile, nauseous compounds in one case; bland, harmless dilutions in the other. The new school has a firm faith in a few good, well-tried drugs, little or none in the great mass of medicines still in general use. Imperative drugging—the ordering of medicine in any and every malady—is no longer regarded as the chief function of the doctor. Naturally, when the entire conception of the disease was changed, there came a corresponding change in our therapeutics. In no respect is this more strikingly shown than in our present treatment of fever; say of the common typhoid fever. During the first quarter of the century the patients were bled, blistered, purged and vomited, and dosed with mercury, antimony and other compounds to meet special symptoms. During the second quarter, the same, with variations in different countries. After 1850 bleeding became less frequent, and the experiments of the Paris and Vienna schools began to shake the belief in the control of fever by drugs. During the last quarter sensible doctors have reached the conclusion that typhoid fever is not a disease to be treated with medicines, but that in a large proportion of all cases diet, nursing and bathing meet the indications. There is active, systematic, careful, watchful treatment, but not with drugs. The public has not yet been fully educated to this point, and medicines have sometimes to be ordered for the sake of the friends, and it must be confessed that there are still in the ranks antiques who would insist on a dose of some kind every few hours.

The battle against poly-pharmacy, or the use of a large number of drugs (of the action of which we knew little, yet we put them into bodies of the action of which we know less) has not yet been fought to a finish. There have been two contributing factors on the side of progress—the remarkable growth of the sceptical spirit fostered by Paris, Vienna and Boston physicians, and above all the valuable lesson of homeopathy, the infinitesimals of which certainly could not do harm, and quite as certainly could not do good; yet nobody has ever claimed that the mortality among homeopathic practitioners was greater than among those of the regular school. A new school of practitioners has arisen which cares nothing for homeopathy and less for so-called allopathy. It seeks to study rationally and scientifically the action of drugs, old and new. It is more concerned that a physician shall know how to apply the few great medicines which all have to use, such as quinine, iron, mercury, iodide of potassium, opium and digitalis, rather than a multiplicity of remedies the action of which is extremely doubtful.

The growth of scientific pharmacology, by which we now have many active principles instead of crude drugs, and the discovery of the art of making medicines palatable, have been of enormous aid in rational practice. There is no limit to the possibility of help from the scientific investigation of the properties and action of drugs. At any day the new chemistry may give to us remedies of extraordinary potency, and of as much usefulness as cocaine. There is no reason why we should not, even in the vegetable world, find for certain diseases specifics of virtue fully equal to that of quinine in the malarial fevers.

One of the most striking characteristics of the modern treatment of disease is the return to what used to be called the natural methods—diet, exercise, bathing and massage. There probably never has been a period in the history of the profession when the value of diet in the prevention and the cure of disease was more fully recognized. Dyspepsia, the besetting malady of this country, is largely due to improper diet, imperfectly prepared and too hastily eaten. One of the great lessons to be learned is that the preservation of health depends in great part upon food well cooked and carefully eaten. A common cause of ruined digestion, particularly in young girls, is the eating of sweets between meals and the drinking of the abominations dispensed in the chemists' shops in the form of ice cream sodas, etc. Another frequent cause of ruined digestion in business men is the hurried meal at the lunch counter. And a third factor, most important of all, illustrates the old maxim that more people are killed by over-eating and drinking than by the sword. Sensible people have begun to realize that alcoholic excesses lead inevitably to impaired health. A man may take four or five drinks of whisky a day, or even more, and think perhaps that he transacts his business better with that amount of stimulant; but it only too frequently happens that early in the fifth decade, just as business or political success is assured, Bacchus hands in heavy bills for payment, in the form of serious disease of the arteries or of the liver, or there is a general break-down. With the introduction of light beer there has been not only less intemperance, but a reduction in the number of the cases of organic disease of the heart, liver and stomach caused by alcohol. While temperance in the matter of alcoholic drinks is becoming a characteristic feature of Americans, intemperance in the quantity of food taken is almost the rule. Adults eat too much, and physicians are beginning to recognize that the early degenerations, particularly of the arteries and of the kidneys, leading to Bright's disease, which were formerly attributed to alcohol, are due in large part to too much food.

NURSING.

Perhaps in no particular does nineteenth century practice differ from that of the preceding centuries more than in the greater attention which is given to the personal comfort of the patient and to all the accessories comprised in the art of nursing. The physician has in the trained nurse an assistant who carries out his directions with a watchful care, and who is on the lookout for danger signals, and with accurate notes enables him to estimate the progress of a critical case from hour to hour. The intelligent, devoted women who have adopted the profession of nursing are not only in their ministrations a public benefaction, but they have lightened the anxieties which form so large a part of the load of the busy doctor.

MASSAGE AND HYDROTHERAPY

have taken their places as most important measures of relief in many chronic conditions, and the latter has been almost universally adopted as the only safe means of combating the high temperatures of the acute fevers.

Within the past quarter of a century the value of exercise in the education of the young has become recognized. The increase in the means of taking wholesome out-of-door exercise is remarkable, and should show in a few years an influence in the reduction of the nervous troubles in young people. The prophylactic benefit of systematic exercise, taken in moderation by persons of middle age, is very great. Golf and the bicycle have in the past few years materially lowered the average incomes of the doctors of this country as derived from persons under 40. From the senile contingent—those above this age—the average income has for a time been raised by these exercises, as a large number of persons have been injured by taking up sports which may be vigorously pursued with safety only by those with young arteries.

Of three departures in the art of healing, brief mention may be made. The use of the extracts of certain organs (or of the organs themselves) in disease is as old as the days of the Romans, but an extraordinary impetus has been given to the subject by the discovery of the curative powers of the extract of the thyroid gland in the diseases known as cretinism and myxoedema. The brilliancy of the results in these diseases has had no parallel in the history of modern medicine, but it cannot be said that in the use of the extracts of other organs for disease the results have fulfilled the sanguine expectations of many. There was not, in the first place, the same physiological basis, and practitioners have used these extracts too indiscriminately and without sufficient knowledge of the subject.

Secondly, as I have already mentioned, we possess a sure and certain hope that for many of the acute infections anti-toxins will be found.

A third noteworthy feature in modern treatment has been a return to psychical methods of cure, in which faith in something is suggested to the patient. After all, faith is the great lever of life. Without it man can do nothing; with it, even with a fragment, as a grain of mustard seed, all things are possible to him. Faith in us, faith in our drugs and methods, is the great stock-in-trade of the profession. In one pan of the balance put the pharmacopoeias of the world, all the editions from Dioscorides to the last issue of the United States Dispensatory; heap them on the scales as did Euripides his books in the celebrated contest in the "Frogs"; in the other put the simple faith with which from the days of the Pharaohs until now the children of men have swallowed the mixtures these works describe, and the bulky tomes will kick the beam. It is the aurum potabile, the touchstone of success in medicine. As Bacon says, confidence and hope do more good than physic—"he cures most in whom most are confident." That strange compound of charlatan and philosopher, Paracelsus, encouraged his patients "to have a good faith, a strong imagination, and they shall find the effects" (Burton). While we often overlook or are ignorant of our own faith cures, doctors are just a wee bit too sensitive about those performed outside our ranks. They have never had, and cannot expect to have, a monopoly in this panacea, which is open to all, free as the sun, and which may make of everyone in certain cases, as was the Lacedemon of Homer's day, "a good physician out of Nature's grace." Faith in the gods or in the saints cures one, faith in little pills another, hypnotic suggestion a third, faith in a plain, common doctor a fourth. In all ages the prayer of faith has healed the sick, and the mental attitude of the suppliant seems to be of more consequence than the powers to which the prayer is addressed. The cures in the temples of Esculapius, the miracles of the saints, the remarkable cures of those noble men, the Jesuit missionaries, in this country, the modern miracles at Lourdes and at St. Anne de Beaupre in Quebec, and the wonder-workings of the so-called Christian Scientists, are often genuine and must be considered in discussing the foundations of therapeutics. We physicians use the same power every day. If a poor lass, paralyzed apparently, helpless, bed-ridden for years, comes to me, having worn out in mind, body and estate a devoted family, if she in a few weeks or less by faith in me, and faith alone, takes up her bed and walk, the saints of old could not have done more; St. Anne and many others can scarcely today do less. We enjoy, I say, no monopoly in the faith business. The faith with which we work, the faith, indeed, which is available today in everyday life, has its limitations. It will not raise the dead; it will not put in a new eye in place of a bad one (as it did to an Iroquois Indian boy for one of the Jesuit fathers), nor will it cure cancer or pneumonia or knit a bone, but in spite of these nineteenth century restrictions, such as we find it, faith is a most precious commodity, without which we should be badly off.

HYPNOTISM,

introduced by Mesmer in the past century, has had several revivals as a method of treatment during the present century. The first careful study of it was made by Braid, a Manchester surgeon, who introduced the terms hypnotism, hypnotic and nervous sleep; but at this time no very great measure of success followed its use in practice, except, perhaps, in the case of an Anglo-Indian surgeon, James Esdaile, who, prior to the introduction of anaesthesia, had performed 261 surgical operations upon patients in a state of hypnotic unconsciousness. About 1880 the French physicians, particularly Charcot and Bernheim, took up the study, and since that time hypnotism has been extensively practiced. It may be defined as a subjective psychical condition, what Braid called nervous sleep, resembling somnambulism, in which, as Shakespeare says, in the description of Lady Macbeth, the person receives at once the benefit of sleep and does the effects or acts of watching or waking. Therapeutically, the important fact is that the individual's natural susceptibility to suggestion is increased, and this may hold after the condition of hypnosis has passed away. The condition of hypnosis is usually itself induced by suggestion, requesting the subject to close the eyes, to think of sleep, and the operator then repeats two or three times sentences suggesting sleep, and suggesting that the limbs are getting heavy and that he is feeling drowsy. During this state it has been found that the subjects are very susceptible to suggestion.

Too much must not be expected of hypnotism, and the claims which have been made for it have been too often grossly exaggerated. It seems, as it has been recently well put, that hypnotism "at best permits of making suggestions more effective for good or bad than can be done upon one in his waking state." It is found to be of very little use in organic disease. It has been helpful in some cases of hysteria, in certain functional spasmodic affections of the nervous system, in the vicious habits of childhood, and in suggesting to the victims of alcohol and drugs that they should get rid of their inordinate desires. It has been used successfully in certain cases for the relief of labor pains, and in surgical operations, but on the whole, while a valuable agent in a few cases, it has scarcely fulfilled the expectations of its advocates. It is a practice not without serious dangers, and should never be performed except in the presence of a third person, and its indiscriminate practice by ignorant persons should be prevented by law.

One mode of faith-healing in modern days, which passes under the remarkable name of Christian Science, is probably nothing more than mental suggestion under another name. "The patient is told to be calm, and is assured that all will go well; that he must try to aid the healer by believing that what is told him is true. The healer then, quietly, but firmly, asserts and reiterates that there is no pain, no suffering, that it is disappearing, that relief will come, that the patient is getting well." This is precisely the method which Bernheim used to use with such success in his hypnotic patients at Nancy, iterating and reiterating, in a most wearisome way, that the disease would disappear and the patient would feel better. As has been pointed out by a recent writer (Dr. Harry Marshall), the chief basis for the growth of Christian Science is that which underlies every popular fallacy. "Oliver Wendell Holmes outlined very clearly the factors concerned, showing (a) how easily abundant facts can be collected to prove anything whatsoever; (b) how insufficient 'exalted wisdom, immaculate honesty and vast general acquirements,' are to prevent an individual from having the most primitive ideas upon subjects out of his line of thought, and, finally, demonstrating 'the boundless credulity and excitability of mankind upon subjects connected with medicine.'"

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