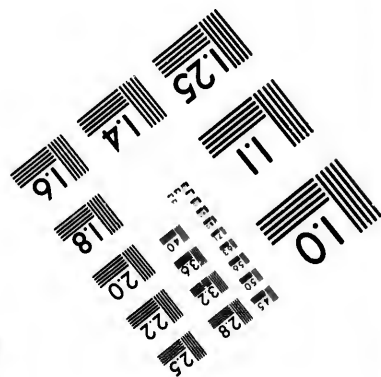
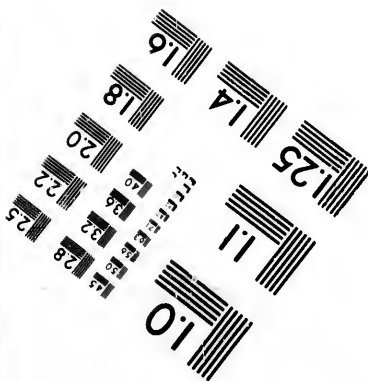
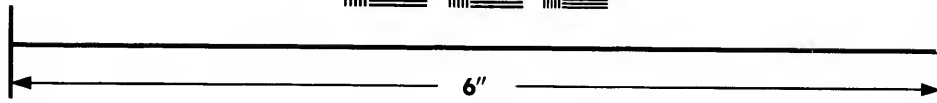
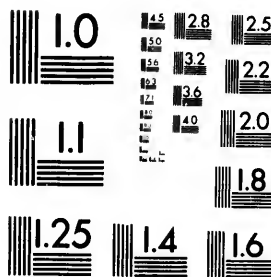


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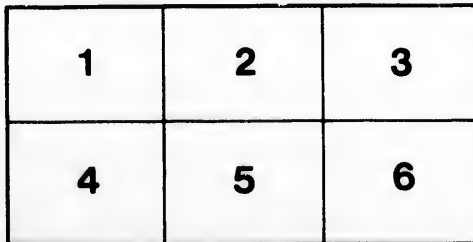
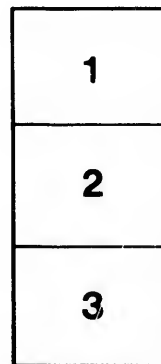
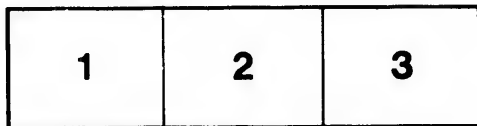
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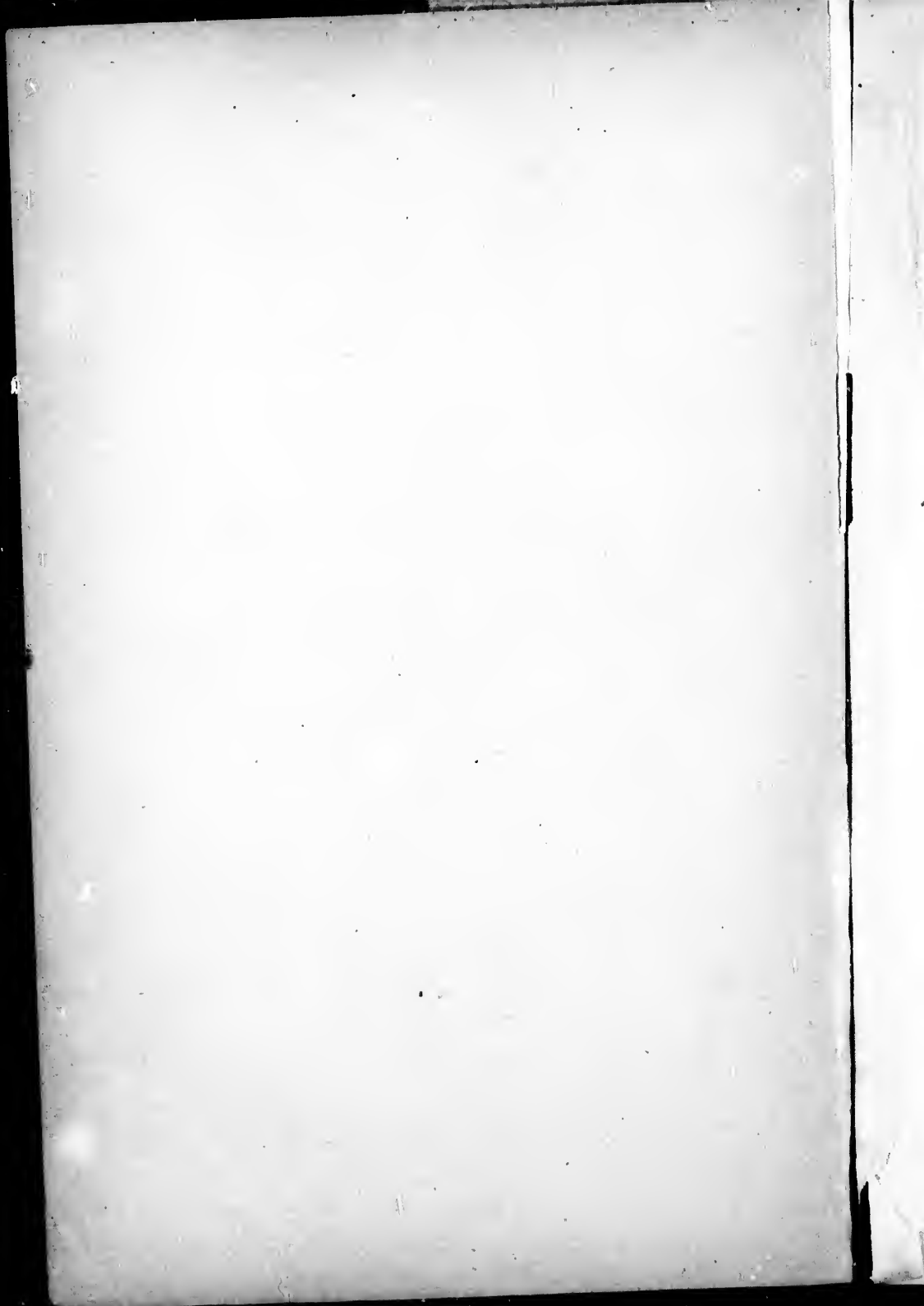
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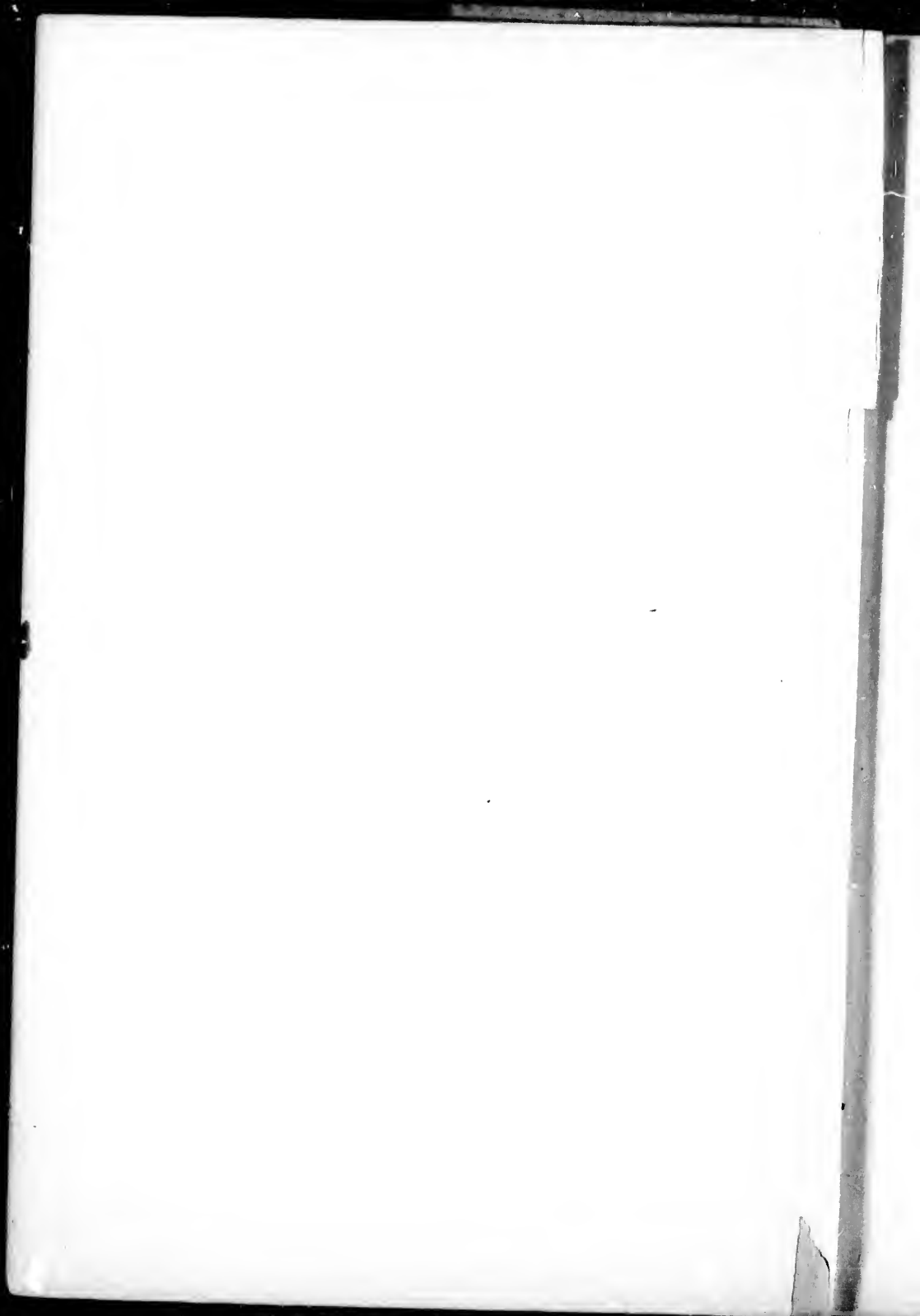
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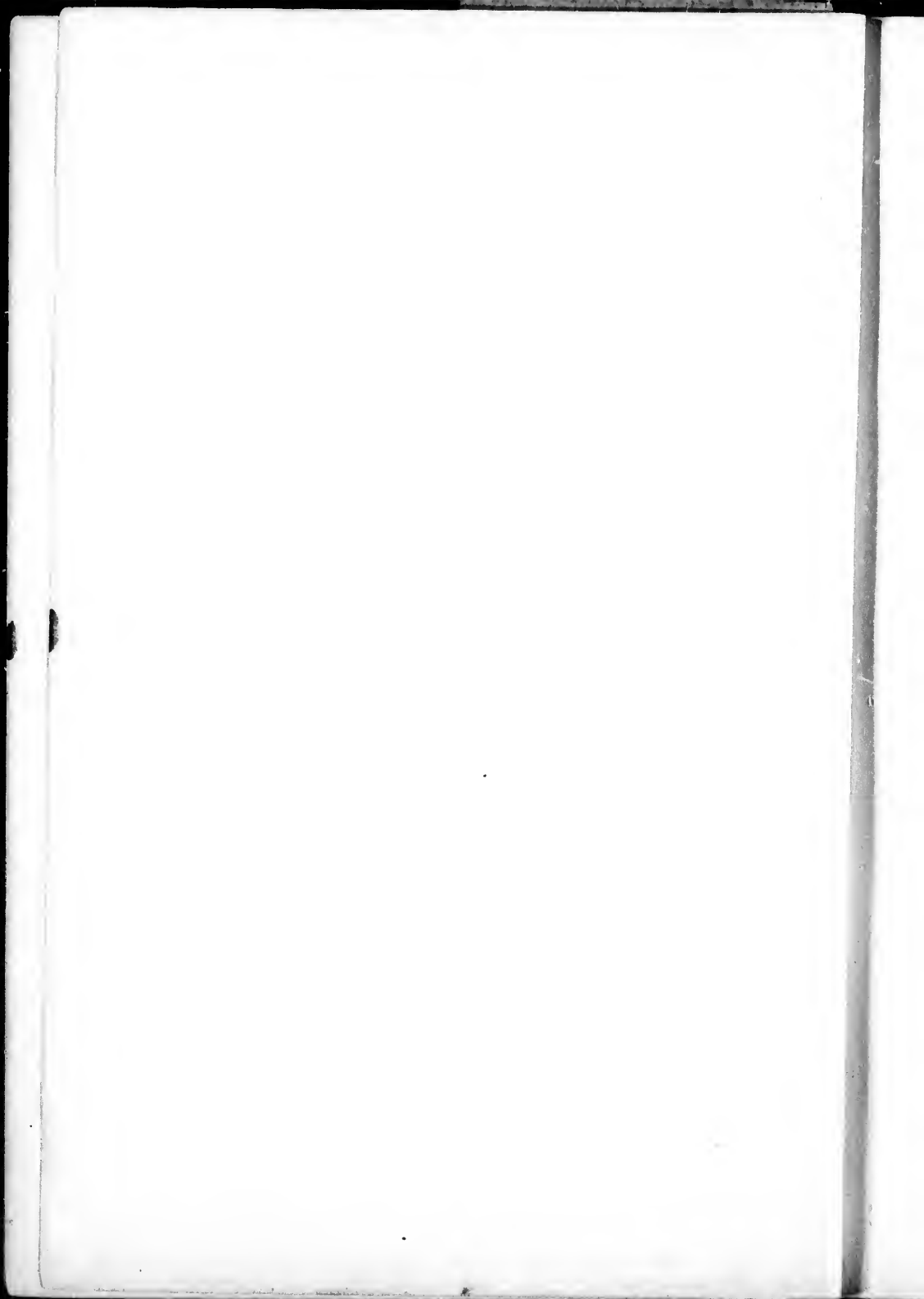
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## PREFACE.

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By the kind permission of Dr. Roddick the following notes, which are practically a reproduction of the course on Surgery, have been published.

For a number of years both the Junior and Final men have wished to carry away with them for future reference the modes of treatment and technique of their own Professor. In these pages we have attempted to set down these principles in concise form.

We desire to thank Dr. Roddick for his permission and the interest he has shown in the publication, also Drs. Armstrong, Garrow and Bradley.

D. M. L.

A. T. M.

MONTREAL, October, 1898.

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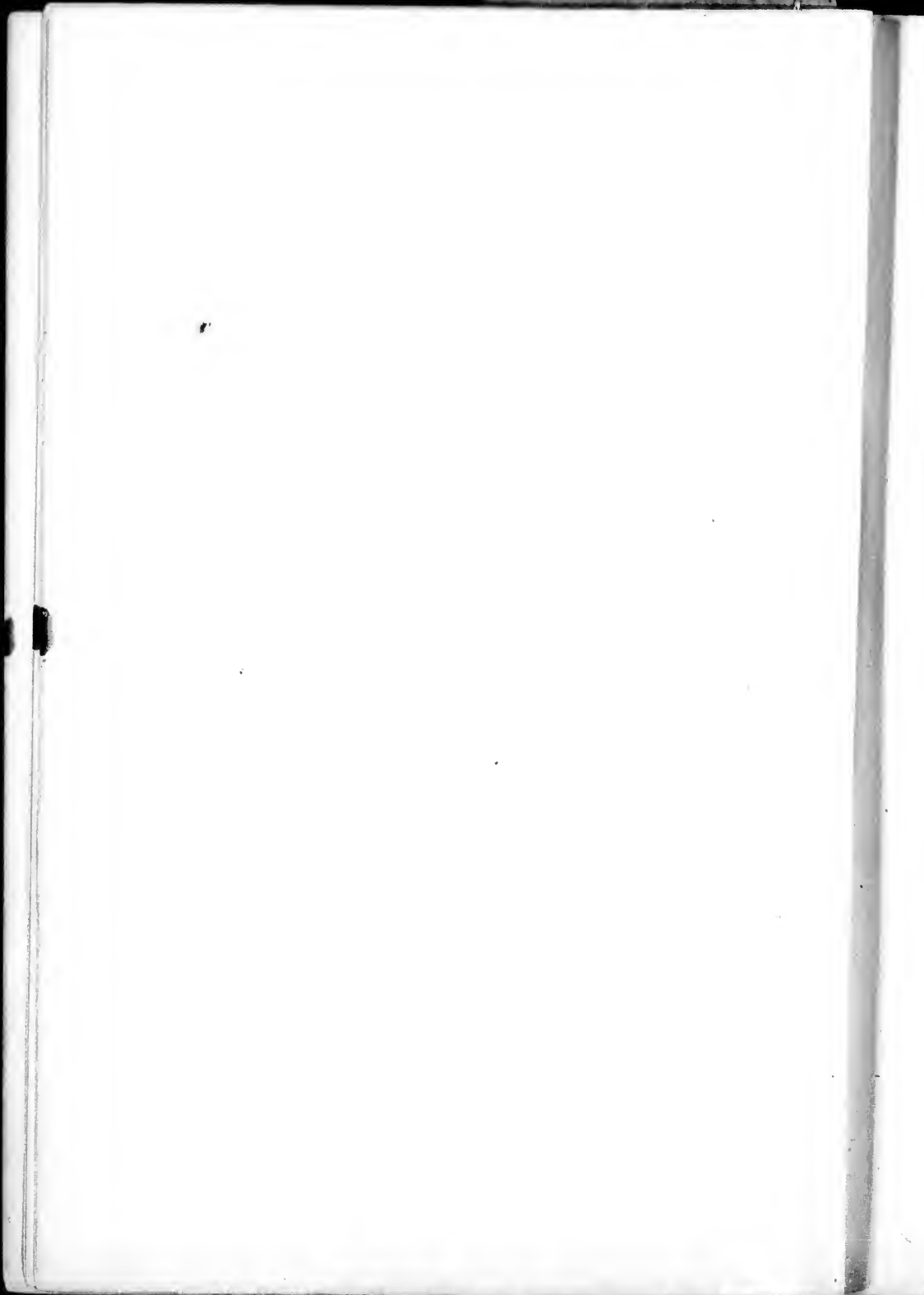
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# SURGERY.

## CONTUSIONS.

A contusion is a subcutaneous laceration, the skin surface remaining unbroken—skin being elastic and tough, often remains intact with extensive subcutaneous disorganization.

Causes :—Blows from blunt objects, squeezes, indirect blows from falls on feet or hands; compression always essential to produce contusion. Contusions may occur in any grade from slight bruise to greatest disorganization of soft and hard parts. As a rule the connective tissue and vessels suffer most, but muscles, veins, arteries and lymphatics may be lacerated, also bones injured. One of the most serious results is extravasation of blood. In smaller injuries only discoloration and swelling.

ECCHYMOISIS:—Discolouration underlying tissues with various changes as in black eye. In serious injury and larger extravasation may have a doughy feeling, or where the parts are lax may have a bag of blood with fluctuation—when this latter is well defined it is called a *Hæmatoma*.

In all cases of blood effusion, whether great or small, the blood is generally absorbed. If air enters may have suppuration, and *hæmatoma* converted into an abscess. Sometimes blood in *hæmatoma* remains long in fluid state, well defined cyst walls forming. Liquid contained dark and of the consistence of treacle. Again walls may become thoroughly organized and colour changed to that of straw forming a true cyst. Extravasation if great may cause fatal syncope, or tension may retard circulation with development of gangrene in the part thus affected. When contusion occurs immediately over or

involves an internal organ, it is serious; thus hemorrhage into the abdominal cavity may prove rapidly fatal.

**Diagnosis and Symptoms:**—The history is of great importance. Pain is usually absent except where great tension—if seen late, diagnosis may be difficult. Ecchymosis may be so great that gangrene is simulated, blebs being formed.

In contusion always a local temp. of 2 or 3 deg., and a general increase of the body temp. In gangrene part shows a temp. below normal, or below that of the corresponding part on the opposite side from that affected. (In all gangrene except inflammatory the body temp. is normal or subnormal.)

In a case of pressure contusion may have the two conditions of contusion and gangrene at the same time. Hæmatoma may be diagnosed by aspirating.

**Treatment:**—Arrest hemorrhage by external application of cold, subsequently heat. Observe care that the cold application does not lower the vitality of the part too much, especially where there is pressure.

After hemorrhage is arrested, hot applications are in order; these applications will relieve the feeling of tension and the pain, and promote the absorption of effusion more rapidly than the cold. Spirits and cold water, acetate of lead and spts. to the part leaving exposed to evaporate; all may be tried or each. If hemorrhage persists in spite of cold pack or lotion, use pressure on the artery with tourniquet above the contusion, also elastic pressure with cotton wool under bandages.

Hæmatoma should never be opened so long as not interfering with the functions of the part and there is any chance of its being absorbed. Where absorption is not going on aspiration may be practiced.

The needle should first be passed through the sound tissue, which will close immediately on withdrawal, and prevent the entrance of air and microbes. If this is of no avail, then open, wash out thoroughly, and leave to heal by granulation from the bottom. If inflammation, local temp., swelling and redness, hæmatoma should then be opened without delay.

Contusion, no matter how severe, if there is no opening, the prognosis is favourable.

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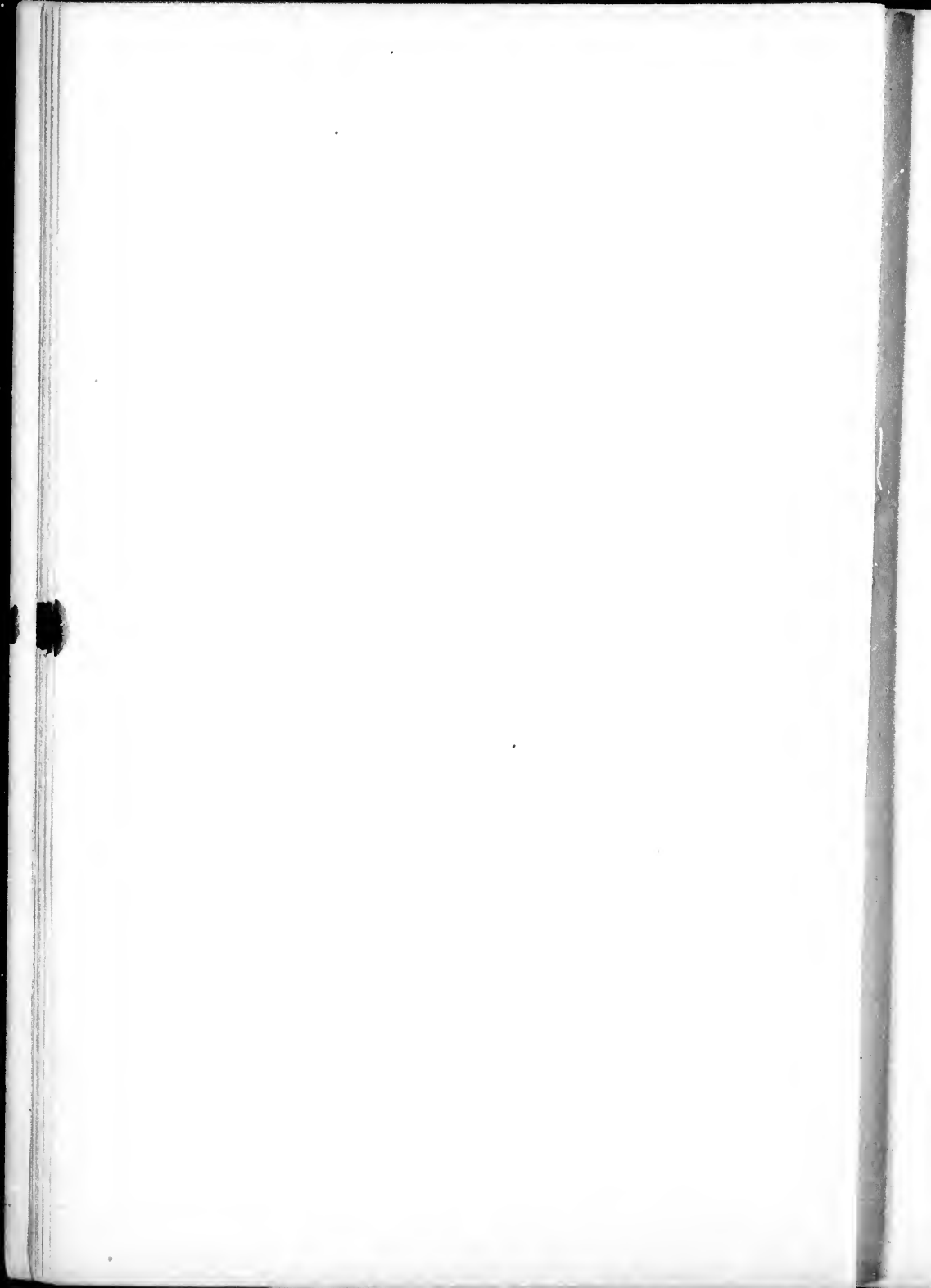
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## WOUNDS.

A wound is a solution of continuity (*i. e.*, a breach) in any part of the body suddenly made by anything that cuts or tears, dividing or penetrating the skin.

Varieties of Wounds:—Incised, Lacerated, Contused, Punctured, Poisoned and Gun-shot.

INCISED WOUNDS:—Those made by a sharp instrument, as knife or sword, may be simple, implicating only the integument, or deeper structures, or complicated with damaged nerves or vessels, or a cavity opened.

Phenomena:—1. Pain. 2. Hemorrhage. 3. Laceration of edges.

The intensity of pain depending upon the nerve supply to the part; the hemorrhage depending upon the vascularity and the size of the wound; the separation upon the amount of tension, or elasticity of the skin, on the direction of the incision, contraction of the muscles, etc. Gaping is always bad where there is much effusion.

CONTUSED AND LACERATED:—These are wounds attended by more or less tearing about the edges or sides, and present every possible variety from an open bruise to the separation of an extremity, machinery, accidents, bites of animals, blunt objects as stones, and all gun-shot injuries.

Characters:—Lips are irregular and torn, ecchymose, not necessarily gaping, very little hemorrhage, dull aching pain; there is always a distinct layer of tissue which must be thrown off before union can take place, so that suppuration is here the rule; the slough may be imperceptible but it is always present.

Remote dangers of this form are 1. Shock. 2. Secondary hemorrhage. 3. Sloughing. 4. Infective inflammation. 5. Gangrene.

PUNCTURED WOUNDS:—From a needle to a bayonet. In wound with a blunt instrument have usually a contusion. In punctured wounds hard to estimate the damage done from external appearance may wound some of the deep arteries, nerves, organs, etc., and, owing to the small opening, escape

of effusion is prevented, hence often have swelling, tension, deep inflammation, hemorrhage, suppuration, etc., false aneurism.

Healing of Wounds:—1. Healing by 1st Intention. 2. Healing by 2nd Intention. *a.* Granulation. *b.* Union of granulation. 3. Blood clot. 4. Scabbing.

HEALING BY FIRST INTENTION:—This is the simplest method of healing. Instrument in passing through the tissues sets up an inflammatory condition in the microscopic layer of tissues so cut through; then follows inflammation, increased flow to the part, stasis, effusion of liquor sanguinis, and white blood cells, glazing of the surface with lymph. Then if the surfaces are brought into accurate apposition, and other untoward conditions are absent, this lymph will glue the sides of the cut together, and healing will commence at once. Healing may be retarded by too vigorous sponging, too large blood clots or the use of too strong chemical solutions in washing. In the young, wounds will heal by first intention in 2 or 3 days, in adult it may take a week or 10 days.

Healing by first intention is unaccompanied by constitutional disturbances. In a large wound may have a raise of temp. of 1, 2, or 3 deg., at the end of 24 hrs. (aseptic fever) little or no swelling near wound and no pain.

HEALING BY GRANULATIONS:—Here the edges of the wound are not brought together. 1. Either they will not come together. 2. That on account of the condition of the wound, it would be bad practice to bring them together, or 3. Failure of attempt to heal by first intention.

Constitutional Symptoms:—Temperature, wound thickened—Necrotic spots on the free surfaces.

Healing:—Instead of lymph glaze seen in 1st Intention, have here an appearance of granulation loops; these granulations pile up until the wound fills; they become organized, fibrous tissue appearing, and the wound drawn together, in this way size of sore is soon gradually diminished. In this form of healing always have an extensive cicatrix. Scar at first red becomes white, losing vascularity...this whiteness

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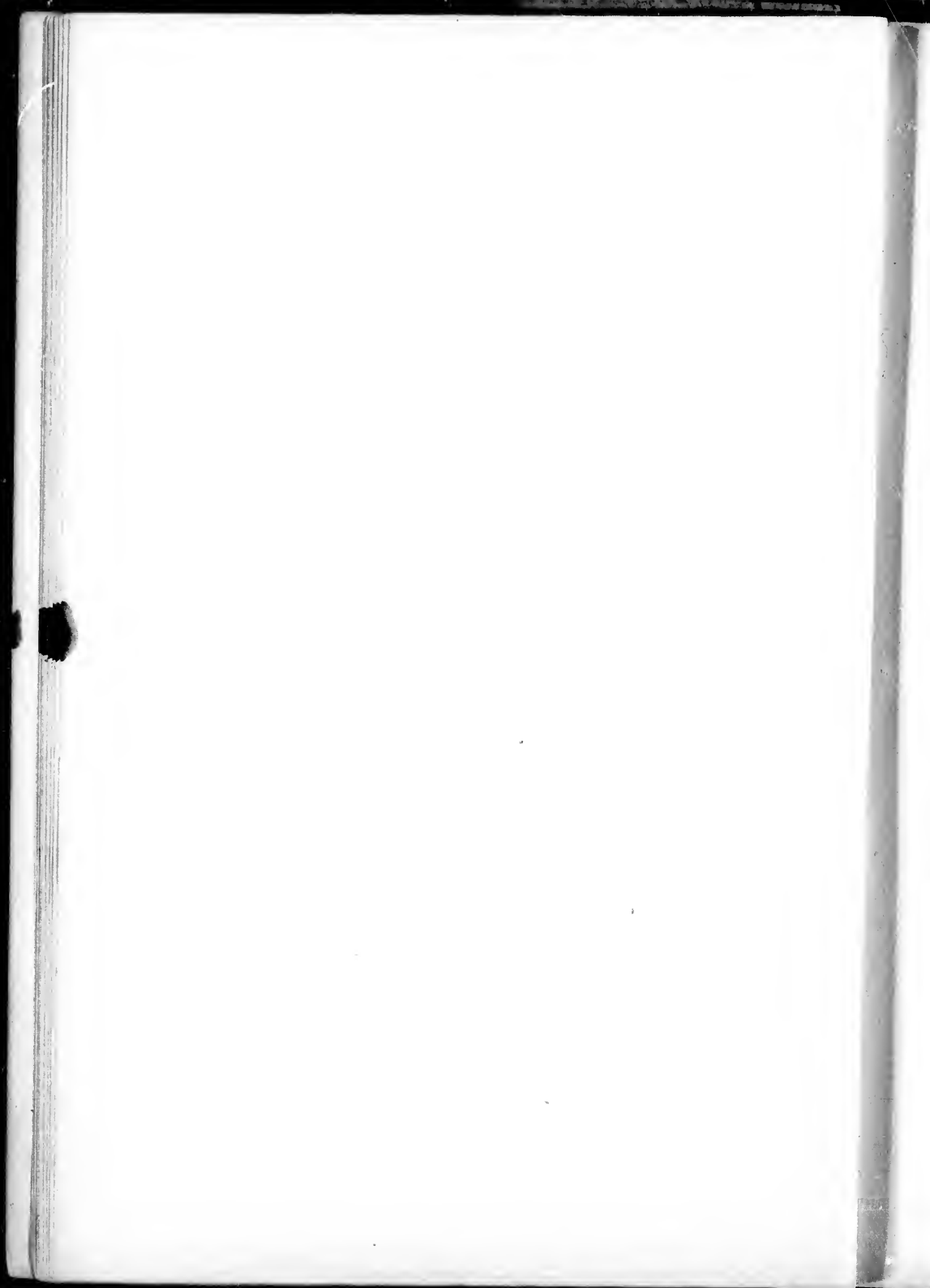
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is due to the compression of the vessels and their disappearance.

**UNION OF GRANULATIONS:**—Granulations on the sides owing to the failure of union by 1st intention brought together, and healing takes place—scar is usually small—here granulations on sides not the bottom of the wound.

**HEALING BY BLOOD CLOT:**—This only possible where an antiseptic series of precautions taken, where the wound is aseptic. Unknown before the days of antiseptic surgery. Where the wound is not brought together it fills with blood clot, lymph being poured out upon the surface of the wound, between the sides of the wound and the clot; if rest maintained, and wound aseptic, leucocytes enter the clot and absorb the red corpuscles, later plasma cells enter, and organization of the clot takes place—not limited to open wounds, therefore in all wounds the spaces become filled with blood clots which become organized. This form of healing takes place in subcutaneous wounds, and also in fractures of bones.

**HEALING BY SCABBING:**—Occurs where portion of the skin only had been injured, or skin and subcutaneous tissue. Here the lymph is effused in sufficient quantity to fill up the wound, and exclude micro-organisms, and the same process goes on beneath as in healing by first intention, only sides of the skin not brought together.

**SYMPTOMS OF THE HEALING PROCESS:**—In healing by First Intention, Blood clot, or by Scabbing; the general condition of the patient as a rule remains good, no disturbance of the Pulse or Temp. However, may have a slight rise of Temp. within the 1st 24 hours (aseptic fever), but where the shock is great, may have subnormal Temp., followed by rise as stated above. Where healing by 1st Intention fails or in extensive lacerated or contused surfaces the Temp. at the end of 24 hours may be 103—4.

Pain, swelling, discharge, and patient suffers from the ordinary symptoms of fever, furred tongue, headache, and loss of appetite—this is traumatic or inflammatory fever. On examination find that pyogenic bacteria have entered the wound,

and that symptoms are due to the absorption of products of bacterial action—this is treated by washing, draining, etc.

But where bacteria have had full swing we have a condition of septic fever, which may result fatally by Septicaemia, Pyaemia, or poisoning by absorption of bacterial products.

*Treatment of Wounds:*—1st try to obtain healing by 1st Intention. Failure is due to the presence of bacteria, either deeply or on the surface of the wound—at 1st superficially and then more deeply.

Forms of Bacteria:—Cluster and Chain Cocci: 1. Staphylococcus Pyogenes Aureus. 2. Staphylococcus Pyogenes Albus. 3. Streptococcus Pyogenes or chain coccus, other forms rarer and less virulent are the Staphylococcus Citreus and Flavus. 1 and 2 are common and dangerous, the two latter rare and comparatively harmless. Staphylococcus in 70 per cent. Streptococcus, 16 per cent. Other organisms, 7 per cent., total 93; same proportion is found to exist in acute abscesses. When wound is bad and open, have also the bacteria of putrefaction growing in the exudate and forming by their action poisonous ptomaines.

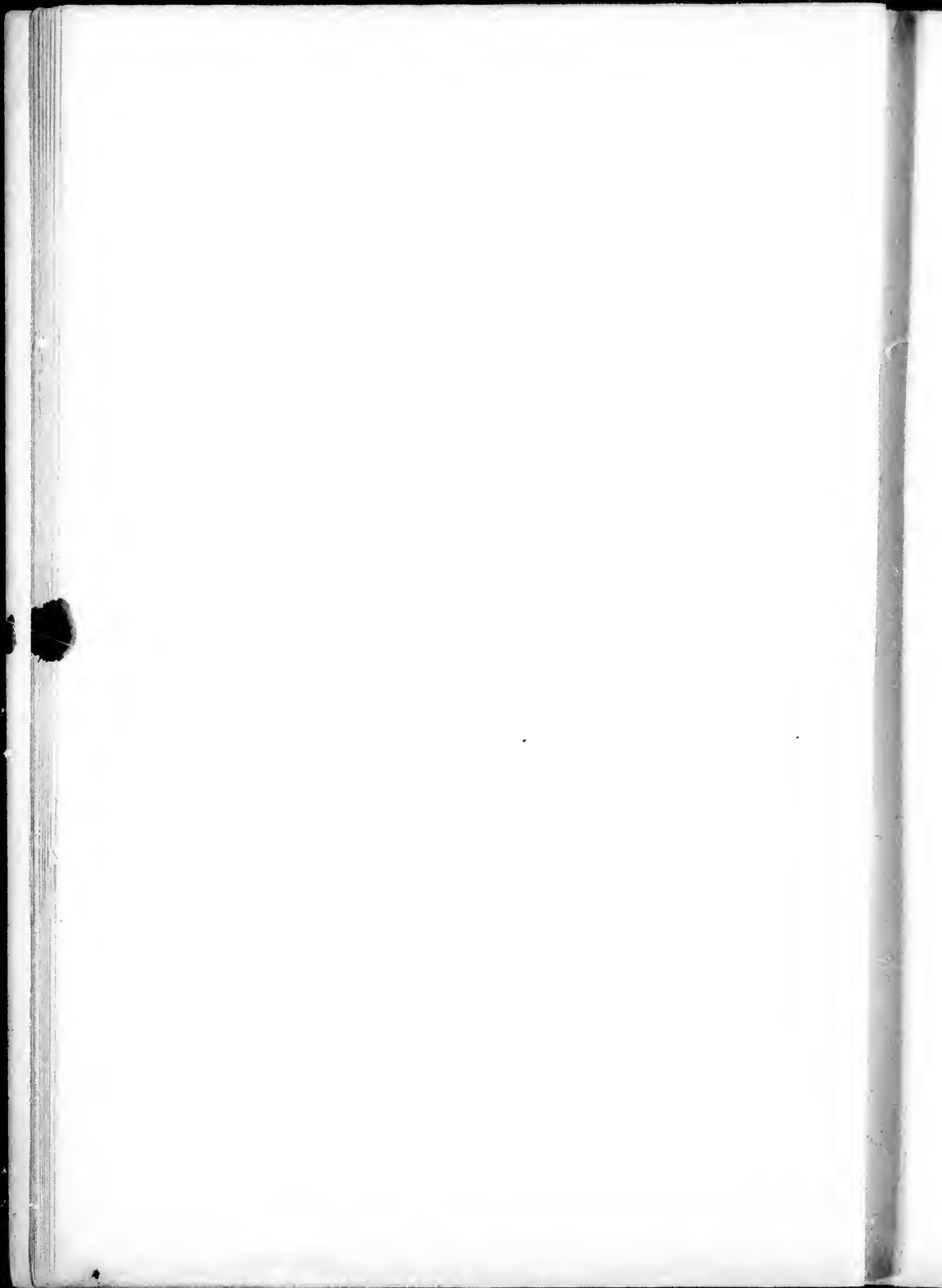
Inoculation:—Dust of the air—though dangerous bacteria do not usually enter wounds in this way, as the dryness of the dust is often sufficient to lower the vitality of the bacteria. More important is the skin of the patient and the hands of the operator, instruments, and appliances.

Pyogenic organisms are the normal inhabitants of the skin of the body, preferring especially certain regions which are moister than ordinary, the axilla, perinaeum, between the toes and hairy parts.

Staphylococcus Albus are common on the surface of the body and on the fingers, frequently deeply imbedded in the skin, called by Welsh, the discoverer, Staphylococcus Epidermitis Albus, thought to be an attenuated form of "Rosenbach" Albus mentioned above. In the mouth and mucous canals the microbes are found in large numbers, hence the necessity of the destruction of these organisms when dealing with wounds. Bacteria vary greatly in their relation to heat, at adult stage readily destroyed at a comparatively low temp.;

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if in the Spore stage they are very resistant—dry heat above the boiling point of water may not prove fatal, even when continued for a considerable period. The bacteria chiefly concerned in surgery belong to the non-spore-bearing class. With the exclusion of Tuberculosis, Anthrax, and the bacc. of Tetanus, all others are easily destroyed. 5 per cent. Carbolic will destroy in a few minutes all pyogenic bacteria, also 1-2000 Hydrarg. Perchlor.; weaker solutions will prevent their spread. The tissues themselves have a great power for resisting the entrance of pyogenic organisms. In the treatment of wounds there is a regular technique established by Surgeons to obtain primary union.

WASHING UP:—SURGEON.—Before proceeding to dress or inflict a wound, the Surgeon must disinfect himself, cover his clothes, and hands must be thoroughly cleansed, nail brush, sterilized water, German Soap, or Etherial Soap of Johnson. Permanganate of K, till skin mahogany color, next decolourise with Sulphurous and Oxalic acid, the Oxalic acid killing some microbes not touched by the Permang. K. Oxalic is however irritating. After Oxalic soak the hands is Bichlor. Hg. 1-1000 or 1-500, especially after p.m. or handling doubtful wound.

WOUND :—1. Soap. 2. Two per cent. Solution of Caustic K. 3. Permanganate. 4. Oxalic; if on hairy parts ether and turpentine after Permanganate. Injection of Sublimate into Vagina or Rectum dangerous; for these parts a saturated solution of Salicylic Acid, or weak Permang. K., and weak Sulphurous Ac.

BRUSHES:—Keep clean brushes, always keep in a 1-2000 sublimate, and sterilize after using.

INSTRUMENTS:—Boil in water 1 per cent. Soda prevents rusting, and increases the sterilizing power of hard water. Instruments are placed in a 1-2 per cent. to 1 per cent. solution of the following :—

One tablespoonful of Soda Carb. or washing soda, to the quart of water.

Soda solution destroys the ivory or wooden handles, and

aluminum instruments are dissolved by it. Where a local operation, a flame of spirit lamp is good for sterilizing the points of instruments required.

**SPONGES:**—The preparation of sponges; first get rid of the sand by beating with a stick, wash several times in water, place in one eighth per cent. of Hcl. acid, then put in water and soak for a week, place in muslin bag, put bag in soda solution which has been boiled, but, after the boiling has ceased, leave in 30 mins.—bag rinsed in plain boiling water to get rid of the soda—place in 1-2000 Sublimate, or 1-40 Carbolic, and sponges are ready at any time for use. Sponges are, however, uncertain, so here we use sterilized gauze 10 to 12 in. square rolled up as sponges.

**SUTURES AND LIGATURES:**—1. Absorbable. 2. Non-absorbable. 1. Absorbable. *a.* Cat-gut. *b.* Kangaroo tendon. 2. Non-absorbable. *a.* Silk. *b.* Silkworm gut. *c.* Cotton thread. *d.* Horsehair. *e.* Silver-wire.

Non-absorbable Sutures and Ligatures are made aseptic in the usual way. In aseptic wounds they become encysted and innocuous; they irritate in some cases, however, and become contaminated. The ideal ligature is *cat-gut*, if it can be made aseptic, as it disappears as soon as its work is done.

To prepare Catgut ligatures:—1. Roll on spool. 2. Place in pure Ether for 24 hours. 3. Oil of Juniper for 24 hours. 4. Corrosive 10 pts. Absolute Alch. 800 pts. Sterilized Aq. 200 pts.; this should be changed twice, then a third time after 48 hours Cat-gut may be put in for good, and use.

The absolute Alcohol gut is very hard; 20 per cent. Glycerine added to Alch. makes a good pliable gut.

To prepare gut that will not absorb too rapidly:—Place it in a sol'n. of following. Chromic ac. 1 pt., Carbolic ac. 200, Water 400, after being taken from the Ether and Juniper emersions.

**DRESSINGS:**—Dressings must possess the two following qualities:—1. Must be absorbent. 2. Must be aseptic.

Cheese cloth is absorbent, also wood, wool cotton, moss tow and jute, but gauze or cheese cloth preferred. To make

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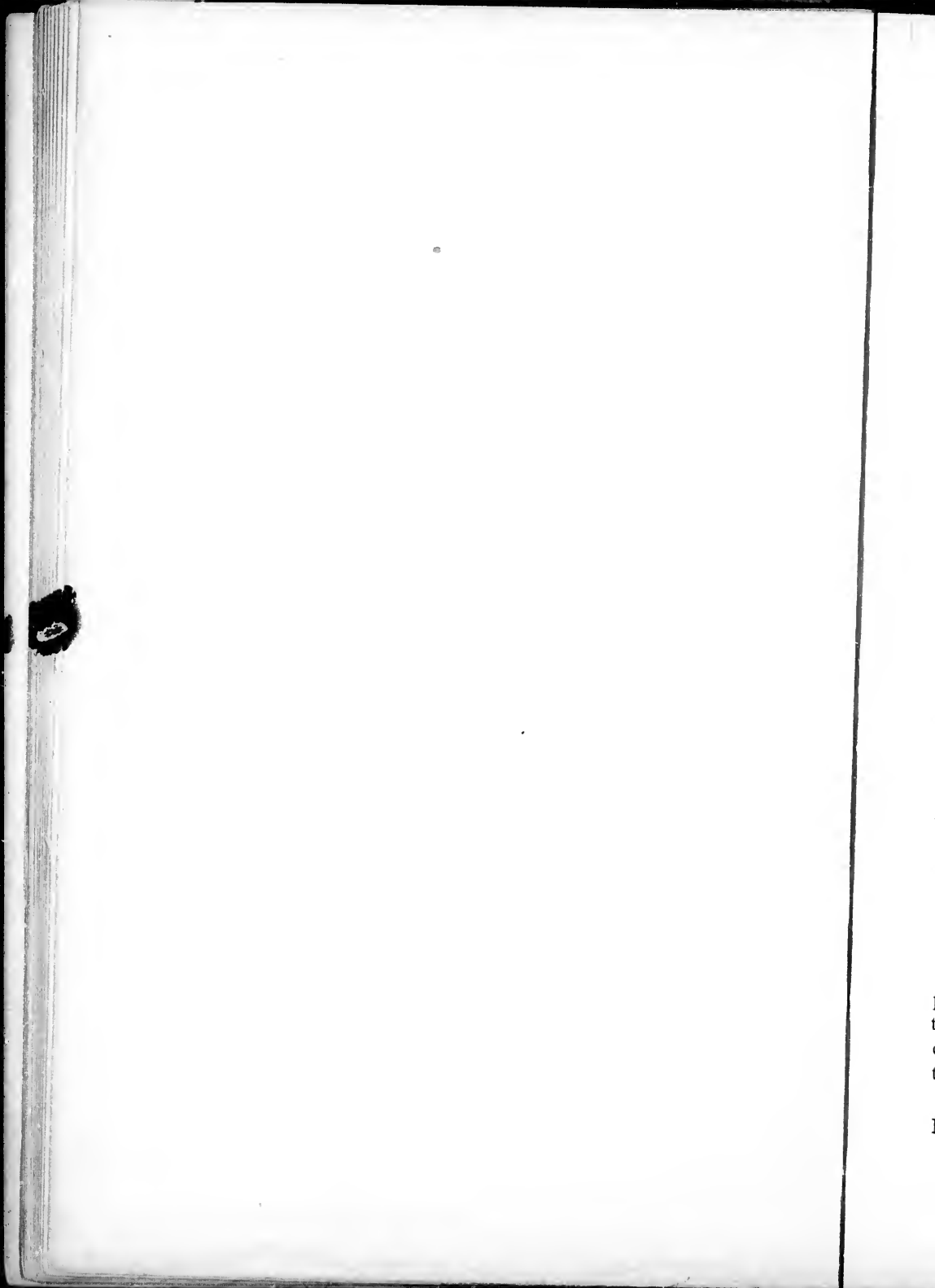
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aseptic a potato steamer is good, or if dipped in sublimate and dried in a closed chamber the dressings will be aseptic.

**DRAINAGE:**—Should boil glass or rubber in 1 per cent. Soda solution, keep in a 5 per cent. solution Carbolic; Sublimate solution will destroy rubber.

The first dressing after operation should be as technical as the 1st. If uncertain of dressings, soak the first layer in Sublimate solutions.

**Treatment of Wounds:**—1. Incised. After stopping hem'g. and foreign bodies are removed, suture—care being taken not to over-extend with antiseptic fluid or to sponge roughly. Suture, horse hair, silk worm gut, continuous or interrupted.

Drainage will depend upon the nature and extent of wound: Small wounds catgut or silk worm gut. 4 to 12 strands give a good drainage, may remove thread by thread.

Dusting powder: After suturing may or may not dust. Iodoform is good but it may not be pure, and should be sterilized as well as other appliances. Iodol, Aristol and Boracic acid are good dusting powders.

2. **LACERATED & CONTUSED WOUNDS:**—In cleansing use the nail brush thoroughly, if interior covered up make full incisions, take off with scissors necrosed tissue, apply strong antiseptics, try and heal by first intention, stitches not generally used if they are free drainage must be secured, pack with Iodoform gauze.

3. **PUNCTURED WOUNDS:**—Opening skin, incising freely, wash and drain.

4. **POISONED WOUNDS:**—By this we mean a wound inflicted, which at the same time gives admittance to poison.

Poison is of two kinds. 1. Infective. 2. Non-infective.

**Non-Infective:**—The venom of various insects, poison serpents and snakes, chemical products of putrefaction. **Infective:**—The poison or rabies, glanders, malignant pustules, and certain other unhealthy or infective processes which gain entrance through wounds.

**SNAKE AND SERPENT BITES:**—This continent Rattle and Moccasin snake, three or four species of viper less common

and less dangerous. Poisonous snakes are provided with a pair of glands resembling the Parotid in position. These glands are oval, flat and tapering, and have a duct leading to the base of the fangs in front. Fangs are long, curved backwards, sickle-shaped, sharp, and can be concealed when the animal is at rest; the venom is ejected by pressure of the temporal muscles. Stock of venom may become exhausted, when the bite is practically harmless.

Symptoms:—These vary with the quantity of venom ejected and the rapidity of the absorption. First sensation is that of a blow with a whip, then pain becomes rapidly more severe: usually the fangs produce an Ecchymotic spot. Swelling is rapid and extensive in the subcutaneous tissues. In favourable cases where the venom has been exhausted the symptoms remain local. If serious the swelling extends upwards producing discolouration of the part; vesications appear, and the part assumes a gangrenous appearance.

Constitutional symptoms:—Extreme prostration, respiratory and cardiac depression, cold perspiration, feeble fluttering pulse and laboured breathing, nausea and vomiting, and above all great mental distress; mind may remain clear until fatal issue. Death may take place in half an hour from direct action on the nervous system, or it may be prolonged for 2 or 3 days. . . . here have extensive suppuration, local sloughing and gangrene.

After death the blood is very liquid, general congestion, multiple ecchymoses in Brain, Cord, Kidneys and Internal organs.

*Treatment:*—Local. If limb be the seat of bite a ligature should at once be placed above the wound, elastic ligature preferred, a series of ligatures recommended by some, then the part should be excised and singed with a hot iron. If finger affected, excise at once. If bite on the body where we cannot apply a ligature, should cauterize or excise, or apply pure carbolic. Cupping encourages bleeding; keep ligature on as long as possible, then loosen gradually, so that poison may be slowly admitted to the general system. After excision apply Permang. of K., or Chloride of Lime, the former oxidizing, and the latter neutralizing the poison.

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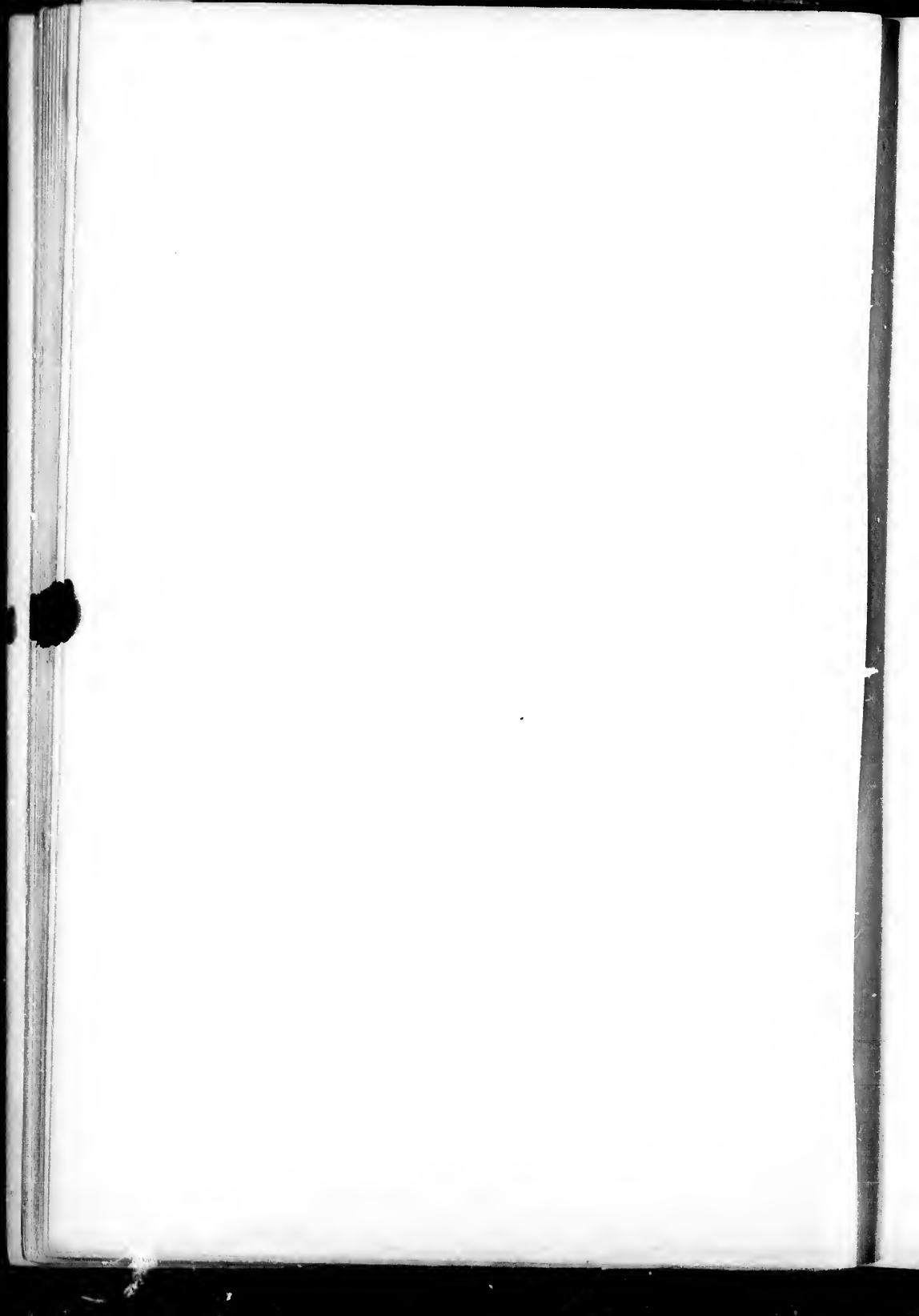
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Constitutional treatment:—Inject strong Ammonia hypodermically, or inject 1 per cent. aqueous solution of Permang. K. about and in the wound.

Alcohol should be given freely to the point of intoxication. Aromatic spirits of ammonia, a teaspoonful to each dose of brandy is useful. Ether and Digitalis may also be injected. Hypodermic injections of Strych. found useful in Bronn and Tiger Snake bites in Australia. Strychnine is supposed to directly oppose the action of the virus. Large doses may be injected until symptoms of poison are overcome by those of the drug min. 10-25 Liq. Strychnia (2-10 min. the normal dose). Keep up the warmth of the body with hot blankets. If breathing fails resort to artificial respiration, and try to maintain life until poison eliminated.

HYDROPHOBIA OR RABIES:—An acute infectious disease occurring in many animals and man. In a large per cent. of cases the dog is the victim and propogator of the disease, Wolves, Foxes, and Skunks are affected next in frequency, the Cat and the Jackal less commonly; also other animals may be affected. Bite of a rabid wolf or cat often worse than that of a dog. Wolf and cat attacks the uncovered parts, whereas the dog attacks as a general rule the legs, and the virus if any is removed by the clothing. Breach of the surface is necessary for inoculation; there being no effect on unbroken skin or on mucous memb. The secretions of the mouth are the chief infecting fluids, although the blood is considered as carrying the poison in some cases. Multiple bites are more dangerous than a single. Free bleeding may secure escape.

INCUBATION:—This varies very much. In the large proportion of cases it may take about 6 weeks. In children a much shorter time, however, sometimes 6 days. The variability varies according to the amount of virus injected and the individual susceptibility. Now thought that 4 months clears all cases, if no symptoms appear. During incubation no SYMPTOMS, the wound heals.

SYMPTOMS:—Local. First notices local irritation, tingling, lancinating pains, severe and about the site of the wound,

may have a discharge or the appearance of vacuoles at the seat of the lesion.

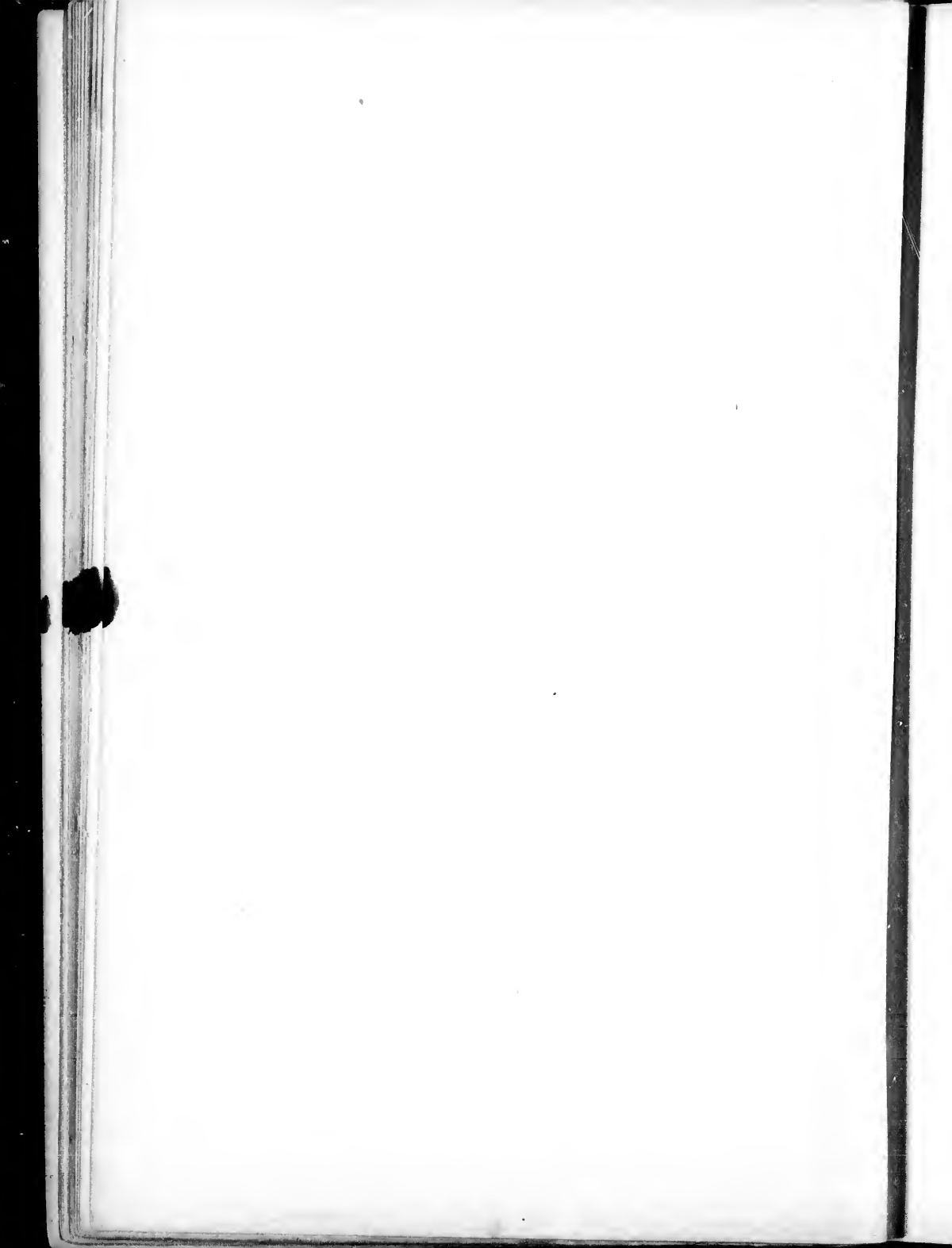
Constitutional:—Insidious, perhaps unnoticed, then restlessness, blueness, and mental depression, with irritability, patient becomes pale, ashy, complains of sleeplessness, and dreams—mouth dry—complains of difficulty in swallowing, feeling of fullness and constriction about the mouth, nausea, respiration hurried, sighing. About the end of the 2nd day of the symptoms the peculiar and characteristic feature of the disease is manifested, IMPOSSIBILITY OF SWALLOWING, the muscles of deglutition are in spasmodic contraction; dread of swallowing. Spasm of respiration muscles becomes more pronounced, the diaphragm is thrown into spasm producing expiratory sound resembling barking; respiration may be discontinued. Spasm caused by light, sight of water, or even by touching; the whole body is thrown into spasm, opisthotonos. Temp. may rise a little, but seldom found above normal. Between spasms great mental agitation, eyes wild, the mind crowded with delusions, may become violent, but, however wild, there are always moments of perfect control. Patient suspicious of everybody, objects to onlookers, saliva bothers patient. Acute stage lasts 48 hours, but death follows usually in about 4 days. Death due to exhaustion, spasm of the rima glottidis, coma.

TREATMENT OF RABIES:—If patient seen immediately after bite, and the bite is on the leg or arm, apply ligature, suction, cupping glass; parts at once excised, cauterized by Carbolic; Nitric Ac. or KOH may be used. In doubtful cases excise the skin, never treat by the mouth. Inject hypo. of Morphia, Chloral per rectum, Atrophine hypoderm. Relieve thirst by enemata of water. Palliative treatment is that of Pasteur. In excision of the part pass the probe well down to the bottom of the wound, and excise well around and below. 50 per cent. of bitten people survive the symptoms. Where clothes intervene four-fifths escape. In Pasteur's treatment, (where the mortality was 14-15 per cent.), it was reduced to .96 per cent.

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## ERYSIPELAS.

An acute, diffuse, infective inflammation, caused by micrococcus, affecting chiefly the skin, or subcutaneous tissues, or both, mucous, sub-mucous, and even serous membranes.

Causes:—

PREDISPOSING AND EXCITING:—1 Chronic Alcoholism. 2. Bright's Disease. 3. Diabetes. 4. Gout. 5. Malignant disease. 6 Over-crowding and neglect of Hygiene. 7. Gangrenous inflammation. 8. Anything that lowers the vitality of the tissues or prevents the excretion of waste.

One attack predisposes to another, and the tendency may be hereditary.

ACTUAL CAUSE:—Streptococcus Erysipelatous. A coccus found chiefly in the capillary lymphatics of the skin, also found in the blood capillaries of the neighbourhood. Cocci are more apparent always at the borders of the patch, cannot be readily demonstrated from the older portions of the patch. They are found in the hair follicles, hence the loss of hair. Never occurs idiopathically, must be some opening of entrance; when no abrasion, then it is thought that the infection is internal. Infections conveyed by instruments, etc., and probably also by the air. Water and Vaccine virus also a media of propagation; also sponges, hands, and irritants, etc. Physician attending case of Erysipelas should never attend confinement case. There is some peculiar relation between Erysipelas and Puerperal fever. The new born infant frequently contracts Erysipelas from puerperal mother. Old wounds, ulcers of lupoid and malignant character are awakened sometimes by erysipelas from a chronic to an acute form. This fact made use of by Surgeons in the treatment of malignant growths Carcinoma and Sarcoma with apparent success.

P. M. Appearances:—Similar to that of other forms of septic poisoning, the blood fluid staining the heart and vessels. The kidneys and liver show signs of inflammation, also all serous membranes, resulting sometimes in purulent effusion. The redness of the skin disappears after death. Spleen is soft and diffuent.

VARIETIES:—1. Cutaneous. 2. Cellulo-Cutaneous or Phlegmonous. 3. Cellulitic. *a.* Erratic—rapidly wandering. *b.* Metastatic—in several places at once. *c.* Puerperal, beginning in the genital organs of lying-in women. *d.* Mucous—throat and Gen.-Urin'y tract. *e.* Neonatorum in infants newly born.

CUTANEOUS ERYSIPELAS:—1. Erysipelas Migrans, or Ambulans, when wandering from one part of the body to another (also termed Erratic).

Simple cutaneous form attacks chiefly the head and face (facial), originating from a scratch, sore in the nose or mouth, has a stage of incubation varying from 8 to 12 hours, sometimes 2 days, sometimes uncertain.

Symptoms:—Invariably ushered in by a chill, except in the old; rapid rise of Temp. 103-4-5 deg., generally falls towards morning and rises towards evening. With chill the P. and R. are stimulated; vomiting and convulsions in children, frequently epistaxis, tongue coated, pain in the back, headache, constipation, and general depression, pains in the joints and limbs. Temp. in favourable cases will fall to 100 or 101, and will remain there, and in three or four days will disappear, returning at times with the appearance of new patches. Temp. falling to subnormal is dangerous.

In severe forms have marked general symptoms, Jaundice, Albuminuria and Diarrhoea, frequent pulse, fever, and general Typhoid symptoms. Delirium frequent, Meningitis, Pericarditis or Pneumonia may occur as complications.

LOCAL SYMPTOMS:—If wound present, found dry and glazed, unhealthy looking, swollen and reddened appearance, granulations fallen, get early a layer of ashen looking lymph, or diphtheritic-looking membrane on the wound. Within 24 hours after the rigor, blush appears at the point of inoculation, spreading edge, zig-zag outline, hot feeling, border well defined; later the skin is of a dusky or yellowish red hue, which does not disappear on pressure; later there is oedema and slight evidence of pitting on pressure, face burns and smarts, and marginal out-

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line elevated. In lax parts, as the eyelids, penis or scrotum, the swelling is great; eyes may close in a few hours. In the palm of the hand there is little sign of swelling.

1st, there is a burning sensation, skin shiny, and soon vesicles appear, which may be very minute, even microscopic. Blebs appear of considerable size, having at first a clear fluid, which later becomes turbid from the presence of pus, dry up and form scabs. The neighbouring lymphatics are tender, swollen and inflamed, red lines marking their course. When the spreading ceases, the redness gradually disappears, skin wrinkled, and desquamation takes place. The hair falls out if not shaven early. An important feature is the depression of the vital system; subnormal temp. and condition apparently out of all proportions to the severity of the symptoms.

In the nose, larynx, pharynx, female genitals and rectum, symptoms are the same, only liable to have minute ulcers instead of vesicles and bullae.

Functions of the part are disturbed, dryness of the mouth, loss of voice, etc.

DURATION:—Milder cases 8-10 days: Severe up to 3 weeks. In some patients tendency to inoculate themselves: In convalescence have relapses, and new eruptions, prone to re-attacks during life.

In diagnosing Cutaneous Erysipelas, it may be confounded with erythema, scarlet fever, dermatitis, eczema, and extensive herpes; constitutional signs, however, should soon clear up the diagnosis.

When we have characteristic chill, enlargement and tenderness of the lymphatic glands, the peculiar zig-zag well-defined raised margin of the patch, finally the vesicles and bullae, may diagnose.

In scarlet fever the rash soon becomes general. In poisoning from plants have eczema, and larger vesicles, and no bullae. Herpes zoster follows the course of the intercostal nerves, and we soon have other characteristics developed.

Erysipelas of the mucous membranes is harder to diagnose. In the fauces it resembles pharyngitis, swelling of the

muc. mem., and thickening, swallowing painful, patient aphonic, glands large and tender; generally find erysipelas on the skin near the affected muc. memb.

Prognosis:—In young and up to middle age recovery is the rule. In infants and the old the disease is very grave; prognosis depends largely upon the location and extent of the disease and the constitutional condition of the patient.

In erysipelas of the scalp or abdomen, may have implication of the scalp or peritoneum. In erysipelas of the face with involvement of the parotid, the prog. is serious; may have serious septic inoculation, pyaemia; may go from the face to the larynx. In the new-born Infant it is serious. It occurs during the first 15 days, usually at the navel, spreads and is invariably fatal, child dying of exhaustion in 3 to 5 days; Phlebitis sometimes occurs; this is grave in old people.

TREATMENT OF CUTANEOUS VARIETY:—Preventative: When erysipelas is epidemic, take care to ventilate the wards, destroy soiled clothing, and take care of the hands, instruments, and sponges; should use disinfectants about the room; lead nitrate is good; destroy all cloths. Bromine and Iodine, Chlorine preparations, etc., good antiseptics, and the persons affected should be isolated.

Constitutional Treatment:—After diagnosis give 1. purgative of Calomel, 8 grs., followed for a few mornings by a saline draught; 2. get rest for the patient; administer Fe—doses depending upon the symptoms, and tolerance of the patient, min. XX-XXX-XL of Tinc. Ferri Perchlor well diluted every six hours, with m. X-XV Chloric Ether to make agreeable.

3. Where Temp. high Quinine grs. X night and morning. 4. Soda Salicylate, grs. X. in the young and robust, repeated frequently—should be carefully watched. 5. Antipyrine and Aconite useful where Quinine fails. 6. Bromides, Chloral, Sulphonal as hypnotics. 7. Pilocarpine will abort the disease sometimes. One-sixth of a grain repeated in 2 hours, and again in 6 hours. 8. Stimulants given freely, champagne, strong beef juice, brandy, egg, etc., ether hypoderm.

Local Treatment:—Make wound antiseptic with Boracic, Permang. K., Salicyl Ac. Sublimate 1-10000 : 1-12000, and

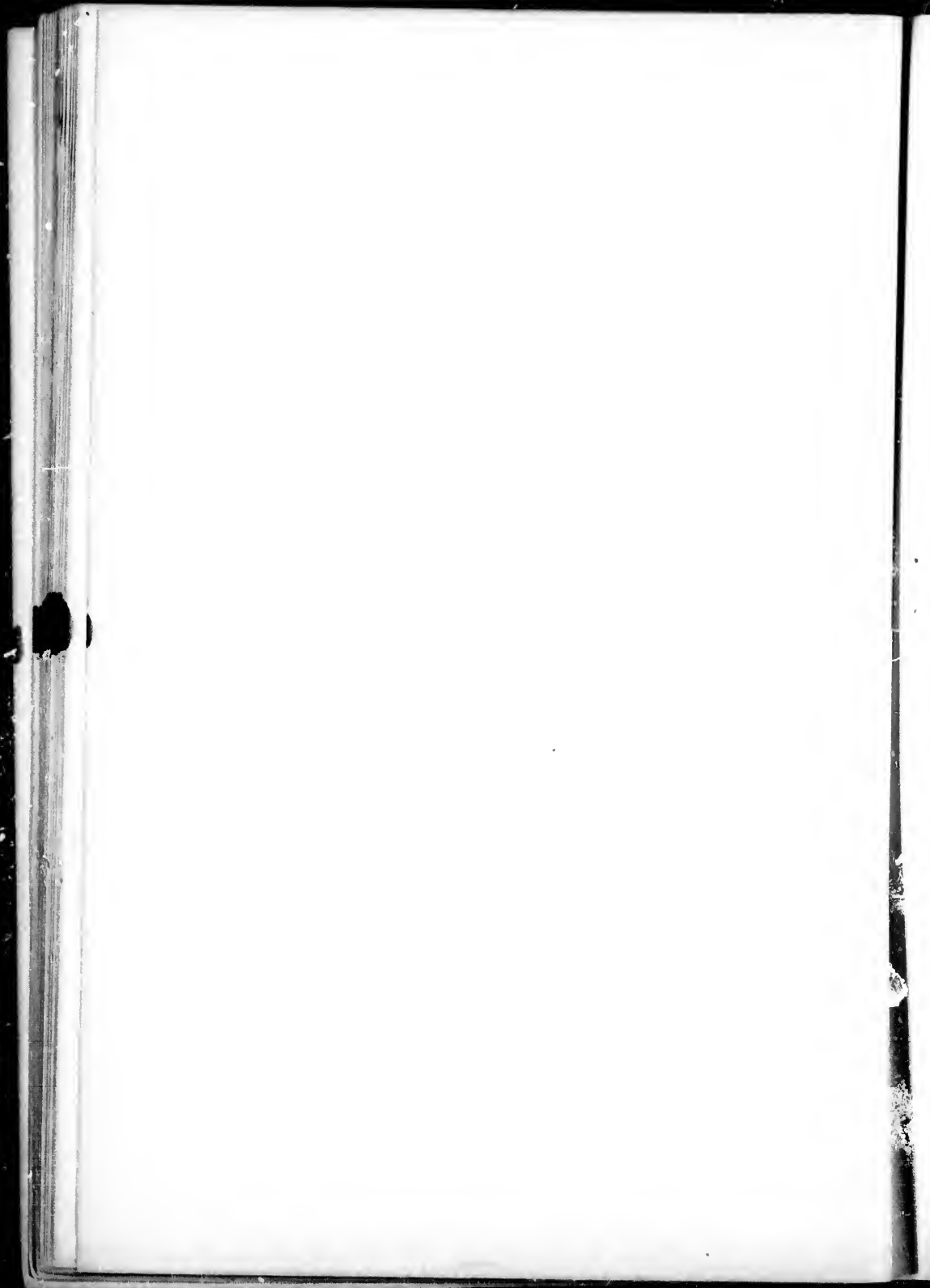
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Carbolic 1-100 cautiously. 2. If disease spreading and cannot be checked, inject pure Carbolic a couple of drops at several places, just at the margin of the patch; or paint a strong solution of Silver Nit. 1 dr. to the oz. an inch from the border, and a second ring a half an inch from this.

Silver Nit. sets up an inflammation as deep as the lymphatics; leucocytes are thrown out and attack the cocci, and in this way arrest of the spreading of the disease is affected.

3. Collodion is useful if painted in a ring, the ring contracts, occludes the lymphatics and limits the spread of the disease.

4. Ichthyol and Lanoline applied on lint and rubbed into the part and changed three times daily. Ichthyol, Collodion and Iodoform each 10 per cent., or Ichthyol varnish: Ichthyol and Starch aa 40. Water 20. Before applying wash with water, Sublimate 1-1000 a.m. and p.m.

5. Guaiacol painted on the surface is useful, one-half to two drachms.

6. Zinc Oxide and Starch with grs. XX to the Oz. of Aristol, as a dusting powder to be rubbed in.

7. If a limb affected, elevate.

8. Slight pressure gives comfort.

9. When tension is extreme may puncture the patch with a narrow tenotomy knife.

10. In Children Kreolin wash is useful.

11. In fauces Silver Nit., one drachm to the Oz., is the best application, followed by one application of boracic acid and glycerine, hot applications to the neck.

12. Scalp, or meningitis, apply cold applications.

13. Larynx steam inhalers, scarification, and iodine spray.

CELLULO CUTANEOUS ERYSIPELAS:—Related closely to cutaneous form, which latter may run into Cellulo Cut., here the subcutaneous tissue is always affected; generally follows a wound; may arise in scratch or acne spots; follows operations on bones, and after stone operations of the old lateral form where much tearing is done.

Symptoms:—Both Local and General are more marked than in the Cutaneous form.

Local:—Oedema and swelling more apparent, redness duller, and not so sharply-defined, zig-zag margin not apparent, surface is purple and later marbled, owing to the pressure affecting the circulation of the skin. Bullae are large and usually contain bloody fluid. Pain soon becomes throbbing. Infiltration is deeper, and on section get a wash-leather appearance. Sup'l. lymphatics are soon obscured by the swelling; when incised the tissues are found infiltrated with fluid and gelatinous, or "wet washed-leather appearance," Fascia not usually affected.

Constitutional Symptoms:—Resemble those of the cutaneous form, only more severe, rigors and delirium pronounced, formation of pus with breaking down of the tissues, and general typhoid symptoms.

Usually Asthenic form, death from Pneumonia, Septicaemia, Meningitis; those suffering from Bright's disease rarely recover.

Diagnosis from Ordinary Inflammation:—The surface involved is very large, no tendency to point, rapid course, grave constitutional symptoms, phlebitis, here feel a distinct cord. Angioleucitis confined to the lymphatics and veins; glands enlarged.

Treatment:—Same course at the outset as in the cutaneous form. Calomel and Salines; patient put on a liquid diet; Fe: Stimulants, especially old people, and, where the circulation is feeble, Quinine or Quin and Fe.

CELLULO CUTANEOUS ERYSIPELAS:—Local Treatment:—Thoroughly cleanse the wound and apply hot antiseptic fomentations, Pb. and Op. half an oz. of each to the pint, with one oz. of Alcohol. Collodion or injections seldom abort the course of the disease.

Usually practice early and free incisions. Incise well into the intercellular tissue, but never into the deep fascia; this relieves the tension and allows of the escape of the exudate.

Hemorrhage is good if small; free bleeding should be arrested. Apply hot antiseptic fomentations, and next day, if there is improvement, dress the wound in the usual way.

If pus is present then provide free drainage. Incisions lozenge shaped, three-quarters to one and a half inches long.

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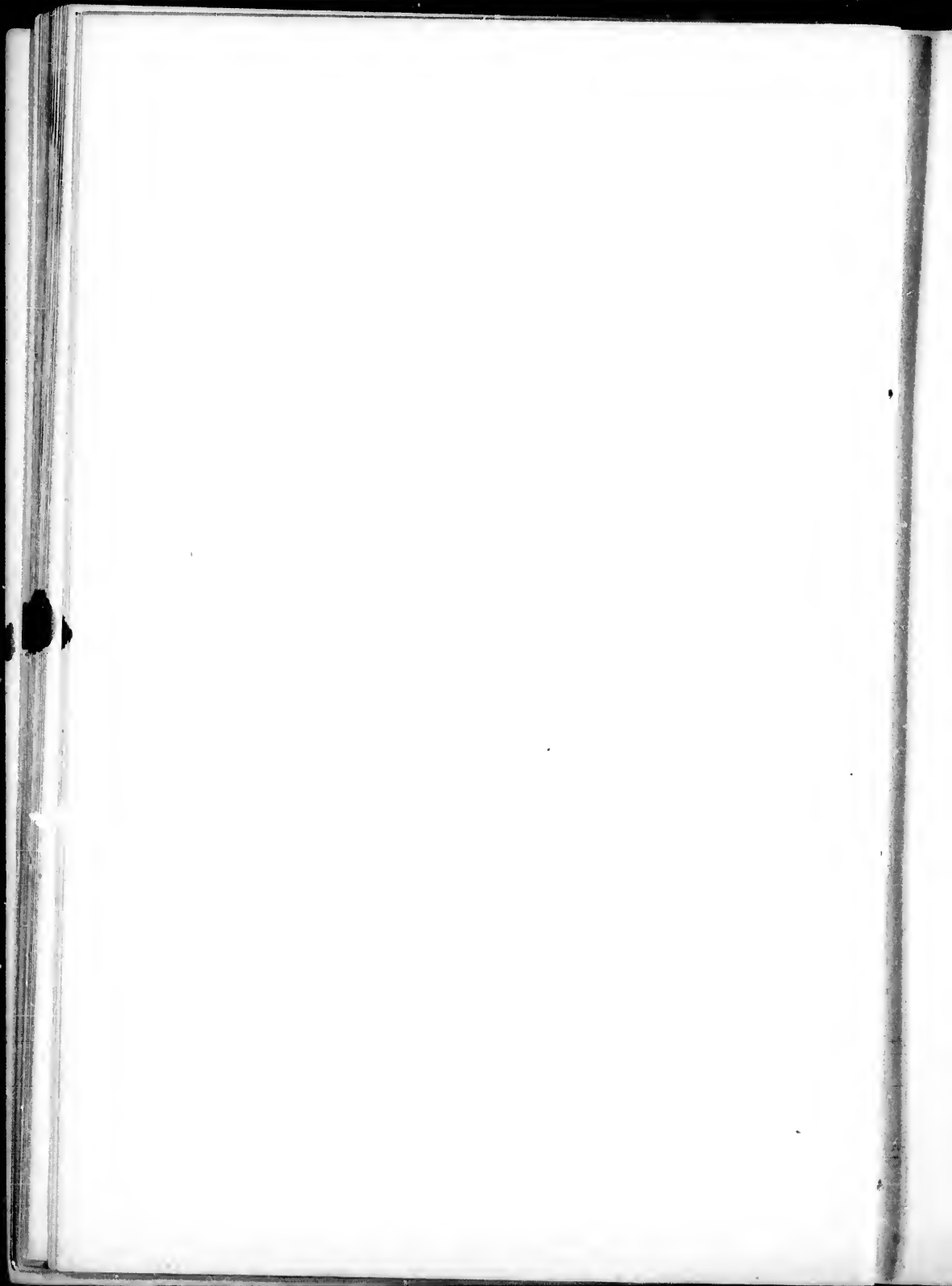
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If patient seen late and sloughing advanced, apply charcoal poultice with Phenol (Carbolic) 1-40.

Stimulants given more freely.

Diarrhoea—give Bismuth grs. X-XV-XX. Opium should be avoided.

Where the scalp is involved, crucial incisions give the most relief; if face and eyelids swollen, puncture with a tenotomy knife.

### CELLULITIS.

Follows :—Puncture in dissecting or P. M. room. 2. Bites of Serpents. 3. Extravasation of Urine. 4. In the pelvis of pregnant women. 5. Extraction of a tooth. 6. Ludwig's angina in the throat.

Constitutional Symptoms :—Serious from the first; death may occur in 2 to 3 days from septicaemia.

Redness of the skin is not pronounced, but there is great swelling and pain. Sometimes it appears in the cellular tissue at some distance from the seat of inoculation.

Red lines of lymphangitis, glands are involved; the part affected is hard. Skin loses its vitality from exudation, and sloughs.

Septic Pneumonia a complication.

Diagnosis:—History, Cause of Inflammation. Great rapidity of course. Asthenic type of symptoms. Prognosis grave.

*Treatment*:—The early treatment is the same as in other forms; ample stimulation. Free incisions extending the length of the affected lymphatics. For Ludwig's Angina early and free incision from chin to hycid.

### BURNS AND SCALDS.

A Burn is an injury caused by the direct contact of the flame, radiated heat, or heated surface.

Scald:—an injury produced by hot liquid, steam or moist heat.

Burns are apt to be deeper and more circumscribed. Scalds are more superficial, and occupy a larger area, as liquids flow over the surface and are absorbed by the clothes.

Clinically, burns and scalds are very much the same.

Classification:—1. Boyer & Morton's, much alike, three degrees. 2. Dupuytren's (French), 6 degrees.

I. Boyer & Morton's:

1. Hyperaemia, erythema, irritation and inflammation of the skin, without vesication or scar.

2. Inflammation of the skin, vesication, no scar, but pigmentation often results.

3. Destruction of the skin and subjacent tissues to various degrees, up to charring and gangrene of the parts; here great charring and deformity if deep.

II. Dupuytren's Classification:—1. Surface scorched, followed by superficial redness, hyperaemia, simple erythema; the redness fades imperceptibly into the surrounding skin. Scorched parts are painful, and tender to the touch. No vesication, often extensive, seldom dangerous.

2. Vesication. Epidermis is raised into vesicles or bullae, indicating that the heat has penetrated far enough to touch the papillary layer of the skin, resulting in lymph effusion.

No mark or scar results. Slight pigmentation; may have ulceration.

3. True skin is penetrated, but not through the entire thickness; some of the deeper portion of the skin is left on, sloughing.

Healing by granulation and white scar, NO DEFORMITY. Hair follicles sometimes injured. In the most painful form the nerve endings are involved, but not destroyed.

4. The whole skin is burnt and destroyed. The subcutaneous cellular tissue may or may not share in the destruction, usually does—DEFORMITY. A burn of the 3rd degree may by sloughing become one of the 4th.

5. Through the skin subcutaneous tissue and deep fascia, reaching the MUSCLES and involving them more or less. SCARRING AND DEFORMITY.

6. Charring of the whole limb by actual flame or molten metal may involve even the bones. Amputation may be necessary.

General affects of Burns:—Symptoms—1. Stage of Shock,

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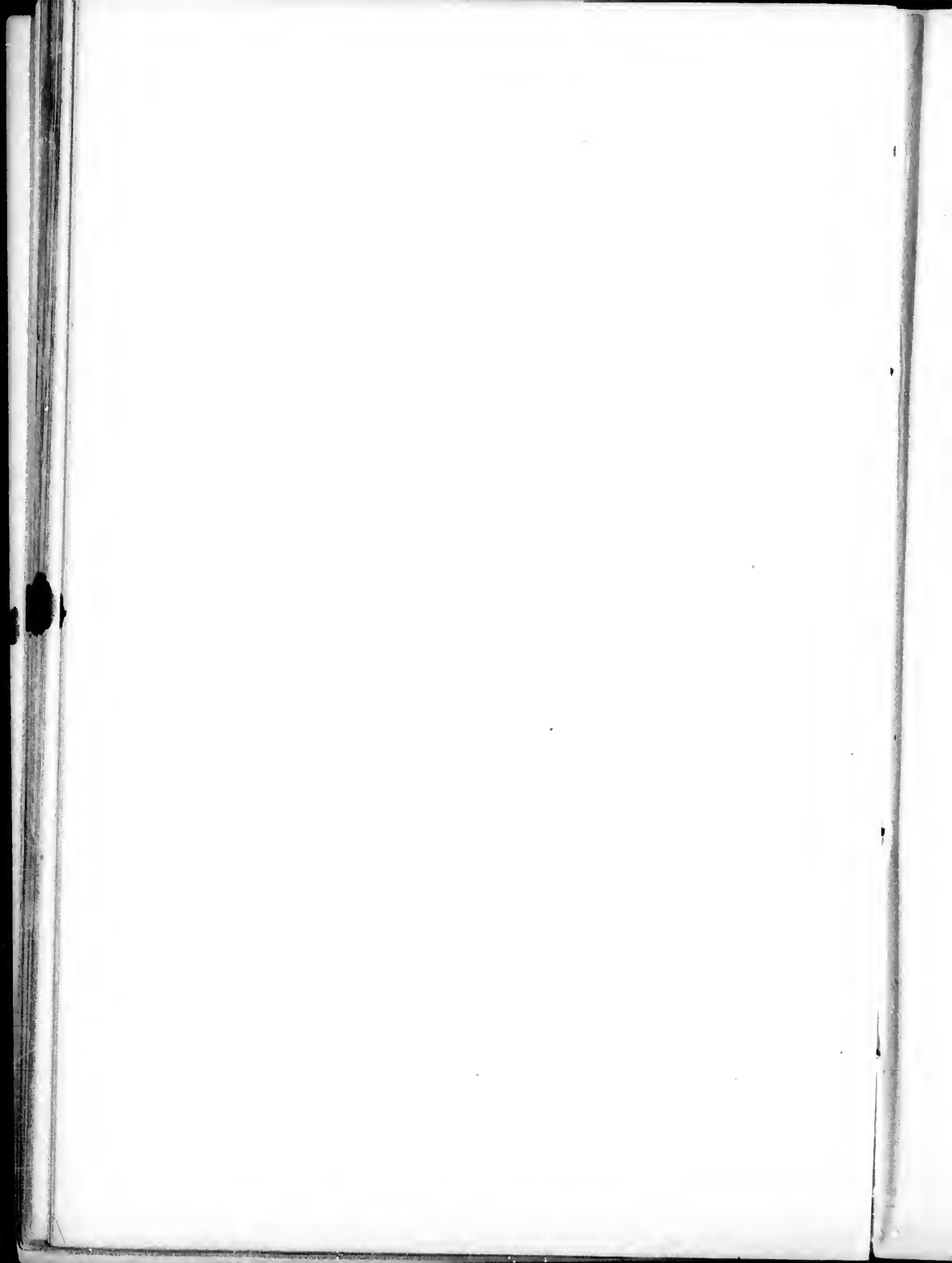
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collapse and congestion. 2. Reaction and Inflammation. 3. Suppuration and Exhaustion.

The 1st Stage is the cause of half the deaths from burns and scalds; the degree depends upon the situation degree of injury, extent of burn and age of patient.

Burns on the chest and abdomen are the most dangerous.

Points of importance:—The extent more important than the depth. Nerve endings involved.

If half the body burned or scalded, or one-third even, death occurs. Infants and females are especially apt to die.

Shock and collapse are indicated by cold and paleness. Temp. subnormal, shivering, clammy sweat, lips white, and trembling, pupils dilated, pulse rapid and thready, Resp. quick and shallow, and Tongue dry. Thirst unquenchable, Sphincters relaxed, convulsions, mental depression, delirium and stupor.

Pain:—usually very prominent, especially in the less serious burns; absence of pain is serious. The greater the shock, the less the pain. Death may follow in a few hours from Cardiac thrombosis. Great precordial pain, irregular heart, dyspnoea, shock and collapse. P. M. appearance not very distinct. Abdominal and Thoracic blood cavities congested, Kidneys, Brain and Duodenum congested, injected, and even duodenal ulcers.

2nd. Reaction and Inflammation, begin in 24 hours, when the Pulse improves; rise of Temp. to normal, improved Respiration, less restlessness, less apprehension around the burn; inflammation sets in, redness, swelling, heat and pain, slight fever begins, increasing according to the septic absorption; when large and deep burn may become offensive, and inflammation of the Viscera, Lungs, Brain, etc., perforating ulcers of the Duodenum may result.

3rd Stage (Suppuration and Exhaustion). This continues from 2 weeks to close of the case, symptoms of septic poisoning or of absorption, still danger of duodenal ulcers, and inflammation of the thoracic viscera—Hemorrhage, Erysipelas, Tetanus and Pyaemia. In children convulsions, and, perhaps, permanent paralysis.

Complications:—Erysipelas especially apt to attack burns and scalds. Haematuria is common. Albuminuria is not infrequent, due to acute Nephritis or amyloid degeneration of the Kidney.

Pneumonia and Pleurisy should be watched for in reaction, indicated by pain, cough, rusty expectoration, increased Respiration.

Meningitis occurs in the first stages—but seldom; Tetanus may occur at any time.

Seldom get Suppurative Arthritis when near joints. Purulent collections in the chest and abdomen.

Ulceration of the Duodenum has always been a puzzle; occurs 1-4, all fatal cases after the 1st stage, usually 10th day; may occur earlier. Ulcer usually near the 1st part of the duodenum, not far from the mouth of the bile duct; looks like typhoid ulcer, pain in the rt. hypochondrium, increased by pressure, brown fluid vomit, Diarrhoea with blood in the faeces; sometimes the symptoms are very obscure. Duodenal ulcers may be single, not invariably fatal.

Prognosis of Burns and Scalds: Depends on extent, degree, situation, etc. Aseptic and antiseptic precautions have diminished the death rate greatly. Burns of the 4th degree are most serious on account of the danger of deformity.

*Treatment:*—To prevent death from collapse and to alleviate pain, give stimulants by the mouth or rectum, combined with opium, Brandy 2-3-oz. If heart failure inject Liq. Strych. and Ether. Children bear opium well in these cases. In Extensive and Superficial burns immerse the body in a warm water bath with Soda Bicarb., removes pain and depression. When reaction sets in remove the stimulants gradually. Watch for complications (if reaction great, local blood-letting is beneficial, exceptional). Give wine and broth.

*Local Treatment:*—Charred or burnt clothing should be cut off. Exclude cold, protect raw surfaces from injury.

In burn of the 1st degree, where no breach of continuity; relieve the pain by immersing in saturated solution of Soda Bicarb.; then dust on flour dried in oven until brown; Zinc powder; Fuller's earth; and cover with cotton wool to exclude

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the air. Cold applications, weak Cocaine especially good, Castor oil.

Burns of the 2nd degree:—Puncture the blister if painful, never remove cuticle. It is better not to puncture if pain not too great, and can be left intact. Olive, Almond Oil or Vaseline applied on lint and bandaged on, soothes.

Make aseptic by 1-200 Carbolic, or Boracic Acid, and Thy-mol; Carron Oil is good; better is Olive Oil and Lime water, as likely to be purer, put on lint, etc. Cover all with oiled silk and bandage.

Burns of the 3rd and 4th Degree:—Cleanse by flushing with Carbolic 1-200 or Sublimate 1-6000, weaker for children; preferable to either is a saturated solution of Boracic acid, Salicylic Acid, Aristol and Eucalyptus, then Carron Oil until pain has abated; or an Antiseptic dressing, Gauze with Boracic Acid, Aristol, etc., this latter being much to be preferred over Iodoform in children especially. Change the dressings as seldom as possible, especially the first, which should be left on 4-5 days. In place of Carron Oil may use Chalk, Ung. Plumb. Co., Ung. Zinci, Ung. Resinae.

Extensive burns treat by total immersion, to prevent sepsis, add to the water Boracic Ac. Temp. of the water that which most comfortable to patient. When slough separates and granulation advanced dress with Boracic Acid, Aristol, and cover with oil silk; employ as little pressure as possible. Keep down exuberant granulations with Silver Nit.

Skin-graft:—Look out for contraction, apply splints early, carry dressings well down between the fingers, passive movements. Old cicatrices may be corrected by rubber bands and splints.

Burns and Scalds of the Mouth in children:—Larynx and Pharynx may be primarily involved, or secondary to burns of mouth; may have spasm of the Glottis and Oedema. Apply ice, leeches, and give large doses of Calomel. Opium may be indicated. Multiple puncture of the oedematous parts may be necessary, or even tracheotomy.

### INJURIES TO ARTERIES AND VEINS.

**ARTERIES:**—The Int. Coat of Artery is not of much surgical importance, except that it is so closely allied to the Media that, when the Media is injured, the Intima invariably participates.

Media is muscular, the fibres circular, does not collapse on transverse section. Veins collapse, except those of the Liver. The Muscular coat equalizes the pressure of the blood on the walls.

When this coat breaks down we have Aneurism. Aneurism is caused by over extension, heavy traction; Legation ruptures the Intima and Media.

**Adventitia:**—Vascular, has Nerve supply. Is of great surgical importance. Surgeons injure this coat as little as possible, as it impairs the other two coats; the vessel lies in cellular tissue; this should be disturbed as little as possible. Disturbance brings on cellulitis, involving the Adventitia secondarily.

How may Arteries be injured? They may be Contused, Punctured, Lacerated, Incised.

**CONTUSION:**—A bruise, suffering along with other tissues. May be slight and unattended by consequence; may cause clot with occlusion of vessel. If clot occurs suddenly may have gangrene. If clotting slow, collateral circulation will be established.

**LACERATED:**—1. Partial rupture. 2. Complete rupture.

Partial:—Where the Internal and Middle coats only have given way, not serious.

Complete:—Entirely torn across, may or may not be serious hemorrhage, the External and Middle coats curl up and the External and Cellular sheath twist and turn over the vessel so that hemorrhage is rare.

This may take place in reduction of old dislocations.

**PUNCTURED:**—Where Arteries punctured, hemorrhage is the rule except where so fine as to be closed by the elastic coats. May have fine punctures without hemorrhage, but there is danger of ulceration at the point of puncture, with

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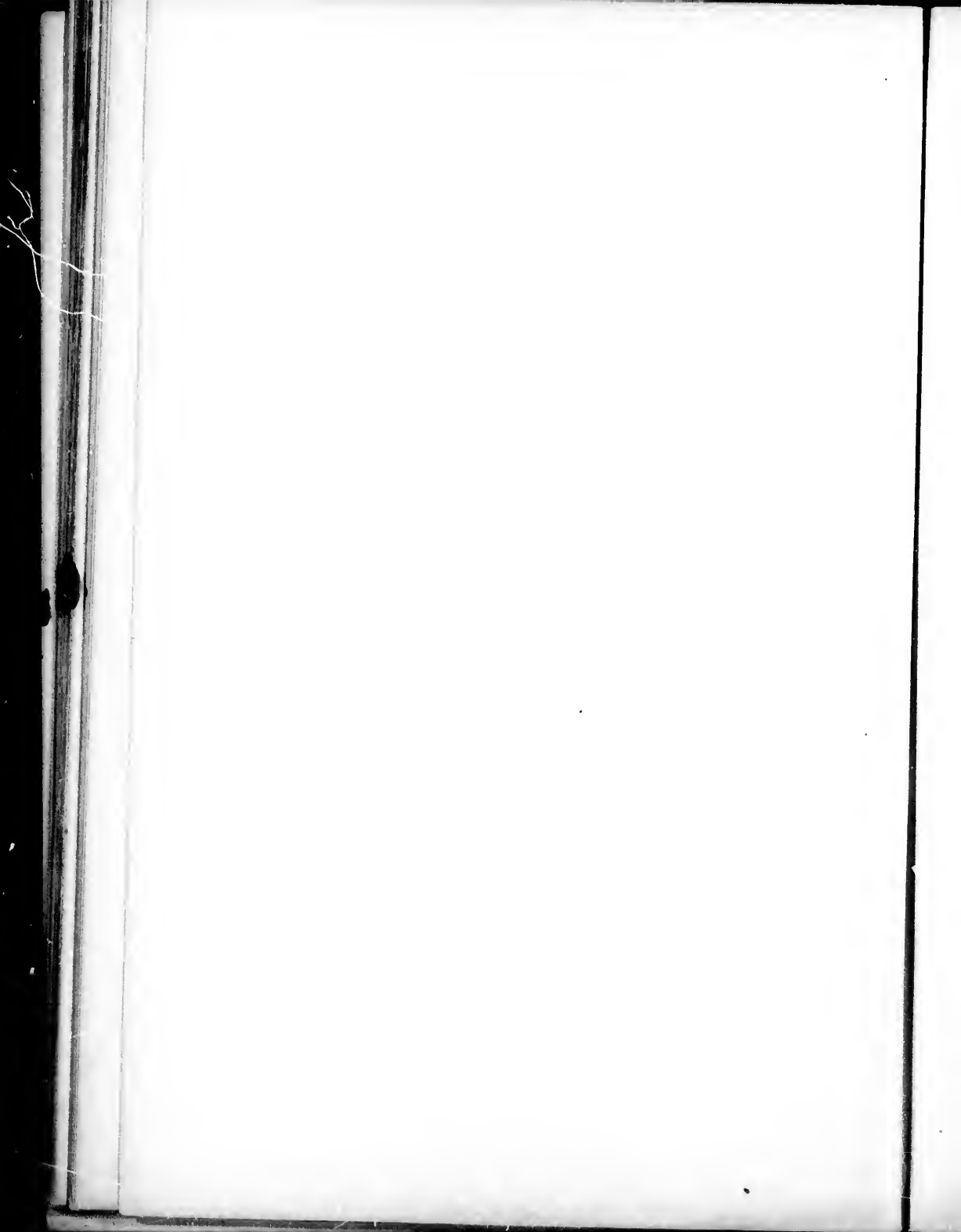
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secondary or late hemorrhage. Where wound parallel to the axis of vessel, less liable to bleed; oblique wounds, especially if against the current, may be very serious, and get considerable hemorrhage.

Clot is very small in punctures, extending outwards into the cellular tissue.

In excitement, etc., clot may be displaced, and secondary or late bleeding may occur.

INCISED INJURY TO ARTERY:—Most frequent: Excessive bleeding, but, if wound long, there is little bleeding comparatively. Oblique wound more likely to gape. Transverse incision gives great bleeding with large gaping wound. Non-penetrating Incised:—The outer and middle coats only are severed. Inner remaining, have for a short time a hernia like swelling, and protusion of the Intima; this soon ruptures and hemorrhage is extensive. Blunt instruments may rupture the Intima and Middle Coat.

VEINS:—Thin, collapsible, Middle coat comparatively weak, this accounts for Varicose veins. Injuries same as Arteries.

Dangers of hemorrhage less than in Arteries, can easily stop the bleeding by external pressure. Veins are more liable to become inflamed.

Treatment of wounded Veins:—Not necessary or advisable to ligature a whole vein; apply a lateral ligature if possible, especially in the case of a main Vein. The blood pressure is slight, and slight pressure will relieve hemorrhage.

The most serious complication is the ENTRANCE OF AIR.

Injection:—Experiment shows in animals that slow injection is not followed by any serious results if the amount is limited. Sudden injection, however, is very dangerous. If care taken not to hold veins open, air will not be sucked in.

In canalization of the Veins, collapse does not occur where following conditions (collapse of the veins). Where thickening of the Vein. Infiltration of the surrounding tissues. Adhesion to the fascia. "The dangerous area" is the term applied to the region of the great Veins at the root of the Neck.

Results of sudden entrance of air:—Instant paralysis and

sudden death. Rt. Ventricle and Pul. Artery full of frothy fluid. Left Ventricle is empty. Patient dies of syncope.

A small amount of air is dissolved in the blood and eliminated by the lungs.

**SYMPTOMS OF THE ENTRANCE OF AIR:**—Hissing, sucking, gurgling or laughing sound, followed by the exudation of frothy fluid.

**General Symptoms:**—Sudden pale look. Pulse fluttering, Heart's action is turbulent but strong, and a churning sound heard over the heart.

Patient is greatly depressed, moans or screams that he is dying, may yet recover, but usually proves fatal, eventually by the onset of Pneumonia or Bronchitis.

**Curative treatment:**—Ligature or compression of the vein, and use pressure on the chest in the young, cut off the circulation of the extremities, and try and procure more blood for the brain; lower the head over the end of the table. Flood the region of the wound with harmless solution, saline, boiled water, or borated water, then water is taken in instead of air. Ether hypodermically. Mustard over the precordial area. Brandy per rectum. Air may be sucked out by pipette. Bleed from the temporals. Administer Oxygen gas. Artificial breathing, and in the young always use pressure over the chest.

#### ARREST OF ARTERIAL HEMORRHAGE.

**FORMS OF HEMORRHAGE:**—1. Parenchymatous, if from the Spleen, etc. 2. Extravasation into the tissues. 3. Internal, into cavity.

Hemorrhage is:—*a.* Primary or reactionary. *b.* Secondary or recurrent.

A Primary Hemorrhage occurs at the time of the wound.

Hemorrhage arrested by:—1. Natural means. *a.* Temporary. *b.* Permanent. 2. Surgically.

*1a.*—When complete cut of the artery, the muscular fibres of the inner coat, i. e., the Media (not the Intima) contract, lessening the calibre, and retraction within the sheath also occurs. Contraction is most important, and in small vessels this may be sufficient. In the larger vessels

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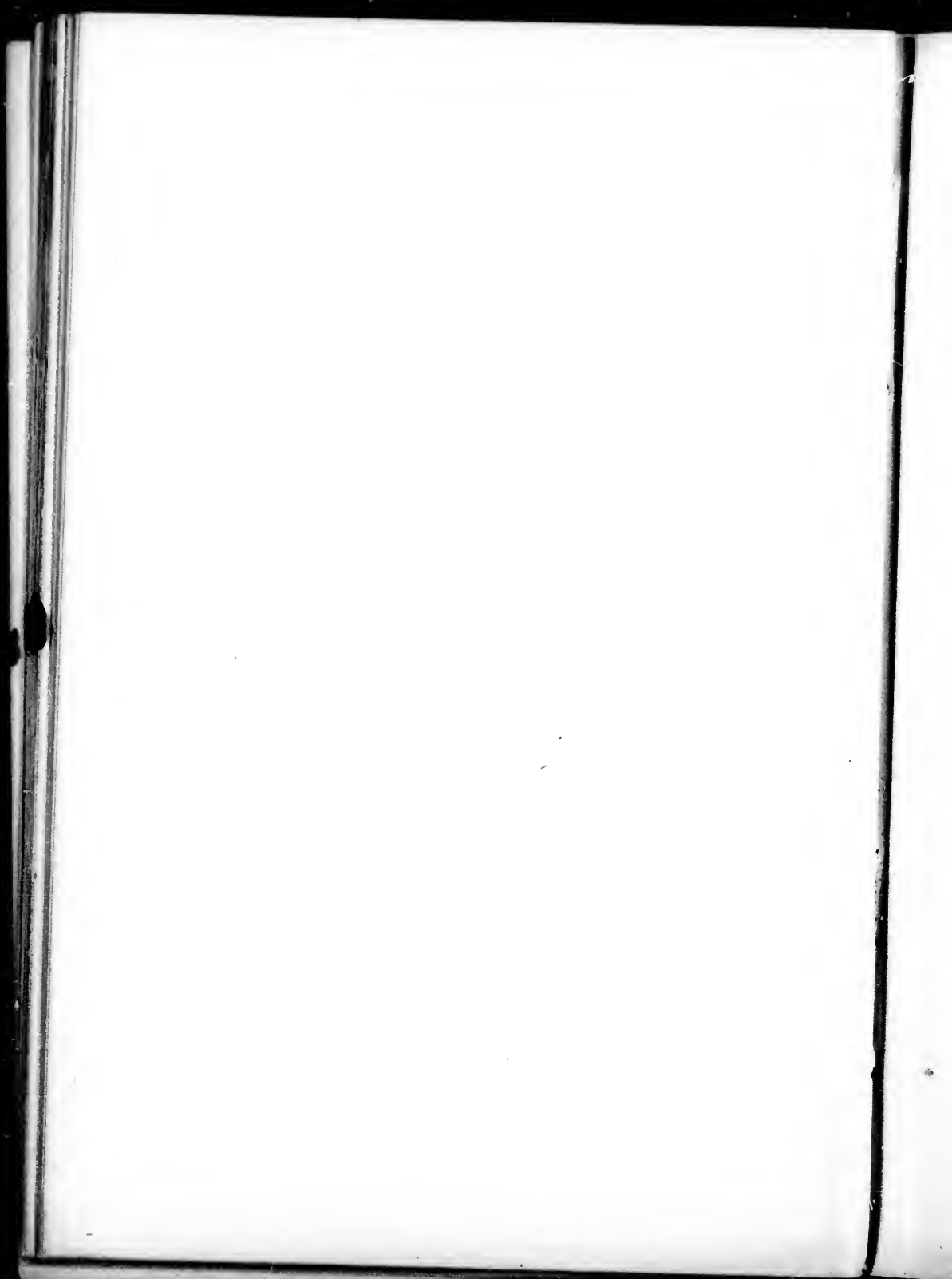
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the blood is arrested by the roughened Intima, and we get external coagulation, at first tunneled by blood, then a solid clot (with hemorrhage the blood clots more easily). Then we get an internal conical clot, reaching to the first branch given off. The internal clot is not so important as the external clot, but it acts as a buffer temporarily, and finally becomes organized, forming a plug of fibrin, which is permanent.

Temporary arrest is retarded by partial division of the artery; therefore completely divide the arteries which are wounded.

We also get retardation or temporary arrest by adhesion of the sheath in peri-arthritis, oedema, etc.

Again by frequent irritation due to wiping with sponge or stimulants too often.

Again retraction of the muscle leaving vessel protruding. And, lastly, haemophilia, to be referred to later.

*1b.* Permanent means:—Traumatic inflammation causing exudation of lymph, which will clot, making the internal clot into granulation, and then into fibrous tissue.

2. SURGICAL MEANS. (*a*) Temporary. (*b*) Permanent.

Temporary Surgical Means:—Proper pressure, flexion and elevation. Pressure is most easily available, and may do permanently.

It may be applied by tourniquet to Main artery. Esmarch—flat one best as it will not bruise. Petit's is used to arrest circulation only of main Artery. Skey's is used in the same way, and may be left on for any time, as it does not cut off all blood supply, which cannot be borne over 1 hour. Signoroni's, or horse-shoe. Lister's for the abdominal aorta. The Spanish windless (a handkerchief and stick). By digital pressure. A large door key padded is the best for the Subclavian. Davey's Lever, a piece of hard wood 1 ft. long introduced into the rectum, and applied to the iliac artery. It has been blamed for ulceration of the bowel. By direct pressure of the finger itself, by plug, or against the bone, as on the scalp. A graduated compress is used in wounds of the palmar arch (it may be used as a permanent thing). It is dangerous; at least never leave on without changing for

over 12 hours, as it may cause gangrene. Pressure by flexion is only used at the knee and elbow joints, generally with a pad. Arrest by elevation.

Permanent Surgical Means:—Cold, heat, styptics, cautery, forceps, acu-pressure, torsion and ligature.

For small vessels, and Rectum, ice-water or ice, also in Vagina or Mouth; danger of sloughing if left on too long.

Heat is better, and decreases shock, favours primary union, and is a stimulant, especially on the abdomen. Temp. of water 118 to 125 degrees to a large surface. If to a small bleeding point 150 degrees.

For parenchymatous hemorrhage, Styptics cause coagulation of the fibrine. Apply styptic always with pressure, Fe. Sulphate, Fe. Chlor. (solid and liquid), Alum, Tannin, Gallic Acid, saturated or in solid form, Vinegar, Hamemalis, Antipyrine, Tannic Acid, Gallic Ac. A gummy styptic of tannin, etc. (Dr. Park's). Nitric Ac. is too strong.

Forceps pressure for 24 hours is good on the Vertebral Artery. Acu-pressure (Simpson) seldom used now.

TORSION:—1. Free. 2. Limited.

The free is the common method: 6-8 turns. The inner coats rupture and curl up inside, the outer coat protects the opening and extrusion of plug. Torsion is the rapid method; it requires no assistance, and no foreign body is introduced into the wound.

Atheromatous Arteries should not be twisted. Vessel should be pulled out, and care taken that forceps do not enter the artery and thus damage further instead of closing. Do a limited torsion, artery being held by second pair of forceps little higher up.

LIGATURE:—In 1552, Ambrose Parré, a French Surgeon advocated the ligature.

Ligature as now employed is the best and the safest method, used also to occlude the artery in its continuity.

Ligature tied with moderate force, then the inner and middle coats are divided cleanly, and the outer coat alone remains strangled within the noose. In large arteries, the snap of the Media and Intima is quite apparent. The inner

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coats turn up inside, support the clot and act as a buffer. Division of the coats is not necessary for the formation of permanent clot. This method is said to be attended by no risk of outer coat, under ligature, and thus produce secondary hemorrhage.

In cases where the coats are not severed, ligature is sometimes forced before the pulse wave, and may slip over the end of the artery.

Difficult to gauge the force required to ligature without rupturing the coats.

Division of the coats is still thought the best practice.

In large vessels two ligatures proximal  $\frac{1}{2}$  inch to 1 inch above the excision, and only tight enough to occlude the lumen, thus forming a buffer for the second and tighter ligature at the point of excision.

Ligature may be absorbed, encapsulated, or cast off.

Gut and animal ligatures are absorbed. Silk worm gut encapsulated.

In septic wounds, ends of the vessels with ligatures slough off. Surgeon's knot, two turns, preferred to reef knot. One turn sufficient for small arteries.

REACTIONARY OR INTERMEDIARY HEMORRHAGE:—Within 24 hours and before the permanent process advanced beyond the first stage.

Cause:—Recovery from shock, increased heart action, and displacement of coagulum. Struggling of patient. Imperfect ligaturing, or ligatures softening too quickly

Clot displaced in punctured artery through rapid establishment of the collateral circulation.

*Treatment*:—Elevation, pressure, ice, tourniquet over main artery. If troublesome, open the wound and remove the clots; slight oozing may be relieved by pressure. Use Tourniquet over Main artery instead of Esmarch.

Secondary Hemorrhage:—No form so insidious, difficult to arrest or so extensive; comes on any time after 24 hours. Comparatively rare in antiseptic surgery.

Causes:—Faulty ligaturing. Proximity of a large branch, which comes into operation on establishment of collateral

circulation. Septic infection. Arteritis occurs in later stages of healing as late as the second and third week.

Constitutional conditions: Haemophilia, Chronic Renal Disease, Diabetes.

Breach is at first minute, may have clotting again, and stoppage with disintegration of the clot, and renewal of the hemorrhage.

*Treatment*:—In late case, leave tourniquet in situ. Instruct attendant in digital pressure; if these fail, and renewed hemorrhage, open the wound and ligature. If vessel will not bear ligature, or if parenchymatous oozing, use actual cautery.

By including the surrounding tissues in ligature, pressure on the artery is released, and hemorrhage is arrested.

**AVELING'S DIRECT TRANSFUSION APPARATUS**:—Mediate transfusion is now practiced; blood received into a wide-mouthed earthen vessel, set in a vessel of water Temp. 105; blood defibrinated, filtered through muslin. Inject into arm, leg or vein in the dorsum of the foot; the latter situation is preferred on account of the distance from centre of circulation. Injection should be made slowly and evenly; take every precaution against air and septic matter.

Saline injections give such good results that other methods are seldom employed, the advantages being its simplicity, freedom from danger of embolism, the difficulty of getting blood overcome.

Teaspoonful of salt to a pint of boiled Aq. or Sodium Chlor., 50 grs.—Soda Carb. or Bicarb., 20 grs.—Pot. Chlor., 3 grs.—Sodium Sulph., 25 grs.—Phosph. Soda, 2 grs.—1 pt. of distilled water. Solution of Temp. 100 deg. XX-XXX oz. should be introduced, depending upon the amount lost. Use little force. Injection often followed by a short rise of Temp. Where the loss is not great, or in an emergency, great benefit is derived by injecting oz. 8-10 into the deep cellular tissue of the buttock or side of the chest.

Also beneficial to inject Saline solution into the rectum, say 2 pints, tablespoonful or two to the pint according to circumstances. If peritoneal cavity open, fill the cavity with normal saline solution.

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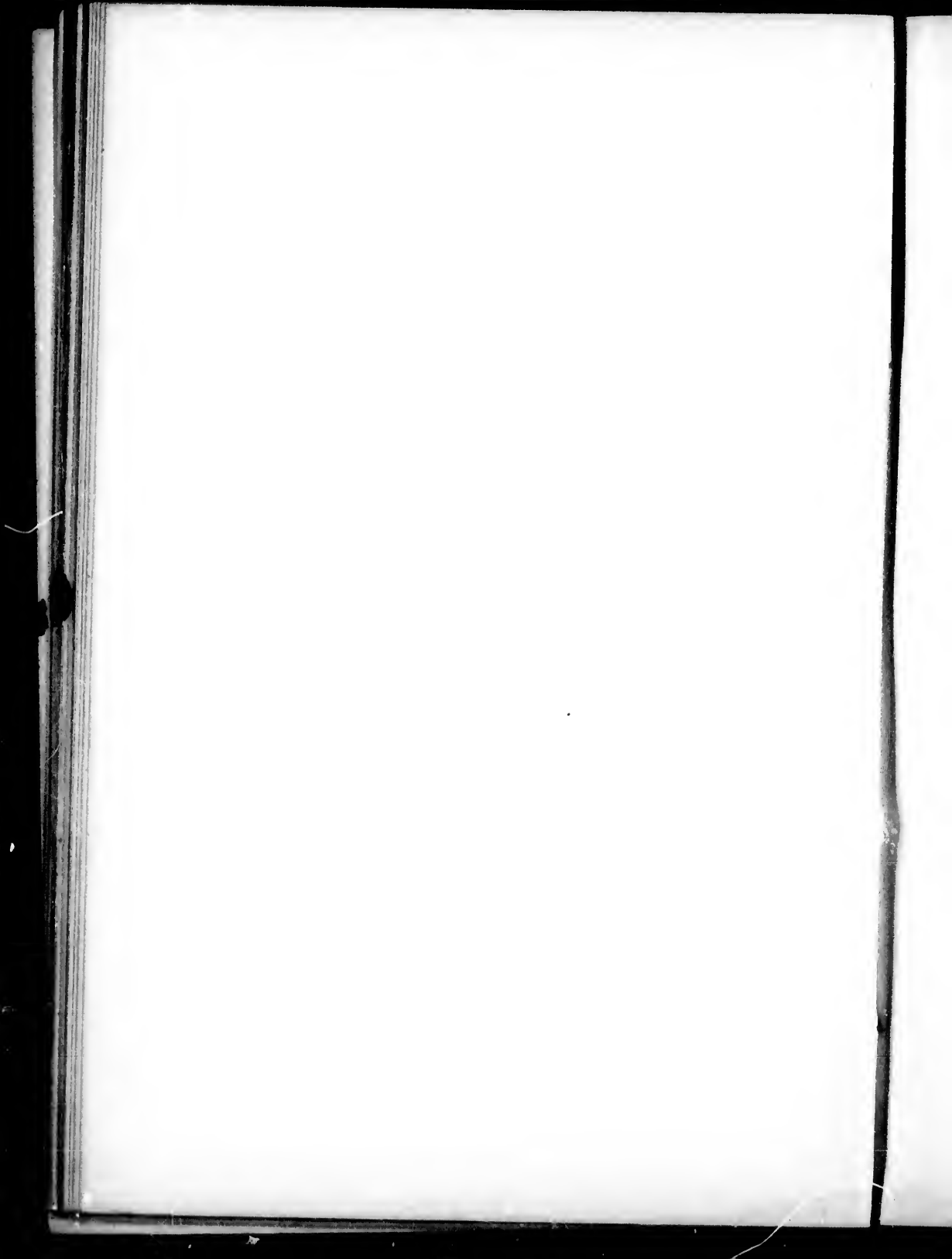
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**HAEMOPHILIA:**—Bleeder's disease, subjects of this are liable to severe hemorrhage on slight injury. Slight bruising may bring on extensive extravasation. It may occur spontaneously.

**Hereditary:**—Propagated through females, most common in Germany. Jewish families are especially affected. There is nothing in the subjects' general health or condition to point to the disease. Even the first menstruation or some unimportant surgical operation has proved fatal.

**Character of the bleeding:** Of a capillary or oozing nature. If spontaneously, usually in the form of epistaxis, bleeding from the gums, externally into scalp, or into the joints.

The disease is frequently accompanied or associated with rheumatism. Knees most commonly affected. No abnormality of the vascular system, the pathology is obscure, usually die young, not in infancy. 50 per cent. do not reach the 7th year. May recover from the first bleeding never to bleed again; seemingly the first bleeding having changed the character of the blood.

**Treatment:**—No remedies serviceable. Generally occurs in members of bleeding families. Cold baths; Sea bathing; avoid stimulants and danger of injury; avoid any operation; Transfusion of little service; the wound in the vein may cause more hemorrhage than the original wound. Pressure, Styptics, Perchlor. of Fe. carefully used. Ice water continually applied. Pressure of Main vessel by a tourniquet. Hot water 115 degrees instead of the hotter water in ordinary hemorrhages, 118 degrees.

**ANEURISM:**—A circumscribed pulsating tumour, containing blood and blood clot, and communicating with the cavity of Artery. 1. Traumatic. 2. Spontaneous, or Idiopathic.

Traumatic follows injury or ligature of artery, or puncture, with the formation of a sac.

2. Spontaneous.—(a) True. (b) False.

**True:**—That in which the blood is included in a sack composed of one or more arterial coats. In early stage have all the coats present; later one or two of the three coats disappear.

(b) **False Spontaneous Aneurism:**—One in which all the

coats have given away, or disappeared by absorption, condensed tissue covering the rupture.

Forms:—1. Sacculated, where pouch developed from one side of an artery; opening to sac may be exceedingly small.

2. Fusiform:—All the coats on all sides equally extended.

3. Dissecting Aneurism.—Usually results from early rupture of an atheromatous patch, the blood running between the coats of the artery and bulging on the outer side.

Component parts:—Sack and contents. The contents vary with the stage of the disease; blood in greater proportion in the early stage; later fibrin in greater proportion. Fibrin in laid down in laminae; this is called Active Clot. The red and softer layers in the centre are called Passive Clot.

Spontaneous or Idiopathic Aneurism Causes:—1. Predisposing and 2. Exciting.

Predisposing Causes:—1. Syphilis. 2. Gout. 3. Alcoholism. 4. Vascular strain. 5. Chronic Endarteritis, especially that form accompanying renal disease. 6. Age, most frequently found between the ages of 30, 40 and 45. There are only some 15 cases reported under twenty years; more frequent in men, northern climates.

Exciting Causes:—1. Sudden mental emotion. 2. Violent exertion. 3. Strains and blows. 4. Growths.

Symptoms:—When first noticed it is soft, elastic circumscribed, pulsating tumour in the course of the large arteries. If fluid contents, it can be emptied by pressure. May be hard by deposition of clot and cannot be emptied, or it may be hard like a growth. Pressure above removes pulsation. Pressure below increases the tumor. It is expansile when soft, but when fibrin deposited the expansile property diminishes. Bruit is heard double in the sacculated form. A thrill is communicated to the hand. Pulse below the aneurism is weaker than the opposite side.

Pressure Symptoms:—Pain, sharp, lancinating or boring oedema, absorption of bone, stretching and expansion of the nerves. Interference with the function of the part.

DIAGNOSIS:—If not consolidated, easy of diagnosis. If consolidated, sometimes confounded with rheumatism and

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neuralgia, owing to the pressure pain. Fluid tumours, cysts, bursae, hydatid tumours, and chronic abscesses, especially in the groin and axilla, may be mistaken for aneurism. Soft sarcoma, pulsating tumours of bones, etc., also mistaken for aneurism.

The history, situation in the course of an artery, bruit, expansile pulsation, disappearance of tumour when pressure applied centrally, and rapid return, the difference in pulse on two sides when in the extremity, all these should be diagnostic.

TERMINATIONS:—1. Death. 2. Spontaneous Cure.

Spontaneous Cure:—(a) May be occluded by formation and organization of clot with passage of the blood stream. (b) Vessel may be occluded by displacement of the clot. (c) Mechanical pressure of tumor occluding vessel. (d) Inflammation, causing coagulation in the sac.

Death:—(a) Rupture. (b) Pressure (asphyxia). (c) Suppuration. (d) Bursting into serous cavity or intestine. (e) Interference with the function of important organs. (f) Suppuration in the cellular tissue around sac, resulting in hemorrhage. (g) Apoplexy from clot. (h) Gangrene.

Treatment:—Medical treatment, includes diatetic measures, rest in bed, proper diet (dry) and alterative drugs: 10-12 oz. of dry and 6-8 oz. of Liquid diet, Pot. Iodide grs. X t. i. d., this lowers the blood pressure and relieves the pain.

If necessary to withdraw Iodine, supply Lead acetate, Ergotine and Iron. In some cases of plethoric people Aconite or a short course of Belladonna indicated. Digitalis is CONTRA-INDICATED.

Surgical Treatment:—A variety of ways. 1. Pressure; this may be applied directly or indirectly.

Direct Pressure is seldom practiced now, owing to the risk of inflammation, apart from a soft pad and flannel bandage during preparatory treatment.

Indirect Pressure:—Digital, Esmarch's bandage, Instrumental pressure, and flexion.

Digital Pressure practicable only in Hospitals, relays of students; this is the safest and best method, pressure should be tried first; less pain, venous circulation not interfered with, and no damage to the tissue.

Pressure of thumb, or first two fingers; changes should be made carefully; a sand bag hanging from the ceiling pressing upon the thumb or fingers is of great assistance.

Read's method :—Rapid method :—Esmarch bandage, rapid stagnation, red clot formed, patient under morphia or an anaesthetic, bandaging from the end of the extremity, tight below, lightly over the aneurism or aneurismal sac, and tighter again above. A broad band should be placed at the upper end; this treatment is continued for from one to one and a half hours, and on removal of the bandage apply Signorini's tourniquet above the aneurism to prevent displacement of the clot. This continued on for 48 hours.

Dangers of this bandage are Gangrene, rupture of the Sac and permanent Nerve lesions, also the occurrence of aneurisms elsewhere on account of the increased arterial strain.

Instrumental Pressure:—Hart's Tourniquet or Compress is the best form, the pressure is continued 5-6 days or until testing shows the formation of a clot.

Flexion:—Knee and elbow with pad, supplemented with digital pressure.

Other Methods:—1. Manipulation. 2. Introduction of foreign bodies, i. e., Iron wire, Cat-gut, Horsehair, introduced into the sac through a trochar. 3. Injection of coagulæ. 4. Fe. Chlor. Necessary to employ pressure both above and below. 5. Acu-puncture; introducing a long needle into the most prominent part of the sac, and passed until it impinges upon the sac in numerous places; this with every antiseptic precaution. 6. Galvanic puncture:—Two fine steel needles introduced 1 inch apart; hard clot forms on the positive pole and soft clot on the negative; operation has to be repeated.

7. Ligature:—I. Method of Antyllus: Ligature above and below, now only practiced in traumatic forms; frequently followed by secondary hemorrhage on account of the ligatures being too near the sac, where the arterial walls are also weak.

II. Anel used only one ligature on the heart side, but ligatured too close to the sac, and secondary hemorrhages occurred here also.

III. Hunter profiting by the experience of the two others ligatured well up on the healthy artery, and had great success.

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IV. Brasdor applied ligature at the periphery of the sac. In aneurisms of the Carotid obtained clot in aneurism, but frequently had rupturing of the sac.

V. Wardrop, cervical aneurism ligatured, also both carotids in first part and the Subclavian in the third part, also placed peripherally.

Dangers:—Gangrene, probably as safe as pressure, with antiseptic precautions.

8. Temporary Ligature:—Acute-pressure—needle with wire loop, dangerous, disturbs artery in its bed, cellulitis.

Rule:—Ligature the artery in two places, and divide between—this is good practice. Amputation in bursting aneurism or gangrene.

ARTERIO-VENOUS ANEURISM:—Thigh and at band of elbow, from careless venesection, and usually caused by puncture.

*Treatment:*—Ligature both above and below both artery and vein, and excise the dilated aneurismal sac.

TRAUMATIC ANEURISM:—A blood tumour communicating with the artery, produced by an injury involving all the coats of the artery.

The Diffuse form tends to spread rapidly to the surface or into a cavity, causing often fatal hemorrhage.

The circumscribed form:—Slow escape of blood, formation of a fairly organized sac. This, however, tends to give way from exertion on the part of the patient, tends to enlarge, finally may burst with serious hemorrhage. In some cases sufficient time elapses to allow of organization of the effused blood, with spontaneous cure.

Diagnosis:—Known by rapid appearance of swelling, Echinosis, following injury or fracture, where fragment of bone has entered the artery; may be confounded with acute abscess; but we have in aneurism pulsation, bruit, thrill, effects of pressure, etc.

*Treatment:*—Diffuse:—Here have no alternative but ligature above and below wound, incising part between. Use tourniquet, digital pressure in performing the operation.

In the circumscribed form if it will not improve on rest pressure, etc., ligature immediately above and below sac, and excise. Where tumor large it may be necessary to ligature the vessel in its course. (Hunterian operation).

### DISEASES OF THE VEINS.

**PHLEBITIS:**—Inflammation of the coats of a vein. Where the inflammation affects the Intima, it always produces con-  
gulation or thrombosis.

I. Simple Phlebitis, non-suppurative or plastic.

II. Suppurative or Septic.

Simple Plastic Phlebitis of the vein is usually attended by an effusion of plastic lymph, and usually ends in resolution.

Forms:—I. Traumatic. II. Phlebitis by extension. III. Gouty. IV. Idiopathic. The idiopathic form follows Typhoid, Uterine and Puerperal Phlebitis.

Symptoms:—A firm knotted cord in the situation of the vein; the vein is tender; if superficial have a reddened line, some oedema and slight febrile disturbance.

In gouty subjects the pain is very great, and there is a great tendency to recur. In any form the pain lessens with the pouring out of the lymph, veins, however, becoming more hard and cord-like.

*Treatment:*—I. Of simple Plastic Phlebitis. Bowels emptied with Calomel and salts, light diet. No alcohol, especially in gouty forms. Drugs, Alkalies, Potash salts, and if gouty Lithia and Pot. Iodide.

Local Treat.:—Kept in bed part raised on pillows, and evenly supported; all rough handling, massage, sudden movement to be avoided. Dry heat indicated. Later stages with chronic hard oedema, treatment changed to massage, douches, etc.

II. Of Suppurating or Spreading Phlebitis.—The plastic form from irritation or lowered condition of the system may become suppurative. A spreading suppuration of the Vein and surrounding tissue. Puriform softening of thrombus. Infection tends to spread to surrounding tissue, with abscess forma-

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tion. Septic emboli may become detached and carried into the circulation with resulting Septicaemia and Pyaemia.

Symptoms:—The cord-like character seen at first disappears; veins become soft, inflammation of the surrounding parts.

Constitutional disturbances marked, rigors, high Temp., and all the other symptoms of abscess formation. Further, may have delirium, etc.

*Treatment*:—Locally through asepsis. Poultices will soothe, abscesses freely opened, also the vein below and above. Thrombus flushed with sublimate and stuffed with gauze.

If upper limit of Thrombus can be found, cut down, and ligature 1-2" above.

Quinine, concentrated foods and stimulants indicated.

**VARICOSE VEINS**:—A permanent dilatation of the veins with thickening of the walls, caused perhaps by over-exertion of the part, with driving of blood to the superficial veins. Veins are lengthened, dilated, tortuous, especially the outer coats thickened. The Inter and Intra Muscular veins may be affected, but never the deep veins.

Common in women, especially those who have been pregnant, caused by prolonged constipation.

Complications:—Hemorrhage, ulceration, thrombosis, and apt to be followed by inflammation, chronic eczema, later chronic induration of the skin.

*Treatment*:—Palliative, or Radical.

I. Palliative, by application of carefully applied bandage, rubber bandage, elastic stocking, no long walks, stimulating diet, where hemorrhage raise the part.

II. Curative, or Radical treatment. Three (3) modes:—  
1. Acu-pressure, bougie upon vein and figure of eight thread, adhesive inflammation, several needles required, left in a week or more. 2. Ligature, Silk or Chromic cat-gut, excise the vein between the ligatures. 3. Excision, expose a long portion of the vein or varicose mass, ligature above and below, dissect from its bed, and ligature the branches.

## GUNSHOT WOUNDS.

When extensive comprise all characters of lacerated and contused wounds and burns. They almost always suppurate.

Varieties :—1. Mere contusion, with possibly subcutaneous fracture called wind contusion, and due to a spent ball, or a ball striking obliquely, or on some hard substance, bone or something in the pocket.

2. Ball causes gutter or furrow, or brush burn, possibly a little skin overhanging.

3. Bullet forms a tubular wound, lodging in the soft parts; possibly may rebound from the bone.

4. Bullet lodges in a cavity.

5. Perforating (most common and important). Opening of entrance usually less in size than bullet, owing to the skin being stretched before broken, with edge inverted, and, if from a short distance, blackened, contused and burnt.

Opening of exit is irregular, larger than bullet, ragged, and with everted edges. If from a rifle at a short range it is very hard to distinguish these. The presence of two openings does not necessarily prove that there is no metal in the wound, for the bullet may have split or knocked a bone fragment out, itself remaining, or two balls may rarely enter the same wound; likewise there may be more than one exit from the bone being splintered or the bullet splitting.

Track of the Bullet:—The interval between the opening of entrance and that of exit. Deviation of this track from the straight line may be produced by the bones, tendon, fascia, or even the contracting muscle; bullet striking the rib or the head will be carried partly around, hence probe cannot always be passed in a straight line.

Symptoms vary with the particular nature of the missile, and the presence or absence of foreign bodies.

Symptoms :—1. Shock. 2. Pain; may be very slight as seen in excitement of action, or very intense, and probably referred to different region, where nerve trunks are affected.

3. Paralysis; from concussion of large nerves.

4. Hemorrhage:—Generally slight at the time. The large

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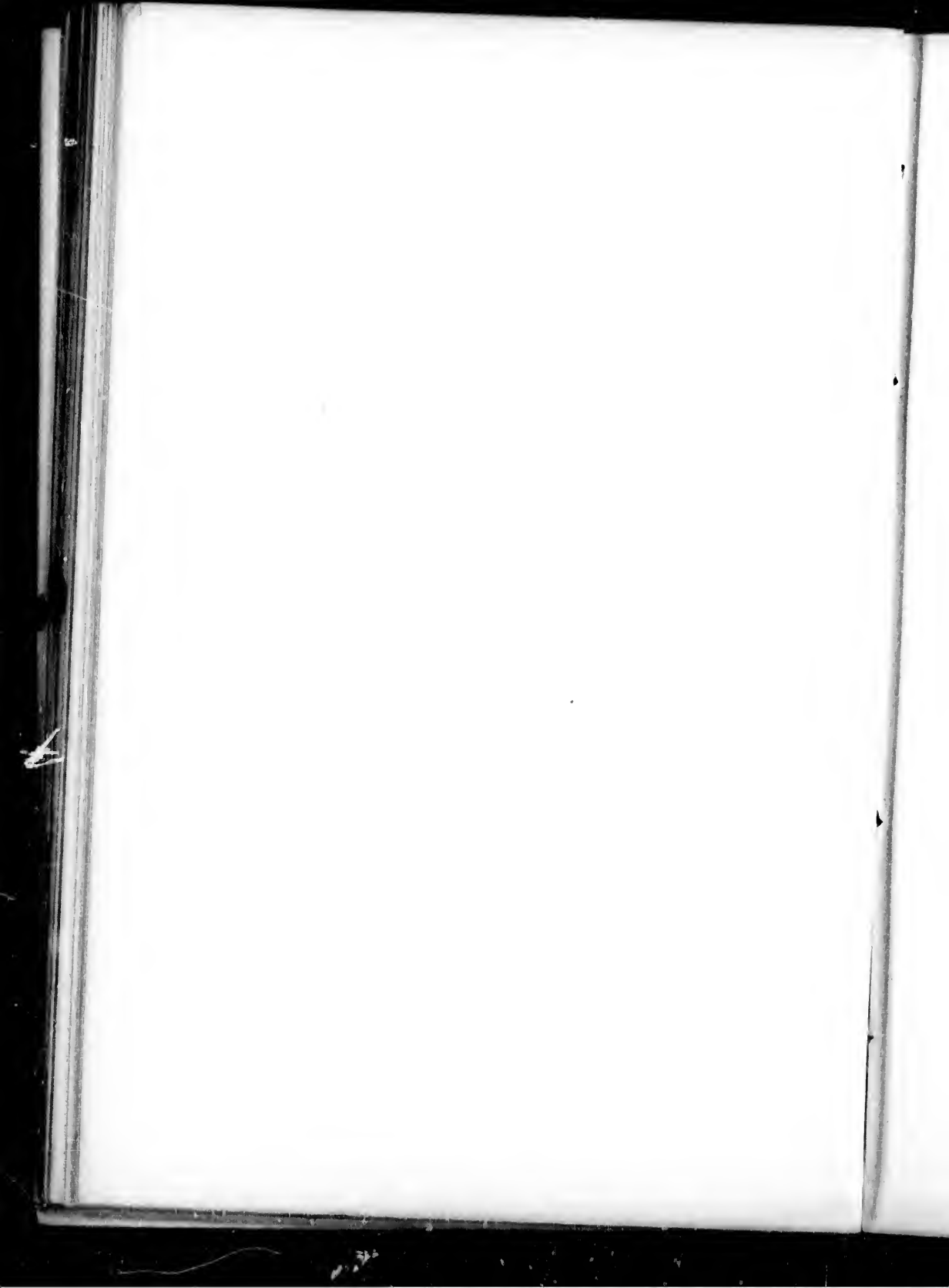
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vessels are rarely affected because of their mobility and elasticity; hemorrhage is apt to occur in 10-15 days from sloughing, if artery has been burnt at the time.

5. Sepsis. Tetanus. Hospital or other gangrene.

*Treatment of Gunshot Wounds in General:*—1. Promote reaction from shock.

2. Arrest the hemorrhage.

3. Remove foreign bodies.

4. Treat the hemorrhage; if venous raise the limb; pressure by bandage. If arterial in limb, tourniquet, or Spanish windlass, or rubber bandage. Flexing the limb, with a compress behind, if in the popliteal space, axilla, etc. If can't control the wound hemorrhage, by controlling circulation, then plug with gauze or aseptic fingers.

5. Explore the wound while numbness persists, with body and clothes in position occupied at the time of wounding (to show if foreign bodies likely present and to relieve volvular action), using aseptic finger where possible, enlarging the orifice to discover and remove foreign substances; sometimes a probe is necessary, ordinary silver probe, straight, or vertebrated or unglazed porcelaintipped probe, which last will show the mark of the lead if it touches the bullet. The only fallacy is that the bullet may have left some lead on the bone, and passed on. Various electric arrangements also.

6. Remove the bullet by ordinary dressing forceps if superficial, the open spoon, if the track is wide. If proper aseptic apparatus is not at hand, better to have wound uncovered and exposed to the air than use bandages that are not aseptic.

Remove as soon as possible all foreign bodies; irrigate, loosely pack with Iodoform gauze, antisept. dress'g. With primary occlusion, if bullet has been cleansed in entering the wound, even if not extracted, dressing may be left until healing well advanced, watching, however, for septic temp.

Where wound gapes widely, or dirty probes or fingers have been used, irrigate, enlarge the edges, have free drainage, anti-septic dressing.

Amputation.—Limbs must be sacrificed, oftener in military, than in civil practice, for bullet wounds are more serious.

**Time:**—If shock be not too great it is best to amputate at once. If one must wait, wait 10 days, keeping up cautious antiseptic irrigation.

Excision in bullet wounds involving joints is not very satisfactory.

**Fracture:**—Treat as a compound fracture elsewhere, save that here the ends projecting through the skin should be returned, not sawn off at once, or one is apt to have necrosis, osteo-myelitis and inflammatory affection generally.

**Gunshot wounds of the head:**—As a rule these are fatal, but much depends upon the depth of penetration. The finger is the safest probe. If finger cannot be introduced then let it alone.

The dangers are:—(a) Suppurating Meningitis fatal in 2-6 days.

(b) Cerebral abscess; danger lasts for 3 weeks at least.

Trephine may be used for enlarging the wound for exploration, removal of foreign bodies, depressed bone, etc., or where any pressure symptoms are present.

If don't find bullet at once cleanse thoroughly, shave off the hair, occlude the wound, and dress with a little Iodoform and Boracic.

Gunshot wounds of the chest are:—1. Non-penetrating; unimportant, unless they fracture a rib or injure the pleura.

2. Penetrating, which are exceedingly dangerous, giving rise to shock, collapse from hemorrhage, dyspnoea, haemo and pneumo-thorax, haemoptysis, and emphysema, later may have pneumonia, sloughing or gangrene of the lungs. Haemorrhage may be from the intercostal or mammary arteries, or from the lungs; blood from the lung is frothy.

Emphysema is caused by the air being pumped on expiration into the tissues at the side; exit being prevented by the tissues already swelled with air.

Sloughing of the lung may occur. Gangrene of the lung only when wound very extensive.

**Prognosis:**—Very grave, but not absolutely hopeless.

**Treatment:**—Arrest the hemorrhage. If collapse does not threaten death, let it alone to give blood a chance to clot. Ex-

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tract all foreign bodies within reach, and tie all accessible arteries. To stop intercostal hemorrhage pass gauze into wound with a probe, and stuff the bag so formed with gauze, pulling it out to render more tight. If this fails, pass a ligature round rib and all with an aneurism needle. It may be necessary to enlarge the wound, and even excise portion of the rib. Apply ice bag to the part, give lead and opium, gallic acid internally, or, better, ergotine hypodermic, say 5-10 m.; meddlesome searching of a wound is unjustifiable. If violent reaction occurs, remove oz. X-XV of blood. Strapping will relieve the pain. Keep patient sitting or half laying on affected side. Give a little ice or barley water, remove blood in pleura by aspiration, or, better still, by opening the chest. If latter has to be done, then may look for bullet. Air in tissues is generally absorbed in 2-3 days, if not punctured.

Gunshot wounds in the Abdomen:—Very dangerous, owing to possible injury to abdominal viscera; shock and collapse are marked. Injury to the stomach is marked by haematemesis and oozing of food through the wound. Injury to the spleen or liver marked by extreme hemorrhage. Injury to the Intestine is marked by food and gas escaping.

Injury to the Kidneys is less serious, as it is extra-peritoneal. Protrusion of abdominal contents is rare.

*Treatment:*—Even during shock, explore with the finger.

If there is hemorrhage do laparotomy, best in the median line, discover intestinal wound by running coils along or injecting hydrogen gas per rectum, which escapes by the wound.

Hemorrhage from the Liver is very serious, can be treated only by sponge pressure or cauterly.

Hemorrhage from the Spleen can be treated by sponge pressure or excision.

Hemorrhage from the kidneys can easily be stopped by sponge pressure.

Hemorrhage from the Stomach or Intestine—ligature as usual; excision of a small piece is good if much lacerated, but generally shock is too great. If likely to die under operation, do a temporary artificial anus; after operation give stimulants and morphine. The dangerous period is the 3rd to

the 5th day, from a small overlooked interstitial wound there may be oozing and then peritonitis.

Repairs of Wounds :—Is by outpouring of lymph, the organization and formation of which forms a permanent bond of union. New tissue always forms between divided surfaces.

(1) Union by first intention, or primary union occurs where divided surfaces are brought together, and left undisturbed, and exudation is very slight; no suppuration.

(2) Union by 2nd Intention—here union differs from primary only in the amount of lymph thrown out, and the size of the fibrinous wedge between the opposing surfaces, the loss of tissue is such that the opposing surfaces cannot be brought together, the edges will not meet; exudation takes place as before. There should be no more inflammation or suppuration here than there is in primary union; presence of blood, if aseptic, should be no hindrance to healing, but rather serves as a scaffolding to support the exudation. Too large a clot will, however, by tension cause inflammation and sometimes suppuration; remove it and look for union between the two granulation surfaces, e. g.:

(3) Union by 3rd degree or intention. This occurs often in surgery where there has been secondary hemorrhage, and we are obliged to tear wound open to stop it.

(4) Healing under scab—(scab is a hardened layer of effused blood and dust and lymph); this may sometimes be encouraged. Lymph at the base of scab forms a protective base or layer to the wound.

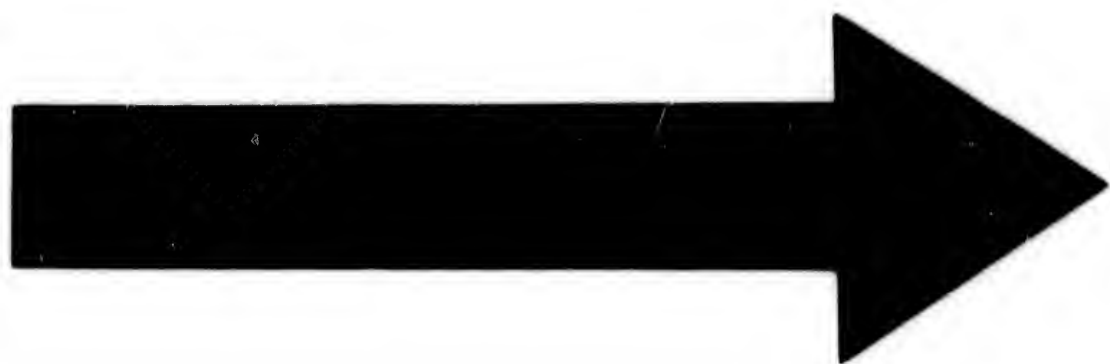
Repair of wounds is often interrupted by intercurrent complications, simple or septic inflammation, erysipelas, wound diphtheria or gangrene.

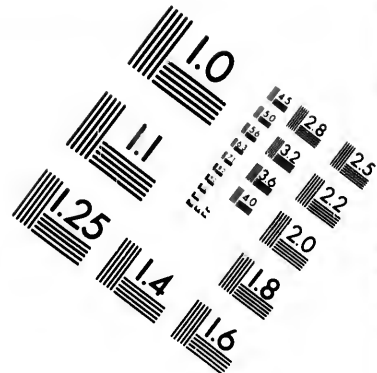
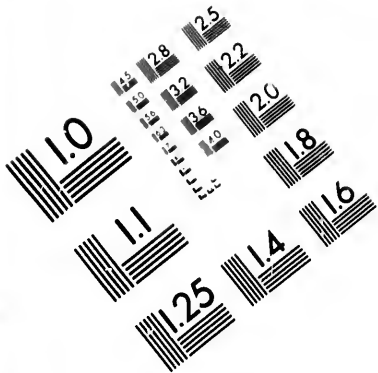
### SHOCK.

Shock is a severe impression made upon the nerve centres, causing general lowering of vitality. It may vary from passing disturbance of emotions to profound depression and death. In severe injuries it is often hard to separate the effects of shock from those of hemorrhage, and still more difficult when to these the effect of the anaesthetic is added.

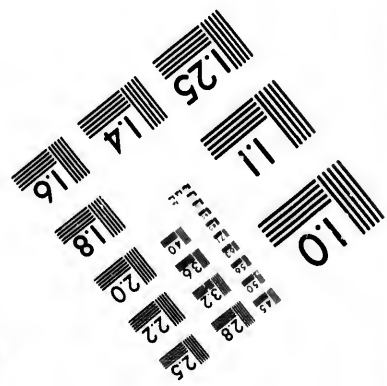
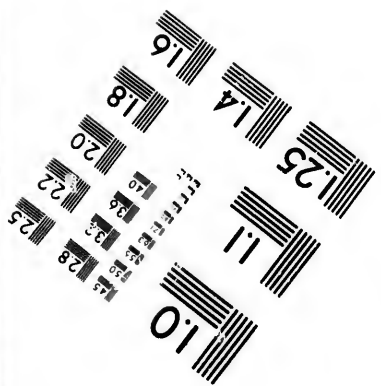
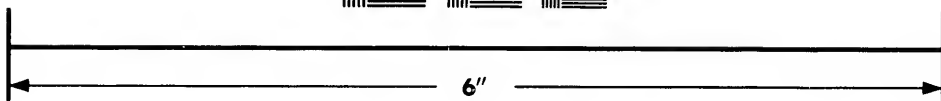
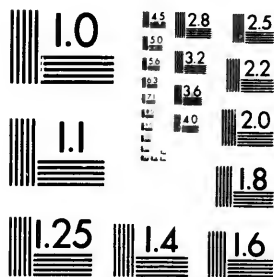
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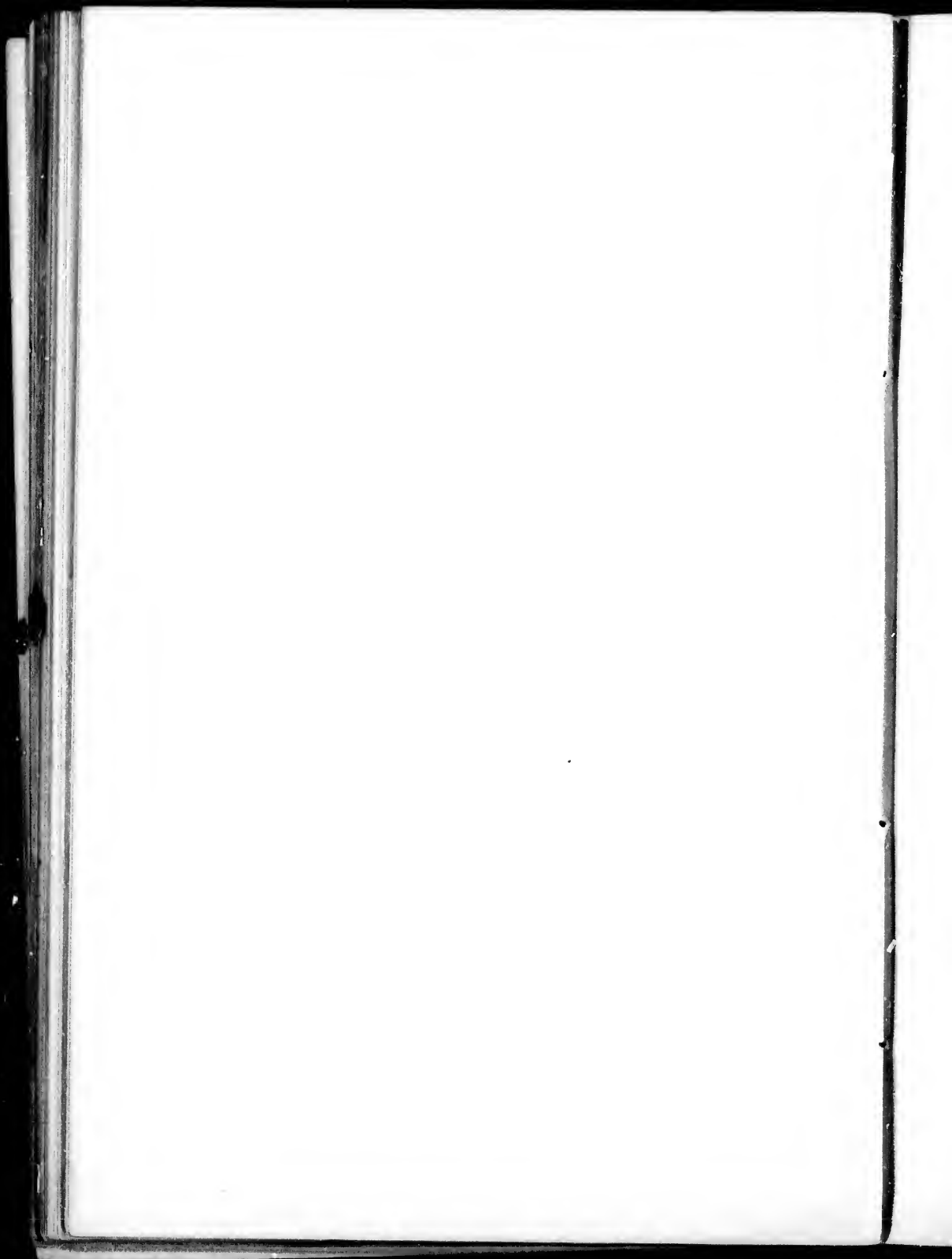


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The only change in *p.m.* when death from shock is distention of the abdominal veins.

Causes of Shock :—Although all injuries produce a certain amount of shock, certain classes of injury and injuries in various regions are especially liable to cause shock.

Women, bedridden persons, phlegmatic persons, very young or very old persons are liable to shock; but opium eaters are less liable, because in them the nervous system is dulled.

Symptoms of Shock :—There are two varieties of shock. (a) Extreme depression. (b) Great excitement.

The first form, that of depression, is much the commoner.

The patient lies semi-conscious with the extremities cold, face deadly pale, expressionless, pulse feeble and fluttering, eyes half closed and glazed, Resp. shallow, Temp. subnormal, vomiting, (especially if the injury is about the head), sphincters are often relaxed. Patient may succumb or gradually enter the stage of reaction.

The second form—great excitement is much rarer and met only in military practice. Here the sufferer—though not necessarily a sufferer—cries or screams. As before Temp. subnormal, cold perspiration, relaxation of the sphincters, may sink into the stage of depression or delirium may ensue, almost immediately causing rapid collapse.

Reaction from shock:—Pulse becomes slower, fluttering ceases, colour of the lips returns, pulse becomes normal in a few hours, or if the reaction is too great get fever, great mental excitement, and traumatic delirium, or there may be fluctuations, relapses alternating with improvement.

Shock following operation is now less common on account of the precautions taken to prevent it. For this confine the patient to bed 1-2-3 days before operation, regulate the diet and the bowels; during the operation keep the body covered, warm with hot water bottles or hot sand bags, or hot water table with water 100 deg. Faren. circulating beneath. If shock occurs during operation, bring it to a close as soon as possible, or discontinue for a time; arrest all hemorrhage.

Treatment of Shock :—Slight cases may require covering the body and the application of heat, mustard plaster, massage

over the heart, lowering the head and stimulants (hypodermic by the mouth or enema). Severe cases similar precautions, stimulate more freely. Brandy a drachm every 5 min. until pulse affected. If hypodermically, Alcohol, Ammonia, Ether (if not already anaesthetized). Tr. of Digitalis 15 min. every 15 to 20 minutes for four doses with probably one-hundredth of a grain of Atropine (only twice).

If hemorrhage uncontrollable, transfusion of blood, or saline solution. Raise and bandage limbs, to give as much blood as possible to the central nervous system and heart.

If no hemorrhage and the superficial veins and heart are distended, bleeding from the external jugular may be advisable; such cases are rare. Electricity is of some use in such cases.

#### TRACHEOTOMY AND INTUBATION.

Tracheotomy may be done :—1. Above the Isthmus of the Thyroid. 2. Just below the Isthmus. 3. Well below the Isthmus. Operate high up if the obstruction is merely in the larynx.

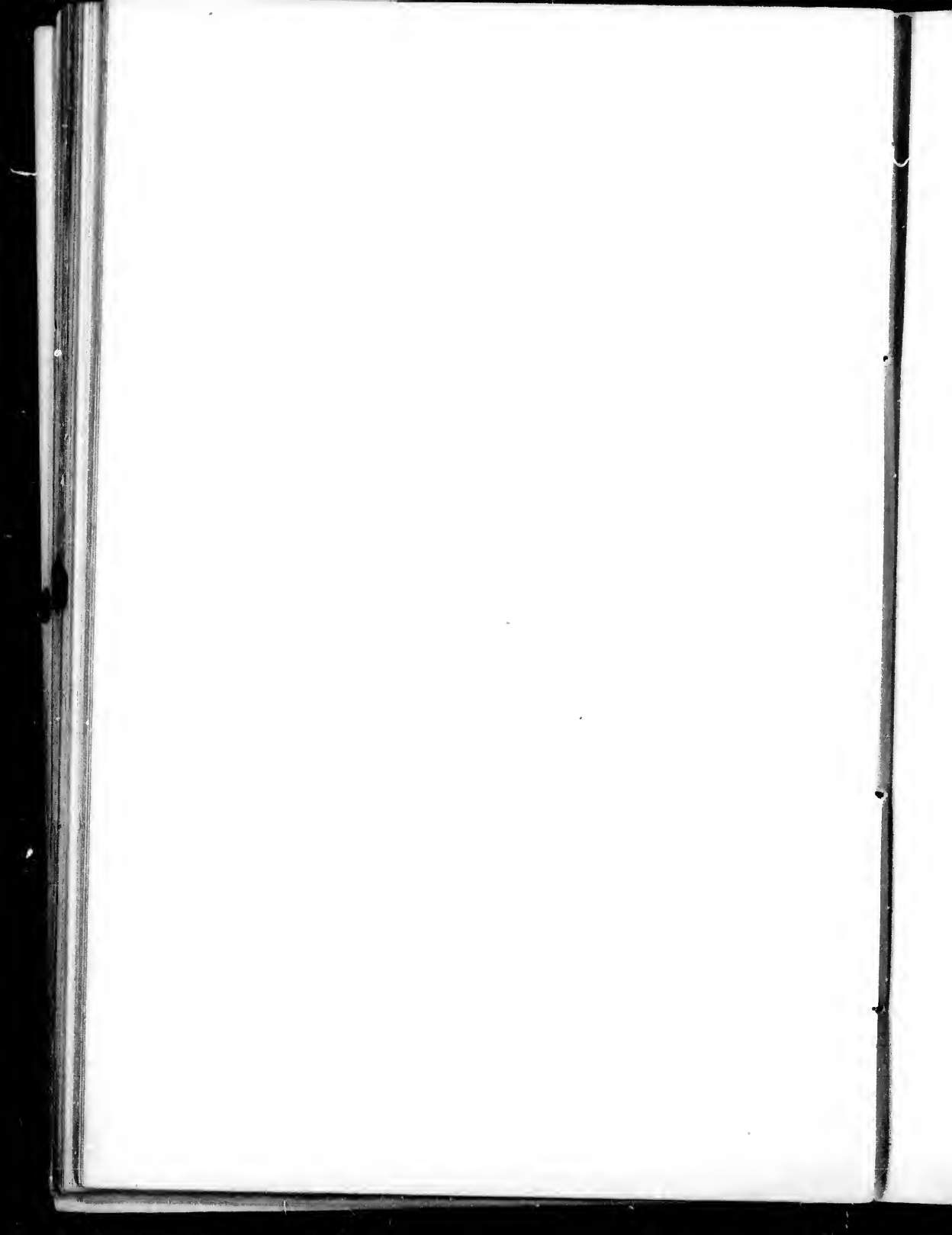
Conditions which may require tracheotomy are:—1. Acute Oedema. 2. Benign Neoplasm. 3. Croup. 4. Diphtheria. 5. Malignant disease. 6. Syphilitic and Tuberc. Stenosis.

The best form of tracheotomy tube is the "lobster tail" pilot. Chloroform should be used as an anaesthetic, and the operation done in the first stage.

High operation :—Having shoulders raised, locate the cricoid, and incise exactly in the middle line to the episternal notch, divide the episternal and deep fascia on a director from below upwards, hook up the trachea and open it from below upwards. In rapid tracheotomy the incision is to be made directly down to the trachea. All vessels should be secured before opening the trachea. If blood gets in suck it out.

In Laryngotomy :—Incision is made into the cricoid or rather crico-thyroid membrane, by knife held transversely. After operation, prop the patient up in bed, except in diphtheria, where there is danger of syncope. Patient generally falls into a long refreshing sleep; on awakening give beef tea, etc., enjoining very careful swallowing.

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Dangers of Tracheotomy :—1. Syncope; especially in the old. 2. Broncho-pneumonia, especially in diphtheria (within 4 days). 3. Secondary hemorrhage. 4. General anæmia; this latter may occur from too small an opening or an opening to one side. 5. Blocking of canula. 6. Ulceration of trachea. 7. Cervical Cellulitis.

Remove tube for short periods of time to be sure that patient can do without it before permanently dispensing with it.

Intubation :—Child is wrapped tight in blanket, tube is introduced (after gagging) by an introducer, which relaxes the tube; after it has entered the larynx put thread on the ear. Breathing immediately becomes slow and tubular. Cyanosis passes off and quiet sleep comes on. If this does not occur, either the tube is in the oesophagus, as is shown by its being gradually swallowed, or it has been plugged with exudate, when it must be removed, cleaned, and re-introduced.

Indications for Intubation :—Marked dyspnoea, with falling in of supraclavicular spaces and cyanosis. Lung should be auscultated. 1st, to see if breathing is equal on both sides. If membrane has reached into the bronchi, then intubation will do no good.

Patient should be fed from a feeding bottle with head well lowered, as danger of food getting into the tube is great.

Removal of the tube :—Leave it in 7 days in child under 2. If onset is gradual, 2 days may be sufficient. As to which operation is the best, opinions are evenly divided, and results the same.

Intubate always in children under 3 and a half years and in the poor.

Tracheotomy in children over 5 years, and in the rich.

### INFLAMMATION.

Inflammation is the reaction of living tissue to injury, and is the result of damage, provided such damage is not sufficient to cause death of the part, and is followed by characteristic changes in the surrounding blood vessels and connective tissues.

Acute Inflammation:—Causes:—(Never Idiopathic.)

Predisposing:—Any circumstance impairing the general health, or rendering the tissues less resistant as food, climate, occupation, age and temperament.

Determining Causes:—(Never constitutional).

(a) Mechanical:—1. Violence. 2. Wounds. 3. Fracture and Dislocation. 4 Foreign bodies. 5. Compression.

(b) Chemical:—1. Heat or Cold. 2. Irritants. 3. Microbes generally (gonococci, etc.).

Inflammation is:—I. Simple, where we have only the non-pathological form; slight irritation.

II. Infective, produced by pyogenic organisms.

Symptoms:—(Celsus' classification).

Rubor, Tumor, Calor, Dolor, also loss of function and impaired nutrition.

Rubor:—Brilliant in acute, livid in the chronic form. The part is far gone if colour is not present after pressure.

If the colour is not red, corpuscles have been driven out, or are decomposed.

Tumor:—Due mainly to increased exudation from vessels, consisting of leucocytes, and serum (containing fibrin), causing swelling of the connective tissue, more marked when the conn. tissues are lax, but pitting occurs even in inflammation of the bone. This swelling usually subsides, but may partially persist.

Calor:—Always, unless stasis is early, or inflammation is very chronic. The Temp. of the part is nearly as high as the internal body temperature, owing to the increased supply of arterial blood.

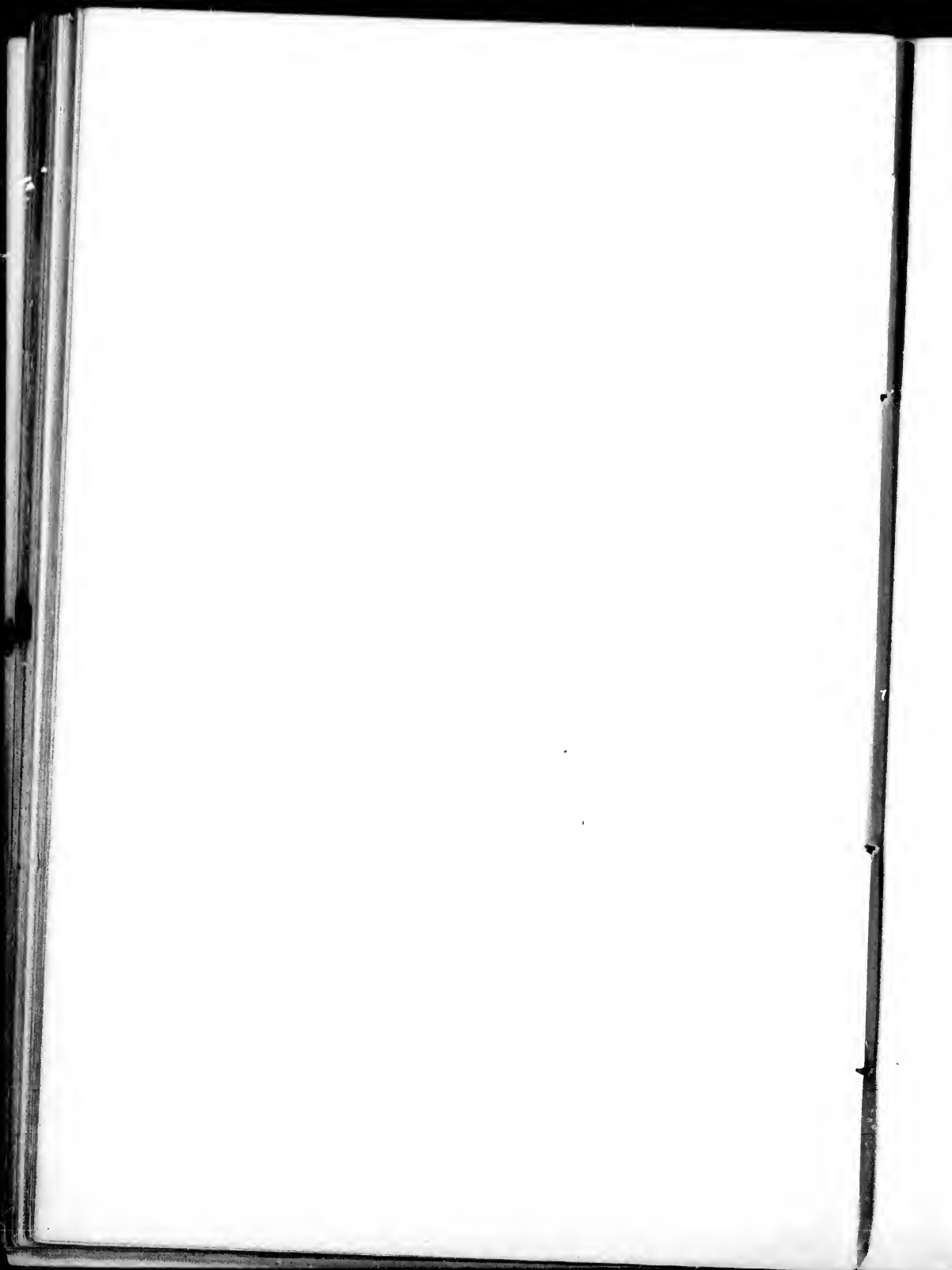
Dolor:—Due to (a) Pressure on the nerve endings from increased tension. (b) Irritation of Ptomaines.

It is worse early, before the tissues have stretched, and most intense throbbing, where room for expansion is lacking. It is increased by dependence of the part. It is burning if skin is involved or mortification is setting in.

Pain is referred often to distant parts through nervous connection (knee in hip disease, penis in bladder).

Impairment of Function :—Seen in inflammation of the glands, deep inflammation of the eye, muscles, joints, bladder.

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Modified Nutrition :—Hypertrophy and Atrophy following Inflammation (seen in bone).

II. Constitutional Symptoms:—All massed under one word—Fever. *a.* General Temp. raised 1 deg. or more. *b.* Pulse and resp. quickened. *c.* Appetite impaired. *d.* Secretions diminished. *e.* Insomnia. *f.* Headache. *g.* Loss of strength and flesh. *h.* Delirium.

Cause of the Fever:—1. The increased heat production from an enfeebled control over the metabolism. 2. Tension. 3. Mental Emotion. 4. Absorption into the system of products, especially of germs, weakening the nervous control.

Fever is 1. Simple:—Traumatic or Inflammatory. 2. Septic:—Traumatic or Sepsaemic. (The severity depending upon the amount of septic ferment absorbed; the age and sex; as slight cause may give rise to severe fever in children.)

Classification of Fever:—(*a*) Sthenic. Shivering, rigors, convulsions in children, Temp. 104 to 105, great constitutional disturbances.

(*b*) Asthenic:—Typhoid type, Temp. less high, sometimes subnormal.

(*c*) Irritative:—Characterized by prominence of the nervous symptoms.

Varieties of Inflammation:—A. 1. Simple, non-path. organisms, no tendency to spread.

2. Infective; virulent micro. org., tend. to spread, (*a*) Sthenic, and (*b*) Asthenic.

B. "Parenchymatous:"—Cells of the organ affected.

"Interstitial":—Connective tissue of the organs affected. Practically these occur together.

C. Serous:—Collections of fluid.

D. Adhesive; fibrous; tendency for the surfaces to adhere, common in the peritoneum; a partition of dangerous areas. This adhesion may give rise to bands causing subsequent stricture of the gut, or fixation of a joint.

E. Suppurative—generally due to cocci. The cocci break up adhesions, and cause suppuration.

F. Hemorrhagic:—If blood present in effusion.

G. Croupous:—When wound on mucous surface attacked easily peeled off.

H. Diphtheric—seems to be incorporated with the mucosae.

I. Gangrenous.

*Treatment*:—A. Remove the cause. B. Relieve the tension (sutures, good draining). C. Antiseptics hold 1st place.

A. Local Treatment:—1. Rest and position. 2. Pressure. 3. Blood letting. 4. Cold and heat. 5. Counter Irritation (chronic). 6. Astringents (chronic).

1. Rest and position—tend to diminish blood supply and facilitate nervous return. Partially recumbent in inflammation of the head; the brain must have blood.

2. Pressure:—Uniform, gentle and elastic, therefore cover with cotton, wool or sponge before bandaging.

3. Blood-letting:—Incisions of great value when the part is much distended, warding off the tendency to suppuration. It should go through the skin and cellular tissue, if involved, and enter any hard unyielding mass, especially necessary in phlegmonous inflammation; punctures in eyelids, scrotum, penis. Cupping, leeches, venous puncture, common in the testicle; venesection only in suppurative arthritis and pneumonia.

4. Cold and Heat:—Cold is a powerful agent in controlling inflammation, but it needs caution, for it constricts the vessels, diminishes the action of the leucocytes and the general vitality. It is of most use as a preventive, unless continuous cold will increase inflammation by reaction. Ice bag, cold irrigator; or by capillary attraction with candle wick, lead or alcohol, added to the irrigator, intensifies the cold.

Heat:—Fomentations, Douches (Antiseptic), hot water bag. These stimulate the leucocytes, dilate the vessels, diminish tension, and promote resolution, and, if condition too far advanced, these encourage suppuration.

5. Counter Irritation:—Plasters, linaments and cauterly, used mainly in chronic forms.

6. Astringents for mucous membranes.

B. Constitutional Treatment:—1. Diet; milk oz. 2-4 per hour, peptonized if necessary. Beef tea (not if diarrhoea present). Chicken broth (add starch if much diarrhoea). Jellies. If rejected, peptonized enemata oz. 2-3 q. 3 hour with Tinct.

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Opii if necessary. Wash bowel beforehand. Alcohol with caution. Better without in early stages. Indicated by delirium, oz. 3-4 per diem; half a pint of wine per diem.

For thirst, barley, toast, rice water, acid drinks.

2. Fever—Quinine, grs. 5 q., 6 hour.

If high fever, grs. X. b. i. d., or even grs. XX t. i. d.; don't use pills.

Quinine is very good in genito-urinary inflammation.

If Quinine fails, try Salicylic acid, Antipyrine, Aconite and Antimony.

3. Pain:—Opium.

4. Stimulants:—Alcohol; Ammon. Carb., grs. V., spt. of Ammon. Aromat., Aether.

5. Purgatives—Calomel, grs. 3 to 5, with V-X grs. Soda Bicarb., followed by a warm Seidlitz, or Sulph. of Magnes. Oz. 1. (Drachm, 1, every hour in peritoneal inflammation.)

#### CHRONIC INFLAMMATION.

May follow acute form, often recurrent. Very common after (a) Syphilis, (b) Tuberculosis, (c) Rheumatism, and (d) Gout.

Symptoms:—The same as Acute, but less severe.

1. Pain, neuralgic or boring.

2. Swelling very marked, causing degenerations (joint affections, etc.).

*Treatment*:—Remove exciting cause.

Constitutional Treatment:—Mercury, Colchicum, Acid Salicyl., attend to nutrition, the bowels, uric acid tendency.

Therefore, recommend the change of air and climate, the use of baths, woolen clothing, tonic Syr. Fer. Iod.

Local Treatment:—Determined by the condition of the part; warmth is generally better; often, 1. Alternate heat and cold are better. 2. Friction and massage. 3. Counter irritation, vesicants, stimulating liniments, cautery lightly (every week, 8 to 10 spots), setons. 4. Alterative Ointments. Hg. or K.<sup>o</sup>I. with pressure or Scott's Ung. Ammoniacum and mercury ointment on sheepskin. 5. Astringents.

Modes of termination of Inflammation:—1. Resolution. 2.

Suppuration. 3. Ulceration. 4. Gangrene. 5. Hyperplasia.

1. Resolution:—The symptoms gradually subside, and we have a complete return to normal in a few hours, or before the end of many days. If complete there is no alteration in the tissues.

2. Suppuration:—This is the common termination to infective inflammation caused by:—(a) Staphylococcus. (b) Streptococcus.

In chronic abscesses they do not occur; they probably die out.

Non-Bacterial Suppuration may be produced by sterilized cultures or turpentine, mercury, castor oil, puriloid material, but never met with clinically.

Abscesses:—Circumscribed collections of pus usually caused by staphylococcus. This is:—1. Acute or hot. 2. Chronic or cold.

Acute Abscess:—Symptoms.

Local Symptoms:—(A) All ordinary symptoms intensified.

(B) Skin shiny, soon adheres to the lower tissues; oedema follows; it is dusky especially at one point where we have bulging and peeling off of the skin (the abscess is pointing), the skin breaks, and pus is evacuated.

(C) Fluctuation. Sensation imparted upon manipulation—oedema same. Palpation of the buttock or across the hamstring muscles will produce the same sensation, but we will not get it in the long axis.

(D) Certain tissues greatly resist the progress of abscess through them, as in psoas abscess; abscess points towards the skin instead of towards the internal cavity.

Constitutional Symptoms:—(a) Rigors or shivering fits, or convulsions or vomiting, when pus begins to form.

Small frequent pulse, frequent respiration. Face pinched. Pallor marked. Temp. 105 to 106 in one hour (in the old there is sometimes only a very slight chill).

(b) Aiter this may have a most profuse perspiration. Temp. falls, and get relief.

Diagnosis:—From 1. Aneurism. 2. Hernia.\* 3. Rapid Malignant Tumor. 4. Extravasations of blood.

Chronic Abscess:—Generally tubercular, but sometimes sy-

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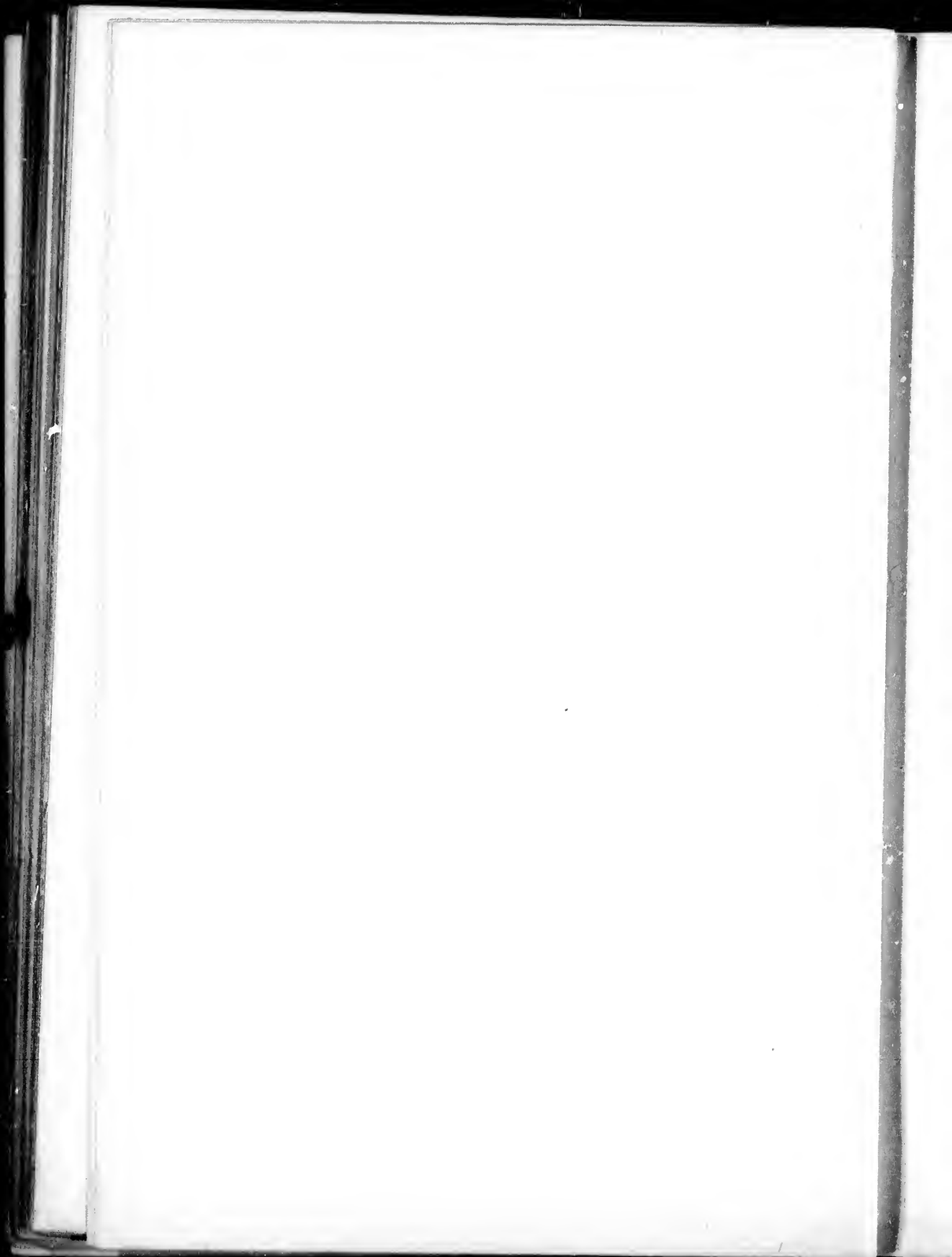
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philitic. Formation is slow, especially those connected with bones, joints, glands, kidneys and bladder. The only marked symptom is the swelling.

Peculiarities :—1. Tendency to form a pyogenic membrane.

2. Huge curdy masses.

3. Cavity tends to divide into chambers. Constitutional symptoms very slight, emaciation.

Residual Abscess:—One which had existed years before, and again appears. Metastatic—Secondary. Lymphatic—In lymphatic glands. Puerperal—Pyaemic, in the puerperal period. Emphysematous—Rectal.

Chronic abscesses may become acute from the entrance of pyaemic cocci.

Diagnosis:—From (1) Fatty tumor. (2) Hydatid and simple cysts. (3) Rapid malignant growths. (4) Serous accumulation. (5) Enlarged bursae. (6) Hernia. (7) Aneurism.

Fatty Tumors:—1. No history of vertebral disease. 2. No inflammatory symptoms. 3. Lobulation, and woolly feel.

Femoral Hernia from Psoas abscess:—1. Neck inside femoral vessels. 2. Sudden, painful, reducible in different way from abscess. 3. Impulse transmitted on coughing. 4. Note resonant. 5. Reappears suddenly on rising.

Aneurism:—1. Lateral expansion; lifting feeling. 2. Different bruit. 3. Stopping circulation, one can press blood from aneurism, and it returns immediately. Use hypodermic when in doubt.

Prognosis:—Depends upon the size, situation, cause and constitution, serious in Tubercular form. Acute abscesses of the bone may prove fatal.

Treatment of Acute Abscesses :—Best way is to open where it is pointing. If not pointing, open where there is oedema, or skin is adherent, cutting in the direction of the fold of the skin, or of the vessels; if deep, dissecting carefully with scalpel. Keep abscess aseptic; don't squeeze blood into abscess.

Hilton's method:—Where not well assisted, scratch through the deep fascia with director, then tear open. If cavity large, wash with hot Boracic. If small, ditto Phenol 1-80; Sublimate 1-5000; Iodoform, tube, dry dressing.

Treatment of Chronic Abscess:—Evacuation is necessary where there is any constitutional disturbance. Aspirator is the safest with delicate persons. Introduce aseptic needle a short way from the top of the pus to get healthy edges. Inject into the cheesy remainder oz. II of Iodoform Emulsion, formulae for same being:—Iodof., 5. Glycer., 30. Water, 100.

Incisions are to be made with aseptic precautions; in the most dependent parts, large enough to admit one to two fingers. Large spoon to scrape away the pyogenic membrane. Where the abscess is large or in a young child do not remove the pus too rapidly for fear of syncope; more pressure is necessary than in the acute form. Irrigate, after scraping, with hot water, at least 120 degrees.

Can paint abscess cavity with a 5 per cent. Ether solution of Iodoform, or Emulsion of Iodoform, 10 pts. to a little less Glycerine or Iodoform Dr. 1 to the oz. of Almond Oil.

Hectic Fever:—Also called "Suppurative fever (Chronic)." This is a fever recurring where long standing suppuration exists; in this the temp. varies from the normal in the morning to 102 degrees or more at night. It especially follows infection of a chronic abscess.

Symptoms:—A bright flush on one or both cheeks. Headache, restlessness, discomfort, chilliness, thirst, hot skin, profuse perspiration, 11 p.m. to 1 a.m., followed by sleep and comfort. Later in the disease have a small frequent pulse. Patient anaemic. Failure of the strength and appetite, diarrhoea, and red cracked tongue.

*Treatment:*—1. Improve the drainage. 2. Wash out with Hydr. Perox. 1 or 2 drs. to the Pt. of Aq., or Zinc Chlor. grs. X-XX to the oz. of Aqua. 3. Improve the diet. Stimulants. 4. Atropine for sweating. 5. Quinine and Fe. 6. Bismuth for Diarrhoea, grs. X-XX t. i. d.

Lardaceous or Amyloid Degeneration.—This is occasionally met with. The liver, kidney, spleen are enlarged; diarrhoea. May be benefited by keeping cavity aseptic.

Prognosis:—Grave, sometimes recovery.

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## SINUS AND FISTULA.

In this healing is incomplete, and a narrow suppurating tract remains.

Causes:—I. Indifferent opening or self-opening of abscess; may also occur in ulcer. II. Wounds; especially gunshot, foreign body remaining. III. Amputation, where bone necroses, or drainage tube left in too long.

Definition of a Sinus:—A persistent suppurating tract, more or less tortuous, opening on the surface, but closed at the deep end; sometimes it communicates with the surface by two openings: especially seen in dead bone. May have a "Y" shaped sinus very hard to heal.

Definition of a Fistula:—An abnormal passage leading towards, up to or into:—(a) one of the mucous cavities. (b) or running between two mucous cavities [fistula in ano, salivary fistula, etc., being examples of the first, i. e., (a) recto-vaginal fistulae being a specimen of (b)]. (c) Congenital—like non-closure of the bronchial clefts.

The orifices are small, therefore fistulae are often overlooked, or buried in granulations, which may be florid at first, but soon flabby and button-shaped (proud flesh). If orifice closes, it causes fever, and must be reopened.

*Treatment*:—1. Remove the cause; any foreign substances.

2. Rest, position, gradual pressure; sometimes the muscle must be divided, especially if near the orifice.

3. Stimulate the granulations:—By

(a) Injecting Zinc Sulph. grs. 11 to oz., or Zinc Chlor. 10-20 to the oz. Tannic Acid 1-4. Silver Nit. 30-40 grs. to oz. Iodine, 1 dr. to 4 oz. (b) Introduce drainage tubes. (c) Make a counter opening, and pass silk or oakum through daily, or introduce tent of Iodoform. (d) Introduce probe, which has been coated with Silver Nitrate Xtals, by dipping in a solution of the Ag. No. 3, Xtals melted. (e) Scrape wall with spoon. (f) Use actual or galvanic cautery. (g) Introduce a sea-tangle tent; this bursts the walls and causes fresh inflammation. (h) Use Elastic Ligatures (counter opening, knot on end), and let it cut its way through; very painful. (i) Opening up and scraping with spoon. (j) Excise the sinus,

and get raw surfaces which can be opposed by deep ligatures.

4. For a fistula between two canals a plastic operation is needed.

5. Tonics and change of air.

6. Anti-tubercular, and anti-syphilitic treatment.

### ULCERATION.

An ulcer is a solution of continuity in the more superficial tissues, the floor being formed by granulations or embryonic tissue.

It is distinguished from gangrene, because:—1. In gangrene, we do not get as here death *en masse*, and definite separation between the dead and living tissues.

2. From abscess, because an ulcer is more superficial.

3. From excoriation, by this not extending through epithelium or leaving scar.

Causes of Ulcers.—1. Traumatism and irritants (generally indirectly). 2. Deficient blood supply (common, especially in lower extremities). 3. Imperfect venous return (varicose veins). 4. Inflammation and inflammatory exudate (in fractures). 5. Pus cocci causing cell necrosis. 6. Influence of pus cocci on wounds (bed sores). 7. Degeneration of neoplastic infiltration (syphilides). 8. Diseases of nutrition (scurvy).

Classification.—I. Acute or chronic. II. (a) Specific: Tubercular and syphilitic. (b) Non-specific: Varicose, hemorrhagic, irritable, trophic, neuralgic, indolent, callous, traumatic, senile. III. As to appearance, sloughing or exuberant.

Perforating ulcer of foot.—Constitutional causes:—1. Diabetes, inducing ulceration in a variety of ways. a. From associated endarteritis. b. From impaired nutrition. c. From impaired enervation. 2. Scurvy. 3. Neurotic patients, especially women, shown on inner ankle.

If an ulcerative process be not arrested, it may involve muscles, tendons and even bones. Opening up of tendon sheaths may lead to ankylosis. The sheaths becoming affected may rupture large blood vessels and result in fatal hemorrhage. Large ulcers situated in neighborhood of joints often impair their function.

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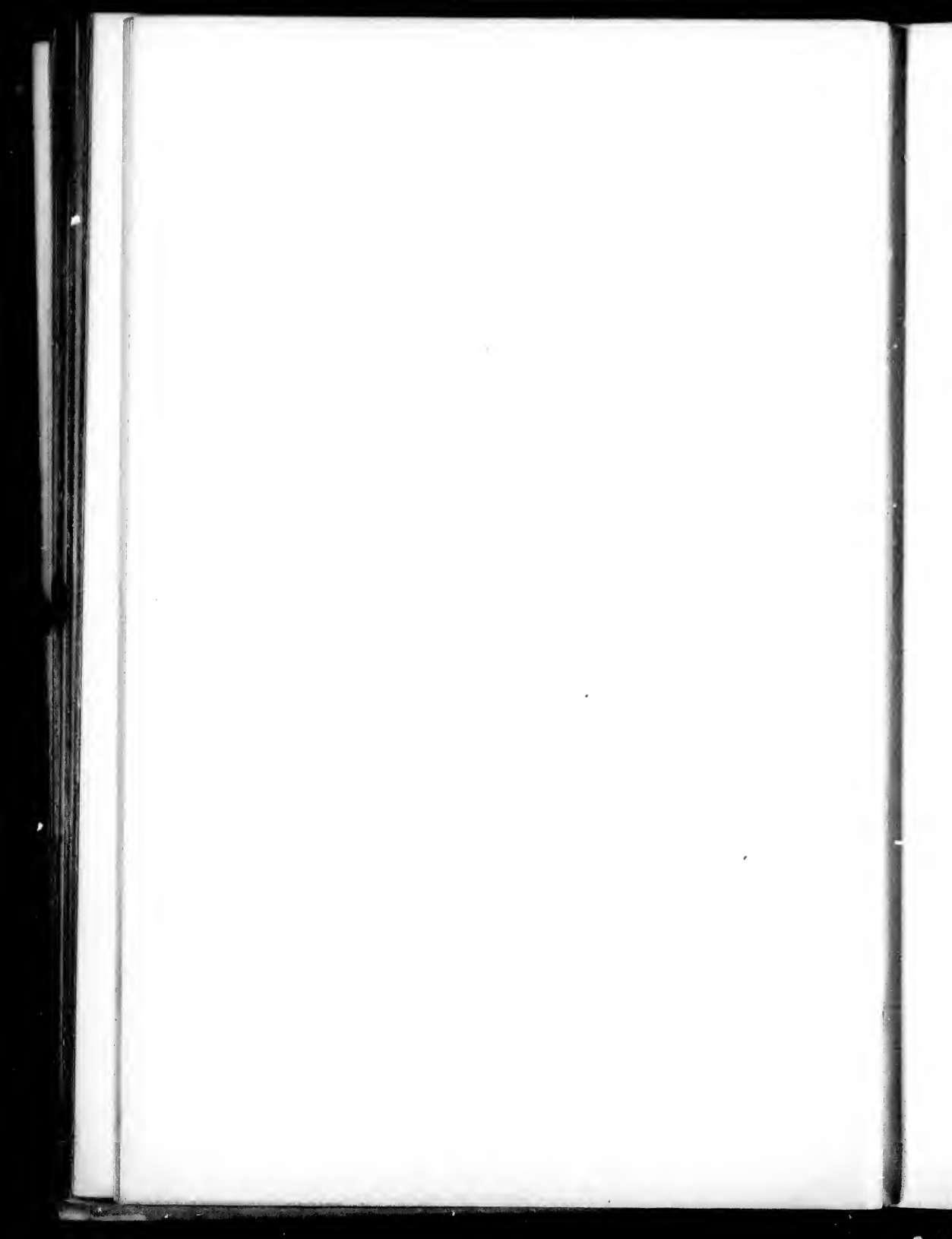
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An ulcer surrounding a limb, when healed, may lead to oedema. Two varieties, 1. Solid oedema leading to elephantiasis. 2. Pitting oedema. Large ulcers any where may lead to horrible deformities. An ulcer is always a source of danger, phlebitis and periphlebitis, may become infected and lead to a pyaemia or septicaemia. It may be the focus for infection of erysipelas.

Diagnosis.—Includes the condition and cause. In studying the features, consider base, edge, surrounding tissues, character of discharge and character of pain present.

Base may be shallow or deep; smooth or granular, sloughy, eroded, indurated and bound down to deep structures, fungating. Character of healthy growth on floor of ulcer—bright red in color; small in size and uniform; neither painful nor tender, and discharge consists of a *laudable* form of pus. Small scattered irregular granulations are due to venous congestion. When sodden with serum may be oedematous, flabby, soft, often bleeding easily.

The edge may be sloughy, irregularly eroded, shelving or undermined, characteristic of tuberculous ulcer, or may be sloughed out, characteristic of Paquelin's cautery or nitric acid. The edge is characterized by three zones. I. A narrow inner one, bright red tinge due to granulations. II. Middle zone, purplish hue. III. An opalescent or milk white zone of almost complete epitheliation.

A rounded, thickened, adherent edge indicates an ulcer of long standing. An infiltrated edge is seen in syphilis, lupous and epithelioma.

A spreading ulcer will usually have eroded edges. Eversion of edge of ulcer characteristic of malignant disease.

Surrounding tissue may be quite healthy, often the result of Paquelin's cautery, but same characteristic is well marked in syphilitic ulceration of upper portion of leg. Surrounding tissues may be inflamed, red, swollen, oedematous, painful, tender, characteristic of inflamed ulcer. Surrounding tissue beside edge of ulcer may be indurated and infiltrated if long standing. Surrounding epithelium may be much thickened from piling up of epithelial scales, or in varicose veins surrounding tissue may be cold and livid.

The discharge may be laudable pus, or may be abundant and thin as in icterus, irritating surrounding structures. In scurvy may be hemorrhagic. Bubo may be infective. Pain may be nil, as in healthy healing ulcer; may be smarting, tingling and burning, as in inflamed ulcer; may come in paroxysms and be radiating.

Ulcers.—Healing ; spreading ; stationary. Healing.—Floor, almost on a level. Granulations, small and bright red. Discharge, very little and of a creamy yellow colour. Edge, the three zones.

Varieties of Ulcers.—I. *Simple*, one which does not heal on account of a local irritable cause. Such are not deep, and granulations usually yellow or brownish red, margins sharp, and surrounding parts usually show some slight oedema or firmness. Situation, lower part of leg. This may grow and produce

II. *Inflamed Ulcer*.—Which bleeds readily, and as process is an ulcerative one, discharges freely owing to extension of process, increases fairly, rapidly, often find little sloughs along base; surrounding skin red, oedematous, and if not properly cleaned, produces erosions.

III. *Irritable Ulcer*.—About fissured rectum and internal malleoli; base red, often elevated above surrounding tissue. It is excruciatingly painful in one particular spot due to presence of an exposed nerve filament on floor, frequently associated with other neuroses. Most of cases occur in aged women, often associated with menstrual disturbance.

IV. *Weak Ulcers*.—Due to: I. Cutting off of arterial supply to a part. II. Venous obstruction. III. Impaired quality of the blood. Granulations usually smooth, yellowish scanty secretion, and is apt to become crusted; edges of ulcer pale and flat, not sloping. Often when venous obstruction coexists, as may arise from fibroses, Bright's or heart disease, granulations apt to become flabby and overgrown; bleeding readily, giving rise to proud flesh. It is called a fungous or exuberant ulcer.

V. *Varicose Ulcer*.—Surrounding tissue apt to be oedematous, and from itching is excoriated by finger nails, epithelium

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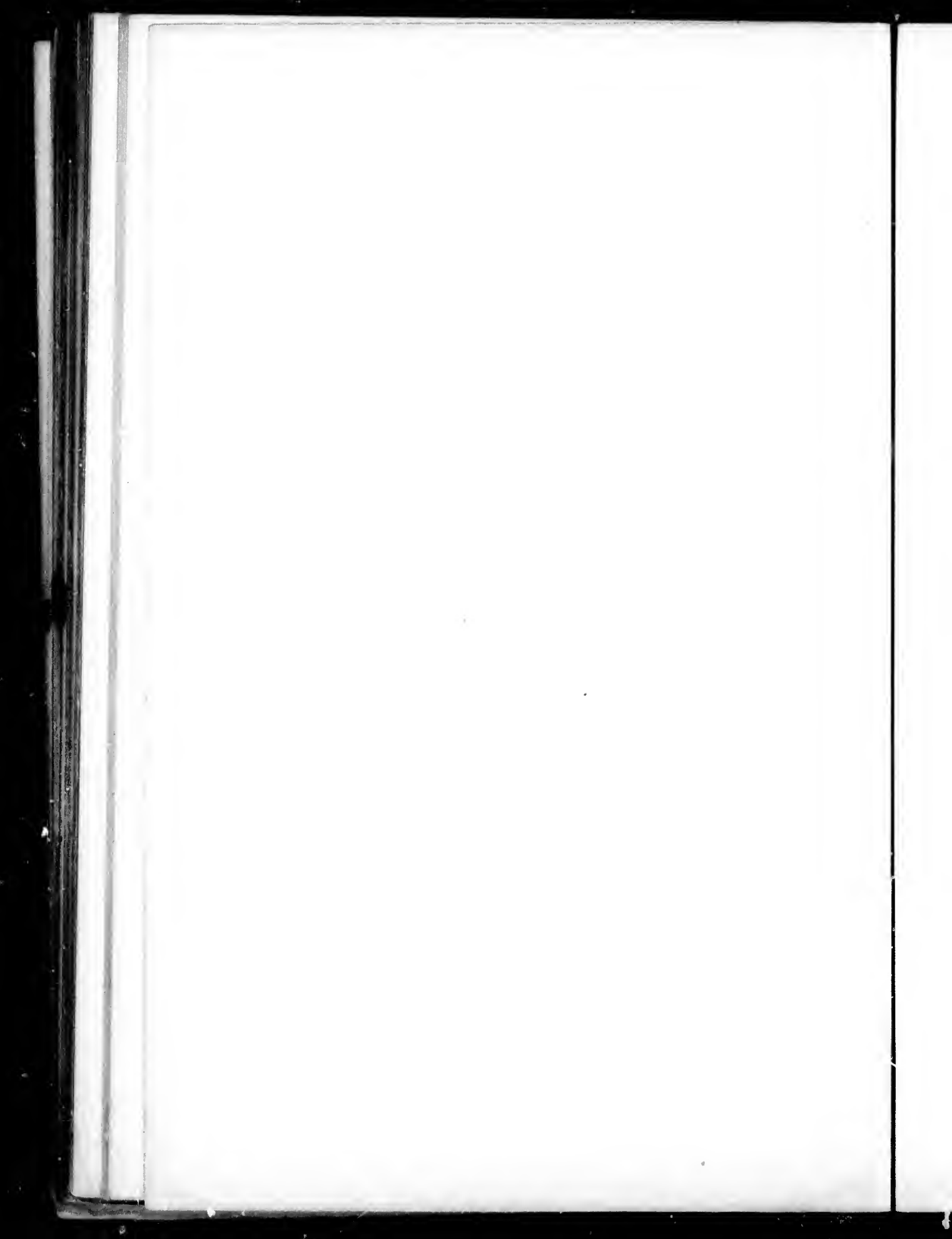
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is macerated, owing to tissue being infiltrated with serum. The source may be the simple giving way of a vein.

VI. *Callous or Indolent Ulcer*.—Is particularly liable to be a terminal condition of neglected ulcers, apt to arise in varicose legs in old people with diminished reparative power, especially when this leads to cutting off of arterial blood supply.

Surrounding structures always thickened and oedematous, base depressed and fixed; nearly always pale; no granulations; discharge always thin, never pusy. Edge thickened, usually rounded, not sharply cut, usually white, and from its look is devoid of inflammation. It is simply a sore in a stationary condition. The situation is the lower 3rd of leg and the victims poor people.

VII. Haemorrhagic ulcer is exceedingly rare, associated with scurvy. Edges and base are swollen, reddened and covered with clotted blood.

VIII. Ulceration due to pressure or to deficient enervation. Pressure ulcers are particularly liable to occur in the foot by development of callous on big or little toes. This callosity may go on developing for weeks or months, then inflammation takes place; the inflamed product collects between horny epithelium and rete mucosum and burroughs its way through. Character—a layer of horny epithelium with cavity in centre; base of ulcer usually covered with fungus, granular and bleeding readily. Granulations always become necrotic and have a bad smell.

Bed-sores.—Due to continual pressure over bony areas. They are formed by a giving way of a portion of tissues, caused by the cutting off of the blood supply, diminished vitality of tissues as in typhoid fever, etc. They are really pressure ulcers.

Perforating ulcer of foot is closely related to above. It begins as a horny layer in same situation, rarely extends in circumference. It involves tendons, fascia, ligaments, joints and bones. It begins exactly as preceding by a funnel shaped cavity and a piling up of epithelium. Two horny surfaces will not unite. It is frequently associated with tabes dorsalis and peripheral neuritis. There is a condition of local anaesthesia.

Phagedenic ulcer is caused by the presence of micro-organisms, as the venereal sores on drunkards; but is extremely rare due to aseptic surgery. It is a variety of gangrene, although the process is a truly ulcerative one. The base of ulcer is covered by a pulpy greyish green false membrane, beneath which a rapidly melting of tissue takes place. Surrounding tissues necrotic looking, dusky; not much swelling, because tissues seem incapable of reaction to injury; offensive odor. Condition always grave because may extend with frightful rapidity.

*Condition of healing.*—1. Base must be on a level with surrounding tissues. 2. Margins of ulcers must be moveable. 3. Whole sore must be capable of contracting as well as margins. 4. Granulation must have a healthy appearance.

*Treatment of Ulcers.*—Find out and remove cause. Improve conditions of base so as to favor granulations.

If it is a healthy healing ulcer, all we have to do is to protect from injury, keep aseptic, and at rest; cover with oil silk and gauze on outside. If granulations under this become fungous then use astringents and pressure.

Rest in bed and splints of the utmost importance. If due to venous obstruction, put patient to bed, apply splints to leg and then elevate. May use Martin's rubber bandage. Asepsis same as for operation. Scrape with spoon. If much discharge, dress frequently. Once a condition of healthy ulcer is obtained, treat as above.

Oedematous ulcers require to be treated with caustic or curette. If a sloughing ulcer, provide for removal of slough by hot antiseptic fomentation, not strong, bi-chloride, 1-10,000 or Thiersch's solution.

Irritable ulcers must have base destroyed by caustic, cautery, or sharp curette, thus killing the nerve. After this treat in ordinary way.

*Weak Ulcers.*—Particularly after burns. When ulcer is over joint it is sometimes necessary to excise the joint.

Varicose ulcers treat on general principles. Callous ulcers may require blistering, or pressure by rubber bandage. In order to relieve tension, may be necessary to make multiple parallel incisions through base.

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Perforating ulcer must have callosity removed and then treat base.

Phagedenic ulceration, a microbial infection; destroy all infected tissue by cauterization. Paquelin's or Thermal Cautery. Then apply moist dressings, Thiersch or bi-chloride, 1-1,000.

To stimulate ulcers.—Sulphate of copper, grs. i-x to the oz. Sulphate of Zinc, grs. i-x to the oz. Nitrate of silver, grs. i-x to the oz. Chloral Hydrate, grs.  $\frac{1}{2}$  x to the oz. Always begin with a weak solution and increase.

Resin ointment.—Resin and yellow wax; Balsam Peru, Cantharides. Iodine (str.), Ferri Pot. Tart.—Red wash.

#### GANGRENE.

Death of the part *en masse*. Mortification or Sphacelation, or sloughing of the soft parts, necrosis of the hard tissues (sphacelus is complete mortification of the parts, generally preceded by gangrene, the incomplete stage).

It differs from ulceration in that the dead portions are visible. It is:—(1) Mixed when 1st moist and then dry.

(2) Primary, when death of the part occurs directly as from a severe burn.

(3) Secondary when death of the part follows acute inflammation.

(4) Idiopathic, when causes not known.

(5) Thrombic or Embolic.

(6) Constitutional, when due to constitutional causes as diabetes.

(7) Pressure when due to long constriction of the part.

Three Great Divisions:—Moist. 1. Inflammatory—this characteristic. 2. Traumatic. 3. Diabetic. 4. Hospital. 5. Purely local:—(a) Cancrum oris. (b) Noma vulvae. (c) Carbuncle. (d) Decubitus. (e) Phagedena.

Dry:—1. Embolic or from ligature. 2. Senile (characteristic form). 3. Raynaud's symmetrical. 4. Ergot. 5. Frost bite (may be mixed).

Septic Forms Proper:—1. Inflammatory. 2. Traumatic.

3. Hospital. 4. Local forms:—(a) Cancrum oris. (b) Noma Vulvae. (c) Carbuncle. (d) Phagedena.

Causes of Gangrene in General:—Predisposing:—(a) old age, (b) chronic congestion, (c) blood affections, diabetes, and Bright's, (d) weak heart, (e) disease of the nerve trunks, or nerve centres.

Exciting:—(a) Inflammation, (b) physical agents (violence), (c) Excesses of heat and cold, (d) chemical agents, including putrid secretions (urine), (e) obstruction to the arteries, capillaries or veins to the part.

Inflammatory Gangrene:—(Typical moist form.) (1) Obstruction to main artery and vein. (2) Constriction, causing obstruction to venous return. (3) Severe crushes and lacerated wounds. (4) Excessive heat or sometimes cold. (5) Extensive burns.

Local symptoms of moist gangrene:—(1) Intense redness, pain, swelling and heat, except the traumatic form which is blanched. (2) Mottled appearance, then dusky brown; yellow and green. (3) Red streaks in the line of the vessels. (4) Temp. falls markedly. (5) Diminished sensibility. (6) Local oedema. (7) Vesicles filled with dark serum (similar vesicles are seen in intense bruising, as fracture), and yet, at this point some parts may be living, and get partial recovery. (8) Blebs run together and break, exposing the raw true skin. (9) Sickening odour, getting worse and worse. (10) Sensibility completely gone and part cold. (11) Colour black. (12) Crackling denotes emphysematous gangrene.

Septic Gangrene differs only from moist in its Bacteriological character.

Local symptoms of Dry Gangrene:—Mummification of the parts gangrenous. Senile form is the type seen where the main artery is plugged, and venous return is good. It becomes more suddenly cold and blanched; within 48 hours it becomes blue, then green, then black. Skin is shrivelled, outer layer horny. Moist spots may appear here and there, and then soon disappear; moisture occurs at the juncture of living and dead tissue.

In both forms when gangrene reaches a part where the

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blood supply is too good to be destroyed, the red line of demarcation forms; redness is most marked towards the dead part, owing to the erection of a barrier of lymph. Then suppuration sets up and a groove appears, which deepens by ulceration until the limb falls off. The direction of the ulceration is oblique so that the stump is conical, also irregular by the greater resistance offered by certain tissues, e. g., the vessels. As a precaution against bleeding, plug 2-3" up. In the leg it usually takes two to three weeks to reach the bone, and three to four months to ulcerate through it. If no operation, stumps heal like a chronic ulcer.

Constitutional Symptoms of all Forms of Gangrene:—These vary with the extent, always more marked early while lymph barrier still weak. 1. Great depression; face dull and anxious. 2. Pulse quick and compressible. 3. Temp. high at times, occasionally a chill. 4. Skin moist and clammy; tongue brown. 5. Great thirst and muscular prostration. 6. Probably albuminuria. 7. Often diarrhoea. 8. Muttering delirium, and typhoidal state latterly. In dry gangrene the symptoms are less marked.

Ordinary treatment of gangrene in general:—1. Very nutritious food, often in small amounts. 2. Stimulants early if pulse feeble. 3. Opium almost always, or, if it disagrees, give Chloral; Hyoscyamus; Cannabis Indica; Sulphonal. 4. Keep the bowels regular.

Local treatment:—1. Warmth to the part by absorbent cotton and flannel bandage. 2. Slightly raise and flex the limb; friction. 3. Antiseptic measures from the outset; Phenol 1-80; Sublimate, 1-1000; Salicylic acid; Boracic; Permang. K.; paint with Balsam Tolu; charcoal, yeast, and linseed poultice, made with Phenol, 1-40 to 1-80. 4. Let the sloughing parts separate as they will. 5. Treat stump as an ulcer.

Treatment of special forms of Moist Gangrene:—1. Inflammatory. This is due either to pressure of inflammatory exudate and consequent thrombosis, or perhaps due to the irritant that caused the inflammation. It is almost always septic. Some forms of inflammation such as carbuncle always cause gangrene. Use general treatment until the form becomes plain.

2. Traumatic. Generally caused by severe crushing, fracture and maceration of large vessels; there may also be inflammation.

(A) *Local*:—Generally from crushing, soft parts being greatly torn. If done by a wheel or other blunt thing, the skin may not be greatly injured. If skin is broken, inflammation is generally immediate. If skin is unbroken, we have extensive exudation of blood, destroying the part by pressure and blanching the limb, which is also very cold, tense and pulseless; loss of sensibility—colour changes.

Up to this point, relief of the tension will often, at least partially save the limb. Line of demarcation appears generally just above the injury. The constitutional disturbance is slight.

(B) *Spreading*:—If tension be long continued, the inflammation produced spreading into the lymph spaces causes deep-seated inflammation. This occurs generally in the feeble; mortification may not appear for two or three days, and then may be above the seat of injury. It tends to spread to the trunk, preceded by discolouration and oedema, etc. Have high tension of the skin. Rapid pulse and resp. Temp. 104-105, sometimes typhoidal condition.

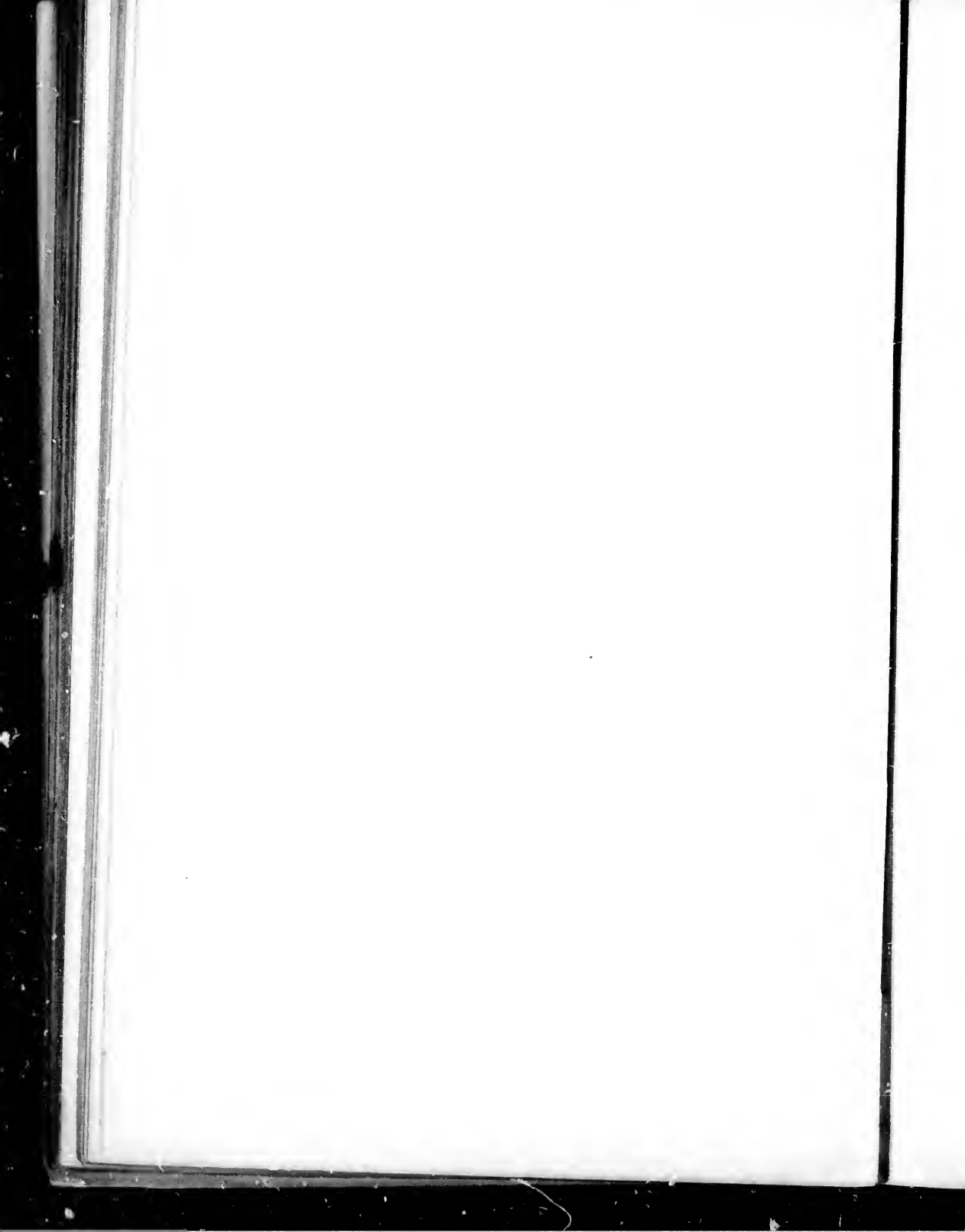
Treatment of the local traumatic form:—Amputate if the patient can stand it; if not, apply general measures, and wait for line of demarcation. It may, however, change to the spreading form.

Treatment of the Spreading Form:—Often extremely difficult. In a few strong subjects, often may be able to amputate. If so, operate high up. As a rule we can only apply general measures and await the end.

3. Hospital Gangrene:—This is a rapidly spreading inflammation, accompanied by extensive sloughing (localized gangrene), which has now practically disappeared from civilization.

The streptococcus causing it is from sepsis in treating the wound. The edges of the wound become oedematous and gradually melt away. Wound takes on sloughing action. Have thin, greenish or bloody discharge and very nasty odour. Large part becomes gangrenous, and sloughs off, leaving gaping ulcers in which hemorrhage occurs.

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Constitutional symptoms are marked, generally typhoidal.

Treatment:—1. Strict isolation, burning of bed clothes, dressings, etc. 2. Cauterize the slough with  $\text{N}_2\text{O}$ ,  $\text{Ac}$ , and solid Zinc Chlor. Cautery, Bromine, and repeat if necessary. 3. Then charcoal, linseed, and Phenol poultices, Bromine solution, Pot. Permang. 4. As it improves Boracic and Iodoform. 5. If a limb, irrigate for hours; keep it in antiseptic solution, for long periods of time. 6. Amputation is occasionally necessary, after line has formed, where involvement is great, or where we have hemorrhages.

4. Diabetic Gangrene:—May occur in the legs of anyone having diabetes, but especially in those who have weak heart, or are old. It frequently begins in a bleb under the foot or one toe (sometimes on the genitals, buttock or eye), and perhaps from slight injury, or perforating ulcer.

Treatment:—General measures and wait for the line of demarcation was the old rule, and then amputate, but Kuster, of Berlin, proved that amputation high up, middle third of the thigh, without waiting for the line of demarcation, saved 6 out of 11 cases. Sometimes Glycosuria ceased temporarily after amputation; proper diabetic diet and treatment are essential.

Special Forms of Dry Gangrene:—1. From Embolism and Ligature. Patient complains of sudden and severe pain and tenderness at the seat of embolism, at which point pulsation ceases, part below dry, cold, blanched, shrivelled skin.

Treatment:—Ordinary measures; keep warm; amputate immediately just above the point of constriction and obstruction.

2. Senile Gangrene:—Typical dry gangrene. It always begins in the legs, results from atheroma, and consequent clot formation and embolus may come from the heart.

Generally begins as a black spot on one side of the toe or foot, often begins as a sluggish inflammation after slight injury; pain often intense, Temp. often hardly raised, spirits low, muttering delirium, line of demarcation appears slowly.

Treatment:—General treatment always opium and alcohol (generally hypodermic with atropine), and keep limb warm.

Amputate without waiting for the line of demarcation, slightly lower than in diabetic form. (Hutchison says lower third of thigh, not so high as Kuster). It tends to become moist as it extends upwards into the calf.

3. Raynaud's or Symmetrical Gangrene:—This is a vasomotor neurosis in children and young adults, and is symmetrical (generally the fingers, toes or ears). Exists generally for months, with local intermittent cold and numbness.

*Treatment:*—Preventive by electricity, warm massage, always wait for the line of demarcation, and for a time remove parts by forceps and scissors, poulticing until circulation is better, then amputate.

4. Ergot Gangrene:—Occurs when Ergot has been mixed with the food, and acts as Raynaud's disease, by contraction of the vessels, anaesthesia, tingling pains, cramps in the fingers, toes and limbs. Dry gangrene becoming moist in places. If severe may have extension and death in eight (8) days. In the more chronic form await the line of demarcation, which is generally early, then amputate.

5. Frost bite:—Due to cold and feebleness, have first blanching, and then erythema, vesication, and possibly gangrene; more moist if gradually produced.

*Treatment:*—Rub with snow or cold water cloths. Keep in cool room, rub with fur, envelop in cotton wool. If vesication, treat as a burn, lead and opium, or Carron oil. Always wait for the line of demarcation, as more or less of the part may be involved than expected.

Local Forms of Gangrene:—I. *Cancerum Oris*—or Gangrenous stomatitis, occurs in children, 3 to 8, who are badly fed, and who have bad hygienic surroundings. Salivation of an offensive character is noticed. Cheek inside is shiny, rosy, swollen, hard and brawny; gums may be affected later. Skin of the cheek becomes pinkish, then black, and gangrenous, and soon a cavity forms opening into the mouth. Pain is often not very great, but constitutional symptoms are severe. In severe cases, 3 to 6 days, cheek is destroyed. Jaw attacked, and comatose; death. Only 1-20 are saved. A bacillus is probably the cause.

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*Treatment*:—Immediately slough appears, give ether, and apply nitric acid thoroughly (this is the best), or Ac. Nit. of Mercury, solution of Bromine, Phenol or Zinc Chlor. Subsequently apply a solution of Pot. Permang. or Pot. Chlor. and Glycerine on swab. Borac-Ac. Diet. Beef essence by the mouth and rectum. Spts. of Ammon. Aromat., Quinine, Fe and Ergot.

2. Noma Vulvae :—Similar to Cancrum Oris ; a phagedenic sloughing. Begins on the skin or muc. memb., extends into the groin, forming a chasm, where the vessels may be exposed. Death occurs from exhaustion and sepsis.

*Treatment*:—The same as Cancrum Oris.

3. Carbuncle or Benign Anthrax :—Is a local gangrene and not a skin disease. Infection occurs probably through the hair follicles, by Staphylococcus Pyög. Aureus.

*Symptoms* :—It resembles a boil, but with intense infiltration of the surrounding tissues, and much greater constitutional disturbances, septic fever, agonizing pain, and part soon oedematous. In about 3 or 4 days there is a large inflamed area, containing a number of pustules, which break about the 10th day, exposing a necrotic core, giving a honey-combed appearance and bloody purulent discharge.

They rapidly coalesce: may be as large as a hand.

*Seat*:—Commonest in the scapular region, and back of the neck, rarely the face (in face there is liability of septic Phlebitis and Meningitis).

*Treatment*:—(a) Under anaesthetic, make a crucial incision well into the healthy skin. Turn up the flaps and scrape out all dead tissue (scissors, spoon, forceps, scalpel), arrest free bleeding by hot sublimate and pressure, dress with Iodoform gauze, and treat as an ordinary ulcer. Peroxide good for after dressings. (b) Give Morphine hypoderm the night after operation. (c) Quinine as an antipyretic. (d) Nutritious broths and stimulants.

4. Bed Sores, or Decubital Gangrene :—Is a form of pressure gangrene occurring on the heels, trochanters, sacrum, elbows and scapula, occiput, especially after spinal lesions.

*Treatment*:—(a) Preventive, by using air or water bed for

cushion, bathing with alcohol, camphorated spirits. Spiritus Aetheris Nitrosi, or alcoholic solution of Alum and Tannin. A series of rings of soap plaster, frequent change of position.

(b) When present poultice with yeast or charcoal, with antiseptic solution to get rid of slough, separating with scissors as soon as possible, leaving raw surface.

(c) Use Silver Nit. grs. XX. to the oz. to restore healthy action.

(d) Next day cover with Zinc and Ichthyol Ung., and absorbent cotton.

(e) Then wash with sublimate and dress with Iodoform.

(f) Later replace Zinc and Ichthyol Ung. with Zinc Ung., and Balsam of Peru, added 1 dr. to the oz. of the Ung., or, what Dr. Roddick prefers, the Ung. Plumb. Co. of London Pharmacy. Sometimes sloughing obstinately progresses, and patients become run down, and die, mainly from the decubitus.

(g) Nutritious food, and sometimes stimulants.

5. Phagedena:—Is not an ulcer but is Gangrene; met with usually in syphilitic cases. In chaneroid. Tissue around the sore may get tense suddenly and gradually blacken. This is the beginning of the destructive action, which may become extensive. (Much of the penis may be carried away, extending into the groin). It occurs especially in those broken down by long disease or intemperance.

*Treatment:*—Constitutional treatment is very important. Iron is often indicated. Richard gives Potass. Tartrate of Iron, gr. X t. i. d., also perhaps Mercury between times for 8 to 10 days, or at same time by inunction or injection.

*Local treatment:*—Apply Nitric acid, or Acid Nitrate of Mercur., pure ferric chloride. Richard applied Potassic Tartrate of Fe. grs. XX to oz. Remove slough, or place part for hours in an antiseptic bath of Phenol, Sublimate and Boracic, to wash off the supuration as formed.

#### WOUND DIPHTHERIA.

Occurs frequently in diphtheria epidemics, in wounds not kept aseptic, especially wounds about the genito-urin-

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ary tract, as circumcision, urethrotomy and vaginal fistula. Operations are also frequently followed by wound diphtheria. A tough grey fibrous membrane appears on the part, which contains, beside the fibrous exudate, granulation cells, micrococci, and the Klebs Loeffler bacillus in the genuine form. In pseudo-wound diphtheria we have only pyaemic streptococci. It is very fatal, especially in children, particularly by producing sepsis, and so producing extensive cellulitis.

*Treatment*:—If possible tear off the diphtheritic membrane, and apply Silver Nit. to the granulating surface; if this not sufficient, apply Nitric Ac., followed by Phenol 1-8, Glycerine after, and wash with Corrosive sublimate. Papoid is excellent, and can be more thoroughly applied; then dress with Iodoform. Relieve any tension by early incision.

*Internal*:—Improve the general health; give Tinc. of Fer. Mur., with Pot. Chlor. and Quinine. Try antitoxine.

### SYPHILIS.

Syphilis is a general infective disease, transmitted by contact and inherited; chronic in its course. Caused by morbid secretion from a previously syphilized person.

Begins locally, invades the whole organism, especially the connective tissue; produces inflammatory processes of a low grade; gives rise to granulation tissue.

Resembles in some respects Leprosy and t'b.c. It differs in having an initial lesion or primary sore.

In the early stages there are many points of resemblance to Exanthemata and Diphtheria.

Like Exanthemata it originates in a mixed infectious fever, with eruptions, constitutional symptoms and period of incubation. Resembles Diphtheria in having a local origin, attacking one part; alike also in plan of systemic poison, in producing peripheral paralyses and infectious form of nephritis.

From analogy, a disease of microbic origin. Klebs, Lustgarten and others have found in active and early syphilitic lesions, curved "S" shaped bacillus with enlarged ends, but their numbers are small, presence not constant, and attempts to make cultures failed.

ORIGIN AND HISTORY:—In Europe towards the end of the 15th Century (1494), a violent outbreak at the siege of Naples, believed at that time to be introduced from America. It probably existed previously to this date in milder form.

Syphilis has grown less virulent within the last 25 years; the treatment is better, and the police regulations improved.

Methods of Propagation:—1. Acquired, beginning in lesion of a local nature. 2. No local primary lesion, disease general; in infant or young. Hereditary.

How Contracted:—Generally during sexual intercourse, called Intergential Syphilis.

Other parts of the body:—Extra-Genital Syphilis.

*Extra-Genital* form contracted:—Through kissing, sore on lips or mucous patch. Child may infect nurse, or nurse may infect child. Midwife in the lower classes may infect the mother on nipples in drawing the breast. Through scratches or bites. Surgeons frequently contract syphilis in operating, and *accoucheurs* in making vaginal examinations. In tattooing, by using saliva to wet the needle—a dangerous practice. In skin grafting. Among the Jews in circumcision.

Further modes of acquiring Extra-Genital form:—Vaccination, from soiled scarifier, or humanized virus. Hutchison investigated one such case, and those opposed to vaccination cite this case. Should take care in vaccinating those in a factory; use a spirit lamp. Dentists by unclean instruments. Pipes, cigars, tooth-brushes, drinking utensils, razors, surgical instruments, chewing gum. Blood capable of transmitting. Normal secretions of Syphilitic subjects do not contain any virus, but may be contaminated with pathological secretions or blood. The saliva is harmless if the mouth is free from lesions, but not otherwise. Semen of a man at any time is not an infective fluid. Women not so infected, but child in directly infected and mother secondarily. Milk of a syphilitic woman does not contain virus, nor does the sweat or urine.

STAGES:—Not always separated, but means of classifying as follows:—I. Primary. II. Secondary. III. Tertiary.

PRIMARY:—1. Incubation. 2. Appearance of initial sore.

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SECONDARY:—Period of secondary symptoms, and eruptions, and may occupy a year or two.

TERTIARY:—More remote lesions, gummata, etc.

Between the latter two stages, perfect health may intervene.

PERIOD OF INCUBATION:—Some time intervenes between the inoculation, and the appearance of the initial sore. Virus is deposited upon some part of the body, the Genitals or Extra-genital, and in many cases person is unconscious of it, others a small sore disappearing in a few days. Incubation may be from 10 to 70 days, generally average between 12 or 15 and 21 days. After expiration of this time the chancre shows itself. Question is:—How long is the poison localized at the seat of inoculation before entering the system? probably very short time, especially because the seat of abrasion has in many instances been destroyed or incised immediately after exposure, and yet syphilis occurred.

When period of incubation is past, we see a peculiar growth of new tissue, chronic inflammatory process, beneath the epithelium, hard and indurated, formed by the infiltration of connective tissue with S. R. cells, larger cells, mononuclear and multilocular cells.

This induration as a rule is marked and decided, but may be modified by the tissue in which it is formed, mucous membrane differing from the skin.

Induration comes on usually very early; other cases of course may be deferred. May be sore for from the 10th to the 14th day before the induration is marked.

As a rule, only *one* chancre; few exceptions. Cases have been observed where *two sores* were observed. Usually where two sores found, one will lose the characteristics of a chancre, the other alone continuing to bear them.

SITE:—In male. Found on the glans penis, prepuce, skin meatus, immediately within the meatus, scrotum and peno-scrotal angle.

In female:—Labia Majora, entrance to vagina, meatus sheath of clitoris, and os uteri.

Clinically two forms of sore:—1. Desquamatory papule. 2. Indurated or Hunterian Chancre.

Desquamating Papule:—This appears as an elevated copper-coloured hard spot, covered with scales, almost invariably found on the skin of the penis, in dry places, seldom found beneath the prepuce or in or on the gland; gradually extends and becomes flatter, indurated, elevated edges, sharply defined; edges may be one-sixteenth in. above the surface; one-half an inch wide. If not irritated, it remains dry, but if irritated, it becomes moist, ulcerates and assumes the second form of the diseased sore. It may be overlooked, as it may cause no inconvenience, painless, and thus may get the extreme form of the disease.

2. HUNTERIAN CHANCRE:—Often begins as a papule, as a rule a little ulcer, on the glans Penis, or Corona in the fissure behind. Very soon it assumes a deep unhealthy look. Induration early, marked and extensive; surface is early cup-shaped. Edges raised above the surface, cartilaginous feel; lifts away from the tissues below; painless and discharge slight, always thin, serous discharge; parchment induration. Irritation brings on a pustular discharge.

Several less Distinctive Forms:—1. Chancrous erosions, looks like an erosion of the epithelial layer, irregular, color dull coppery red.

2. Herpetiform:—Vesicles burst, leaving a chancre, common in herpetic people.

3. "Silvery Spot," looks as if part touched with Carbolic or Silver Nit., in a few days a little ulcer, increases slowly, indurated. Probably ulceration always due to local irritation.

4. "Mixed Chancre," a species of mixed infection, very puzzling; appears early, chancreoidal, generally very virulent, markedly "Hunterian" on glans penis.

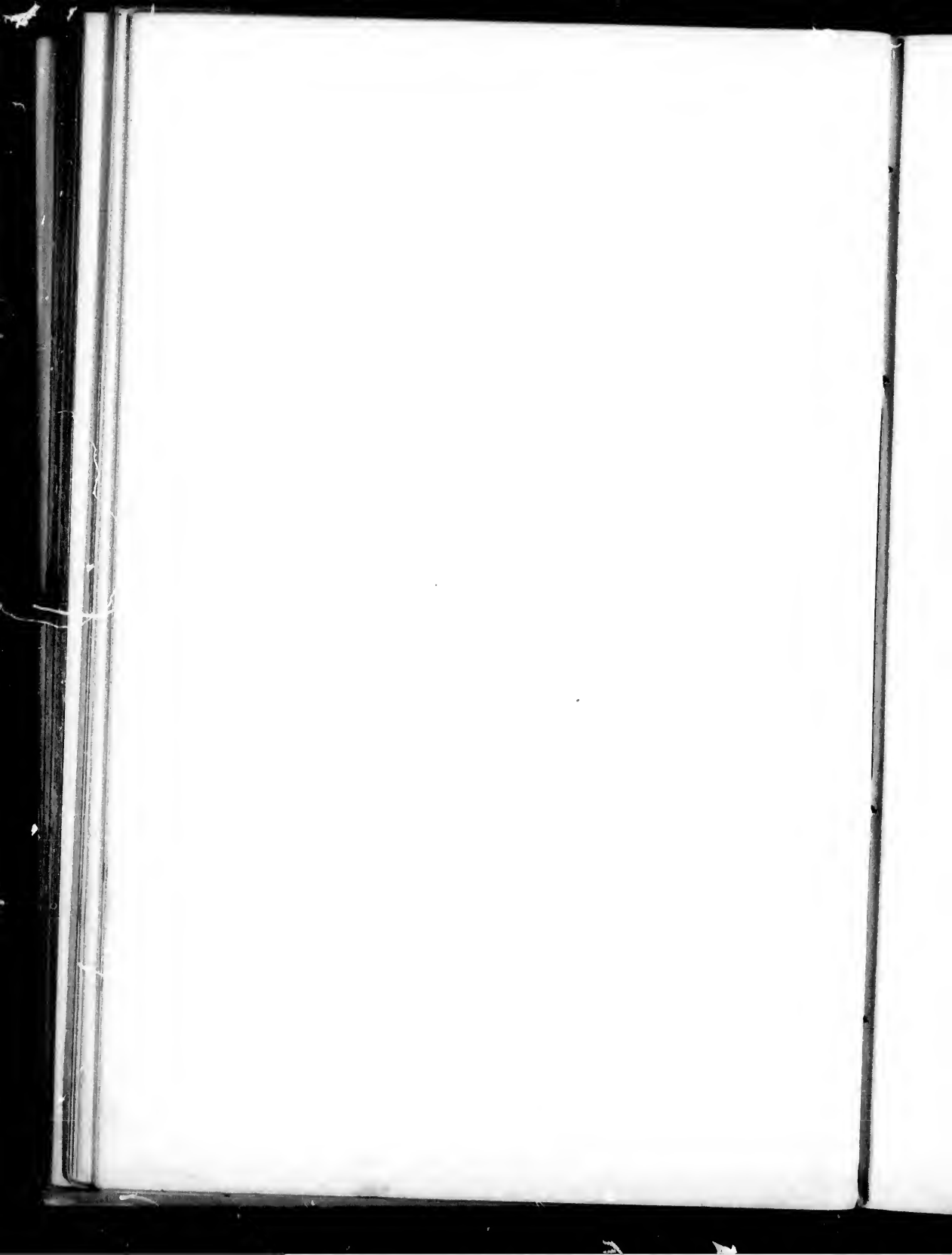
5. Urethral Chancre:—Immediately within the orifice, and may be seen on opening the lips; tends to extend outwards; sometimes more deeply seated, discovered by accident with the endoscope, or felt by patient, often treated as gonorrhoea.

6. Chancre of the Scrotum:—Appears often as a primary lesion, virus rubbed off the penis, large, well rounded, sometimes oval, seldom irregular, often saucer-shaped, covered with membranous-looking substance; here get parchment-like induration.

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7. Extra Genital Chancres:—Generally dry, and run a chronic, indolent and painless course, and last longer than the genital.

(a) Anus.—more frequently in women from the virus trickling behind.

(b) Finger. Appears as a small sore by the side of the nail, accompanied by much swelling—red, painful, finger bulbous, resembles a malignant sore.

(c) Lip:—Quite common, usually situated on the vermilion border, involves the muc. memb. and skin: usually fissured, induration early; may be marked; may be purely "Hunterian," especially at the angle of the mouth, ulcerates and suppurates early. The nearest lymphatics are early implicated; malignant sore takes months.

(d) Tongue:—Rare—might also be mistaken for a malignant growth, early enlargement of the glands is diagnostic.

(e) Tonsil:—Should be thought of in treating irregular ulcerations of the tonsil: Sore irregular, induration marked; sore may be red. Often covered by a milky or dull brown membrane, now and then resembling the diphtheritic memb. It is painful, submaxillary, sublingual, and other glands enlarge.

In women, chancres of the genitals do not show any specific characters differing from those of men. Induration is less marked, more likely to be suppurative, may be followed by oedematous spots. Chancre is sometimes commonly found on the Os, either lips, and sometimes surrounding the Os. Edges are circular and raised, covered with a greenish membrane, causes oedema. Indolent, painless induration present, but difficult to make out.

COURSE:—From 7 to 11 days after the initial sore we get commencing induration of the Lymphatics (the glands) in the immediate neighbourhood. As a rule one gland enlarges first, several immediately following. The glands of both groins are implicated.

If chronic on one side, the glands of that side are affected first, painless, intensely hard, and feel like beans. Each gland clearly distinguished from neighbors, from the skin and un-

derlying parts. No infiltration or doughy feeling. Suppuration outside of the disease. At the same time the enlargement of the dorsal lymphatics is very marked sometimes. They are felt as hard masses.

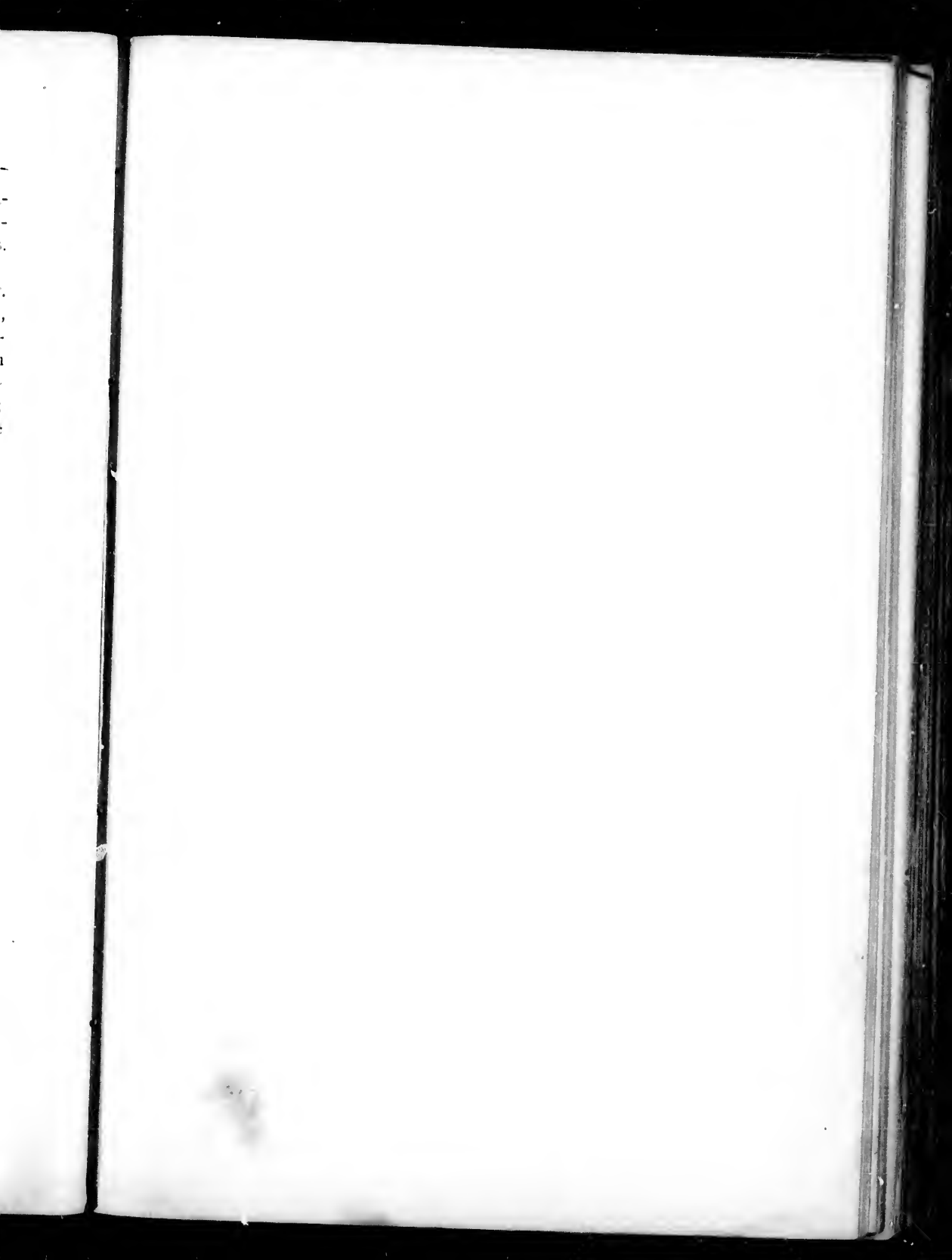
*Treatment*:—Chancre:—Recent method not satisfactory. Frequent cleansing with hot water. Hot borated solutions, and if painful the application of Cocaine. Dusting with Boracic, Aristol, Naphthol, Iodoform. Calomel pure, or with Zinc, is an excellent application. Sublimate only recommended where ulceration is extensive. Black wash is good; never use anything irritating. If sluggish may stimulate with Silver Nit.

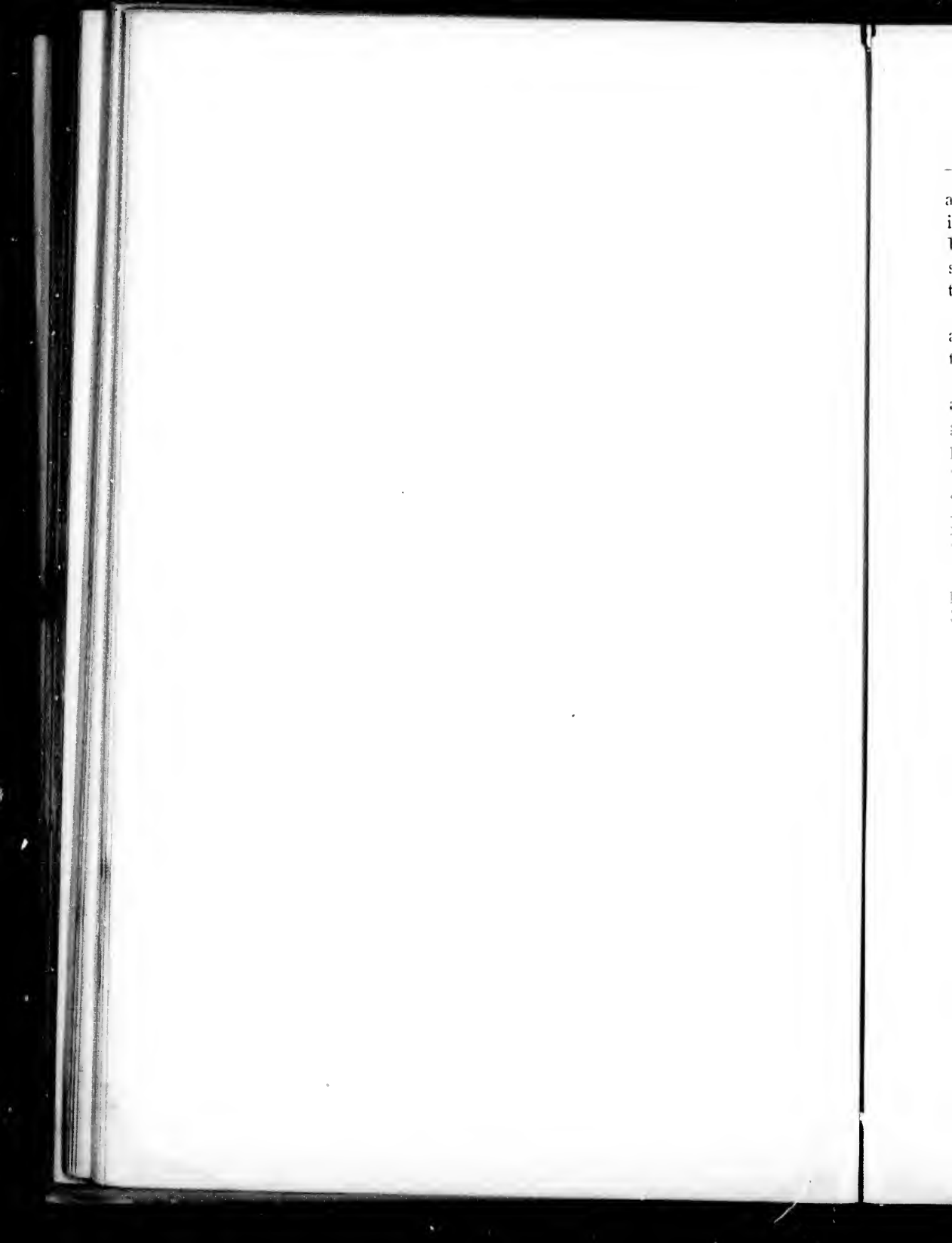
#### CHANCROID.

A local sore, a local contagious ulcer, for a long time a subject of speculation. Is inflammatory and destructive, never leads to Syph. or any form of systemic affection. Vehicle of contagion:—Virus in form of pus. Contagion is contained in the corpuscles. Auto-inoculable, distinguishing it from all other sores.

As a rule the area of inflammation is very limited, but occasionally from irritation, becomes very extensive, producing sloughs. Virus said to be destroyed, by drying. Bacteriology unsettled. No period of Incubation, the destructive action of the pus begins at once, as soon as epithelium perforated. As a rule, 24 hours on the mucous membrane. Skin 2 to 3 days, to 5 days at the outside.

In muc. memb. first signs minute yellow spot, surrounded by a halo of intense redness; if not punctured or ruptured, it grows larger until a pustule is formed, breaks, leaving a typical ulcer, usually round or oval if it develops in a fissure; it may be long. The sores tend to coalesce and form an irregular sore. Edges are always sharply cut, "punched out," edges become undermined; floor of ulcer is uneven and worm-eaten in appearance, and covered with alight yellowish pellicle—disorganized tissue and pus. When grasped in the fingers it is found to be a firm mass, but has no induration unless produced by the application of caustics. Secretion is consider-







able, becomes purulent. Duration of Virus:—Alcohol makes it chronic, active life tends to prolong the life of the virus. Usually 3 weeks with ordinary care cures sores. Treatment should never be relaxed until entirely healed, as there is a tendency to retrogression.

Location:—About the fraenum, on the lips of the Meatus, any part of the Glans, and in the Urethra. Not so often on the skin as chancre. May give rise to sores on the thighs.

In the Female:—The fourchette, the clitoris, labia, os uteri, and near the anus, and on the thighs. Sometimes get fungating sores of a serpiginous character or more serious, the phagedenic form; this thought to be more frequent in double infection, usually due to uncleanness, has all the character of gangrene, extends rapidly, may involve a large part of the penis and spread into the groin. Lymphatics are commonly involved in Chancroid; later the glands tend to suppurate.

DIAGNOSIS:—May be mistaken for Ballanitis, Herpes, Simple Ulceration, Hard Chancre, Mucous Patches, Ulcerating Syphilides.

Difference between Chancre and Chancroid:—

Chancre must come from Chancre or syphilitic lesion. Chancroid has no such origin, but is derived from chancroidal pus.

Chancre has distinct stage of incubation, most common on the genitals, begins as a papule, and often dry (Chancroid begins as a pustule, becoming an ulcer); usually single; surface usually smooth and shiny, glazed (Chancroid, rough, uneven and worm-eaten); pus not auto-inoculable, discharge, scanty, indurated (Chancroid—No induration), and simple enlargement of the glands on both sides.

PROGNOSIS OF CHANCROID—good, except where patient dissipated. Urethral Chancroids may give rise to stricture.

Treatment:—Thorough cleanliness, immediate cauterization with Carbolic, Nitric Acid, Acid Nitrate of Mercury, Chloride of Zn. and Rest. Frequent application of warm sublimate solution. After cauterization, Iodoform is the best application, disguising the smell with ground coffee, or Toncea bean.

Do not continue too long, avoid erythema. Silver Nit. to stimulate. Black wash, later Red Wash. Circumcision necessary if prepuce cannot be retracted, avoid inoculation of incision by touching with caustic.

Treatment of Chaneroidal Bubo :—Recumbent position. Leeches. Hot fomentation. If early, ice. Belladonna Plaster.

Internally, Grey powder, Calcium Sulphide. Injection, 10 min. of Carbolic; 10 gr. to 1 Oz.

Usually perform early excision; remove the glands; protect the wound with Zinc Chloride, grs. IV. to the oz.

### SECONDARY SYPHILIS.

At the expiration of six weeks, or 70 to 90 days, the secondary stage of Syphilis begins.

The systemic effects vary greatly; in some cases, especially women, great constitutional disturbances.

Constitutional Disturbances:—Fever is not a common feature. Temp. runs from 100 to 104.

Complaints:—Neuralgic pains at night, sciatica in anaemic people, disturbances of the sympathetic system, cold hands and feet, early anaemia, and impairment of nutrition, loss of appetite, condition of nervousness, general languor.

Glands Involved:—Both the superficial and deep glands are involved. Cervical, Supraclavicular and Epitrochlear, caused by hyperplastic condition, induced by poison. Later the deep glands are involved; the prevertebral, lumbar, etc.

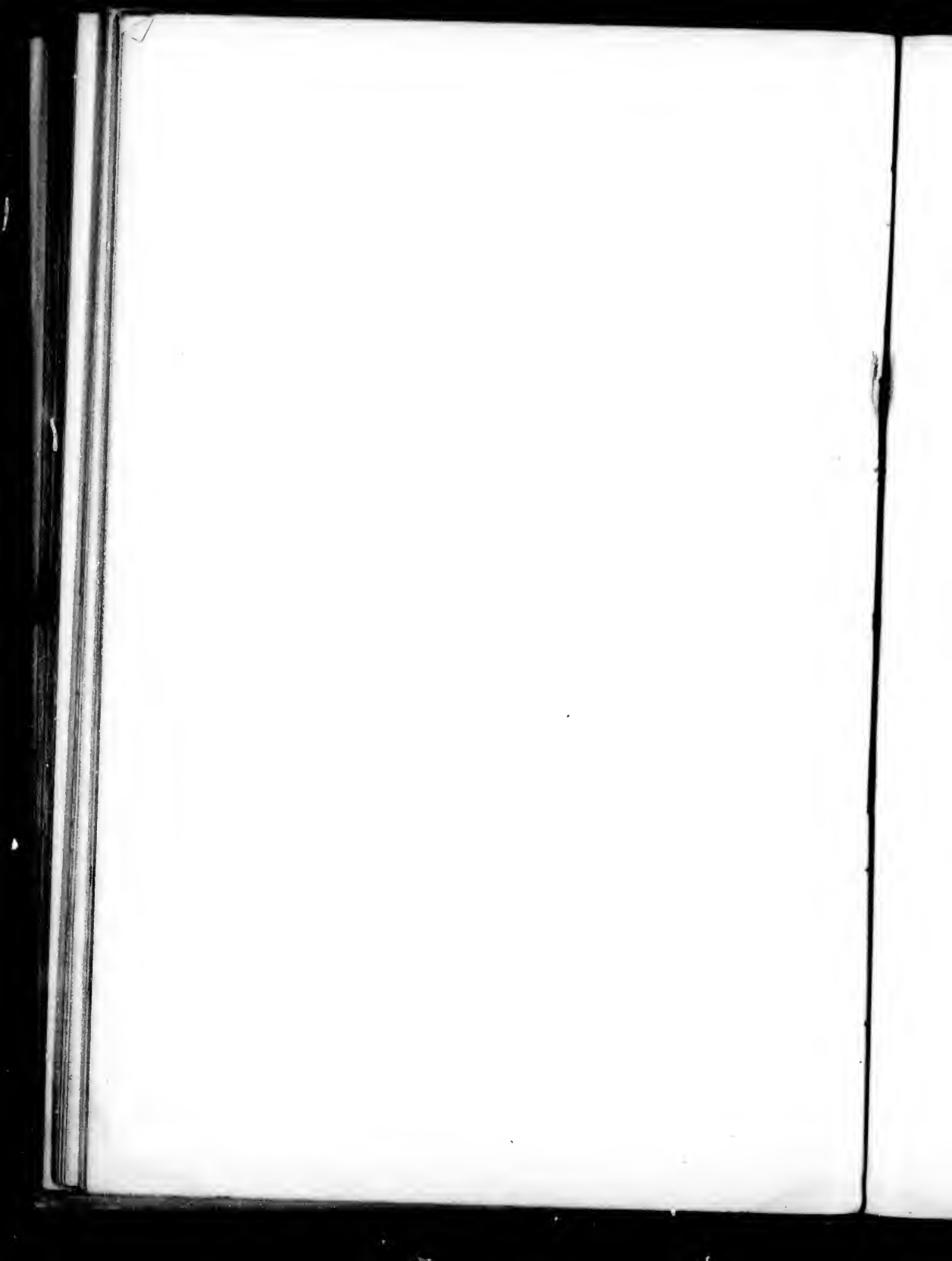
Pains:—Rheumatic pains, pains in the muscles, fascia and joints—the muscles of the extremities are principally involved; pains exaggerated at night; feels in the morning as if beaten. Osseous implications, pain in the skull and clavicle, tibia, ribs and sternum,—later swellings with the formation of nodes.

Rare Complications:—Jaundice sometimes occurs, Albuminuria and Glycosuria.

Cutaneous Eruptions :—1. Syphilides, Syphiloderma. 2. Rashes are early symmetrical; the later stages tend to become asymmetrical.

Characters of Rashes:—1. Polymorphism, i. e., Papular,

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Pustular, and Squamous; all the above may exist on the same patient at the same time.

2. Colour of the rash:—This varies from a mixture of red, yellow, brown and purple; the most characteristic is "copper color," or "raw ham" tint.

3. Arrangement, or configuration, either in circles, "S," horseshoe, or serpiginous.

4. Pain or itching entirely absent.

5. Situation:—Every portion of the body may be the seat. Certain varieties prefer certain places, e. g., Pustules, the face and scalp. Papules, the brow and neck. Scaly, the palms and the soles.

Varieties of Rash:—1. Macular. 2. Papular, (a) dry; (b) moist. 3. Pustular. 4. Bullus. 5. Tubercular. 6. Gummatous. Vesicular syphilide rare (Herpetiform).

1. Macular Rash:—Roseola or Erythema are the most common. Scattered in spots, of a pinkish hue, resembling closely the rash of measles, generally on the front of the trunk, extending up the chest, front of limbs, later the flexor surfaces.

The rash may be very slight and sometimes overlooked. The colour varies with the colour of the skin, and disappears on pressure; may be mistaken for heat rash.

2. Papular Rash:—Usually small, sometimes large, early covered by scales, papulo-squamous syphilide. They appear later than the last form; may remain a year; usually symmetrical; any part of the body; may be dry or moist. Unopposed surfaces are dry. Gives rise to mucous patches in moist places, i. e., beneath the breasts, between the toes, angles of the mouth. These patches are very virulent.

3. Pustular Eruptions:—Following immediately after the disappearance of Roseola; pustules not umbilicated as in small-pox.

4. Bullus Form:—Pemphigus, Rupia, large vesicles form from the size of half a pea to that of a ten cent piece; they are first clear, then milky, later pus, and skin bursts; sometimes called rupia; the oyster-shell variety indicates a bad dose.

5. Tubercular:—Late; tend very soon to become globular on nares, forehead, penis and buttocks.

6. Psoriasis or Squamous Variety:—Scales dirty, ill-formed, tendency to the formation of rings, found after puberty; other often begins in early life.

Syphilitic Psoriasis yields to Mercury; simple psoriasis does not.

Syphilitic found on palms and soles; Simple is only found there when it becomes chronic. It is generally found on the elbows and knees. If long standing may take years to cure.

7. Pigmentary Syphilides:—Occur on the neck, the side of the head and spread; very persistent.

8. Purpuric and Hemorrhagic:—Exceedingly rare.

Condyloma originate from a papule; in places where there are opposed surfaces, and a certain amount of moisture; also called a mucous patch; this latter term is better reserved for mucous membrane.

In early stages of secondary Syphilis, any one of these patches may originate a primary sore in another person; always dangerous. They enlarge by peripheral growth and coalescence; sometimes they become the seat of pruritis.

Mucous membranes:—Erythema of m. m., usually appears in secondary stage, identical as a rule with some eruption on the skin. The fauces, vulva, glans penis may appear gummatus, with skin rash, usually diffuse, well-defined. Resembles Pharyngitis. Velum and Uvula more oedematous than in pharyngitis; soon, in 48 hours, get small patches of ulceration, which extend, coalesce; tonsil may be covered by patch; ulceration extends forward to the angle of the mouth; soon becomes greyish white, like silver nit.; patches are irregular, not elevated, chronic, and resulting eventually in true muc. patches.

Tongue:—With pharyngeal and buccal erythema, the tongue may also become erythematous, sometimes diffuse, at others limited, on the border generally, seldom the tip, these in a week or two have mucous patches. May have fissuring and hyperplasia from irritation. Smoking causes induration, and resembles epithelioma. Epithelioma not uncommonly begins in one of these old syphilitic ulcers.

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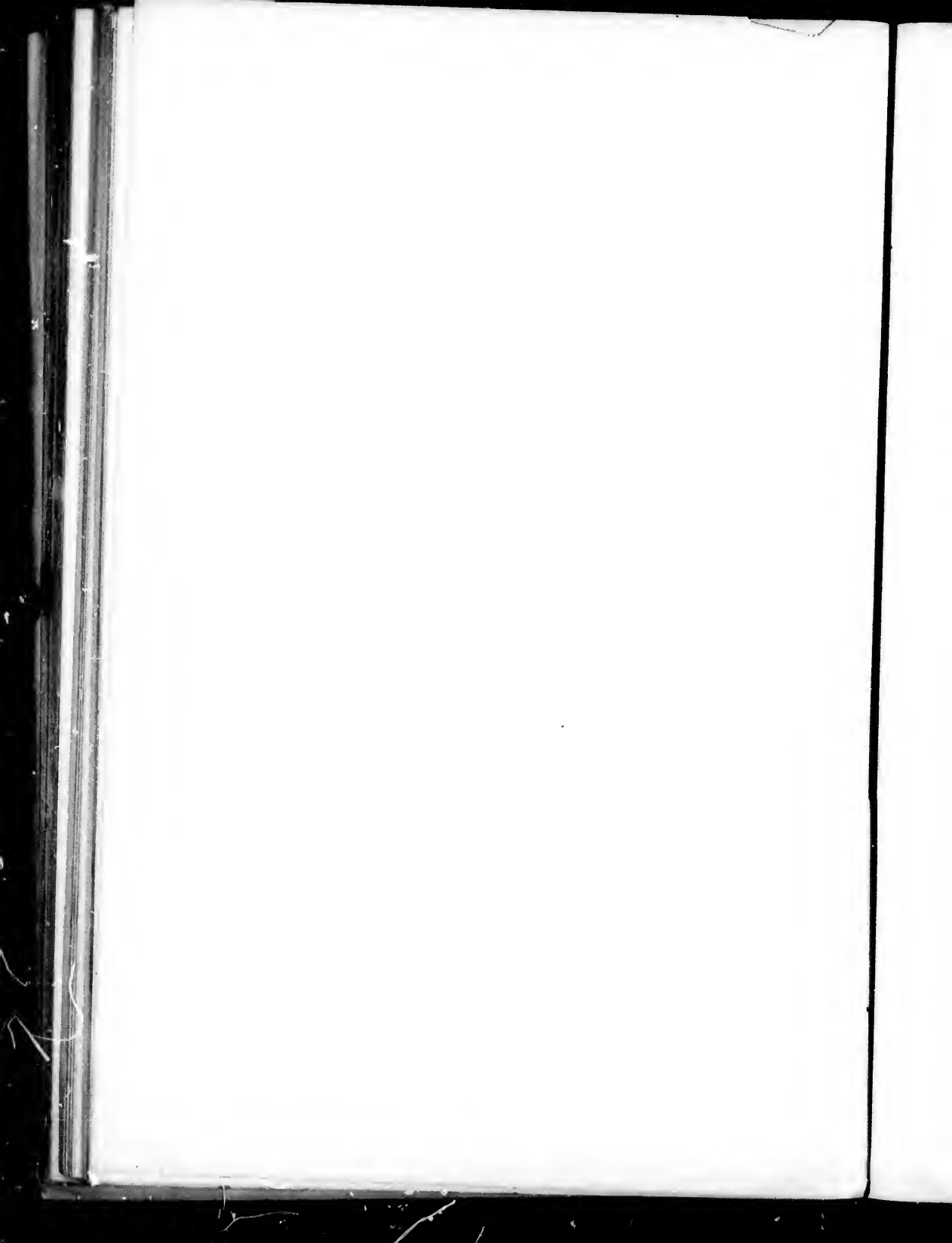
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Nose :—At the same time becomes erythematous; mucous patch; a favorite seat is just within the orifice, rendering the ala puffy and sore. A good deal of purulent discharge.

Larynx:—Chronic inflammation may follow the above symptoms, and may be serious, affecting the voice, and damaging the larynx. Acute oedema is a dangerous complication.

Hair:—Baldness is an important feature (alopecia); beard, moustache, pubic hair, may fall out, eyebrows also, eyelashes seldom, except from ulceration; patchy form is the most common; patches are irregular; back of head first. Hair looks atropic and dull. General thinning less common; occurs third month to first year.

Diag. from other forms:—Alopecia Areata, patches larger, scalp shiny, hair elsewhere is healthy, common in children; seldom attacks other parts simultaneously. Senile alopecia extends backwards, and scalp shiny. Syphilitic form recovered from.

Nails:—Two varieties: (a) Onychia. (b) Perionychia. In the first, the nail and nail-bed are affected. In the second, the condition extends to the surrounding tissues. Occurs late in secondary syphilis, the second year. May have a simple dry condition, friable, and losing its lustre. Onychia Sicca, transparency is gone; only a portion may be involved, but there are depressions and furrows.

Another form is Hypertrophic Onychia; nails separate, bed covered with granulation tissue.

Perionychia, an ulcerative condition, begins with a papule, or a pustule at the border of the nail, creeps under the nail, discharges, nail undermined, on removing matrix found unhealthy; ulcerative. At the same time the disease extends outwards, followed by clubbing of the terminal phalanx, may have the periosteum affected. Toes less frequently affected.

Three (3) forms of Onychia. (1) Simple. (2) Syphilitic. (3) Malignant.

Bones:—The skull, face, palate, tibia, sternum, clavicle, ribs, and sometimes the scapula are attacked. One or more may be attacked at once.

In the early stage have a periostitis proper. Intense pain,

especially at night. At one spot get early exudation, which may under treatment be resolved. If neglected get a permanent exudation; get a permanent node of fibrous tissue; may go further even in the second stage. Denuded bone may become necrotic. Most common in skull.

Tendency to sclerosis of the bone; the whole shaft may be the seat of this syphilitic sclerosis. Obscure aching pain; worse at night; not severe. A most extensive necrosis occurs in sclerosed bones; the canals are closed so rapidly that necrosis follows. Even the skull is the seat of this condition. Syphilitic caries may follow a node, common in the skull, or sternum, or the head of the tibia.

Joints :—Rare; sometimes pain, but generally due to periostitis near by; sometimes synovitis, occasionally gummata in the joints.

Syphilis of Bursae, Muscles, and Tendons:—Rare in the second stage.

Syphilis of the Testicle:—This is common. Epididymitis or uniform enlargement. Testicular sensation is absent, large ovoid, sometimes have hydrocele. Insidious onset. In the tertiary stage get gummata. Epididymitis usually resolves.

*Treatment of secondary Syphilis:*—Persistent attention to general health, food, skin, tepid bath with a little salt, tobacco discontinued, alcohol stopped, except in anaemic subjects. Claret, Sauterne. Sea voyage, mountains, open air.

Constitutional treatment:—Hutchison commences as soon as chancre diagnosed. French and Americans, when secondary symptoms develop. Early treatment delays the secondary symptoms, but does not modify materially the course of the secondaries. Put the patient at once on Mineral acids, Nux Vomica, Pepsin and Iron, Blue Pill twice a week, and generally build up for special treatment.

Complications :—1. Where phagedenic ulcer accompanies the chancre. 2. Where chancre blocks the urethra. 3. Where chancre at the anus interferes with defecation. 4. Where deglutition and breathing affected, owing to chancre of Tonsil or Throat.

In these four cases commence general treatment

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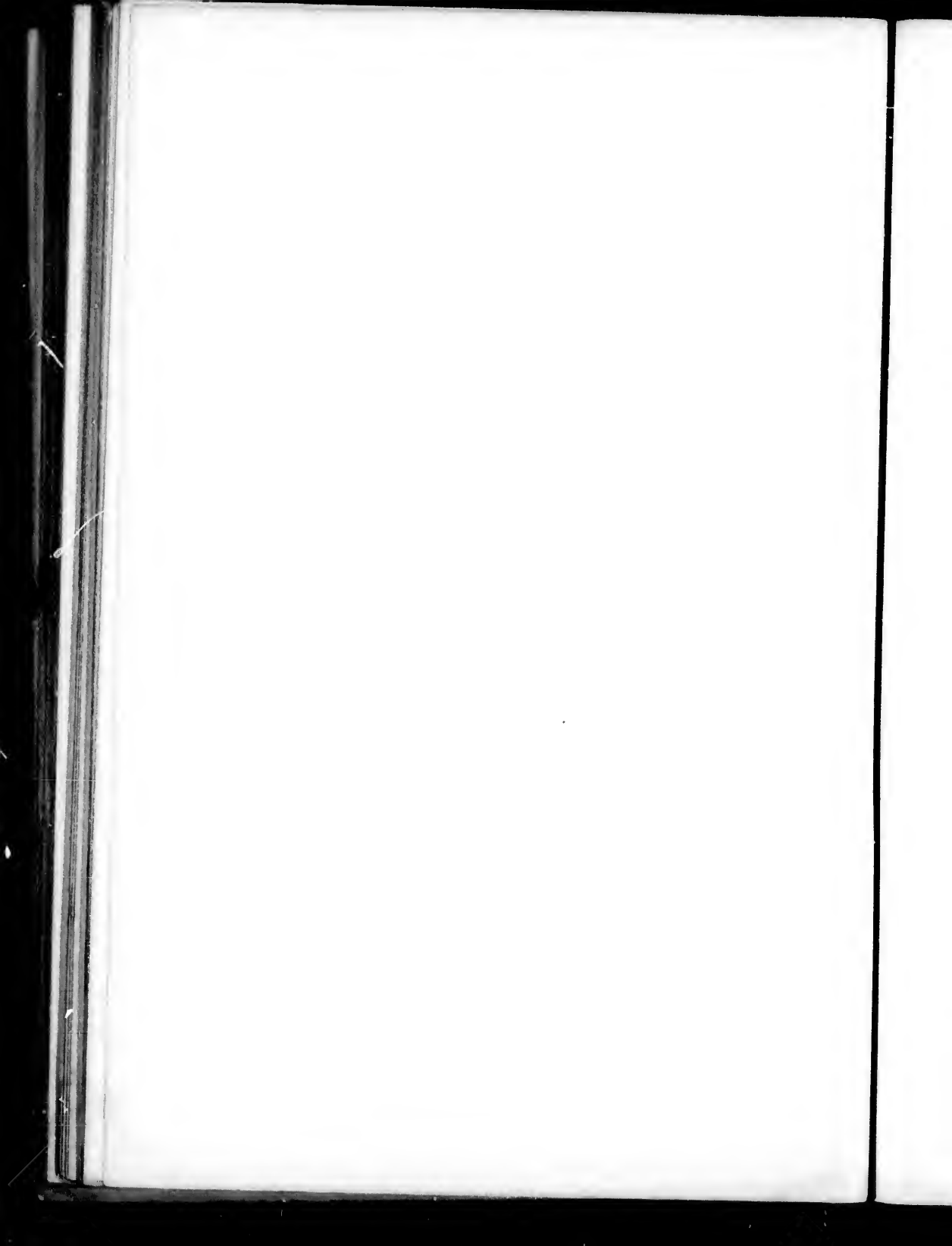
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at once, also do so where wish to avoid abortion, where patient knows enough to insist on early treatment.

Mercury is contra-indicated in Bright's disease, and in the dissipated and starved, or, if used, take great precaution. Examine urine before beginning, also be careful of idiosyncrasies.

Given by the mouth, externally by inunction, fumigation and Hypo. and Eudermically.

Internal remedies in order of value:—Proto-iodide, Bichloride, Biniodide, Tannate, Blue Pill, Calomel, and Gray powder. The Proto-iodide is a general favorite.

Hutchison gives the Grey powder grs. II t. i. d. In early administration it is the best; it is also the best and safest in any idiosyncrasy.

Tannate prevents any troublesome gastritis and diarrhoea, and is thought to have a less cumulative tendency. With proto-iodide begin with a quarter of a grain pill t. i. d. p. c., sometimes get diarrhoea in a couple of days, then reduce to one-eighth grain, or, if stomach is off, give one pill at bedtime only for a few days. If anaemic give Bland's or Vallet's. Persistent diarrhoea; a quarter of a grain of Opium, 4 grs. of Puly. Ipecac. Co. Increase Mercury up to grs. II (two) a day, and this quantity may even be doubled. The tendency to accumulate and suddenly cause salivation should be remembered; if we find the gums tender or bleeding when brushed, then diminish the dose.

Interrupted method:—Fournier's plan. Suspends all treatment after 2 months, interval of one month, renewal for six weeks to two months, followed by a respite of two (2) months, continued over four (4) years. Experience shows that this method is defective.

The most satisfactory is the continuous treatment: 6 mos., 9 mos., or a year.

During the treatment keep warm, take hot sea water baths, woolen underclothing.

Inunction, and other external methods, save the stomach, and tonics have a much better affect.

Objection is that it is uncleanly, and that it requires time and skill in its employment; it is the best method when rapid

action is required. Ung. Hydrarg., or Oleate; 5-10-20 p. c.

Ung. Hydrarg. drachms one-half to one, on the groins, axilla, inner side of the legs and arms, sides of the chest, lower abdominal region, between the scapula and the soles.

Avoid:—The Penis, Anus, Vulva, Scrotum, face and ears. Before using, clean with soap and water, followed by alcohol; rub in vigorously. Feet good, as the socks absorb the Ung., and reabsorption takes place by the foot in the course of walking about.

Sometimes irritation results in eczema, use dusting powder of Zinc Ox. and Starch, or drachms IV of Tale., and Zn. Ox. drs. IV.; Ac. Salicyl. grs. XV.; Vaseline Alb. oz. I. Lisard's paste.

Fumigation.—Cane-bottomed chair, cover patient with blanket. First give steam bath 5-10 min. Then sublime, grs. XX-XXX of Calomel in porcelain dish over spirit lamp.

Half an hour every four days, then every second, and finally every day if necessary as in pustular forms. This method is rapid and clean, efficacious, and with a good nurse great results are obtained.

Injection:—Sublimate one-twelfth to a-tenth grs. in water Mins. X., or suspended in Olive Oil and starch, every three or every other day. Some prefer Calomel gr. i in 10 min. of water and glycerine, repeated every two or three days. This method should not be employed until others tried; liable to produce salivation.

Injections sometimes followed by Boils and abscess; cleanse the parts, inject straight into the deep muscles.

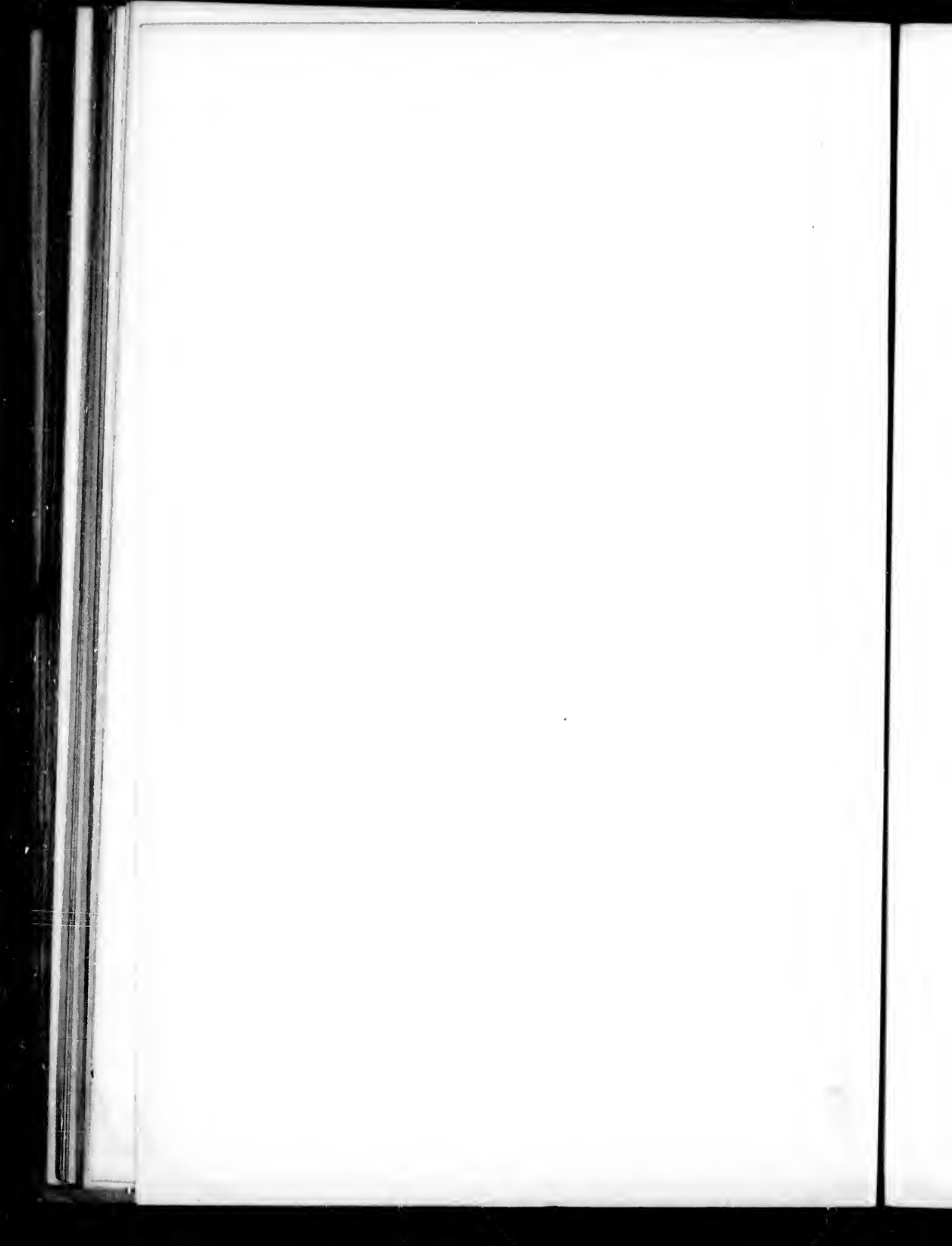
Salivation:—Usual signs, treat with an infusion of slippery elm bark, or linseed tea, borax, chlorate, and glycerine wash, with probably carbolic. Rub the gums with equal parts of Tr. of Myrrh. and Cinchona. Good practice is to begin Pot. Iodidi at once.

For salivation:—Brandy solution, Aix-la-Chapelle.

R. Alum. Pb. Acetatis a.a oz. one-half. Aqua add oz. VI. Sig.:—A drachm in a tumblerful of warm water.

In the later secondary stages and the Tertiary the preparations of Iodine are the most useful. In intestinal lesions, Pot. Iod. is very useful.

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Treatment with K. I. from the beginning is apt to result in extensive tertiaries, nervous involvement. K., Na., Li., Am., and Str., but K.I. is the best. Give in simple watery solutions. Start at 5 grs., and increase the dose by one grain each day up to 20 or 30 grs. t.i.d., well diluted; where stomach fails, don't stop, but go back to small dose. In brain syphilis as high as 300 to 400 grs. may be taken daily. Spts. of Ammon. Aromat. with the Iodine will allow of a greater amount being taken.

Complications:—Aene, Coryza, Urticaria, Obstinate Constipation.

Mixed treatment:—K. I. and Hg., together or in combination. Biniodide or Protoiodide or inunction and K. I. internally.

Treatment of Syphilitic Lesions—Syphiloderms:—Ung. with Int. Treat. White precipite 20 grs. to oz. Local application of the Sublimate 1-6 to 10000, especially in the squamous. Condylomata; wash with sublimate, dust with calomel, or calomel and starch. If irritating use Iodoform, Iodol, etc., and an occasional application of Silver Nit. X to XX grs. to the oz., with sometimes an application of the solid stick.

Syphilis in Mouth:—Mouth wash, Pot. Chlor., and Boracic Ac., Quinine, and sometimes Nitric acid.

Alopaccia:—Cut the hair off, wash with green soap, and apply:—Tr. Cantharides, oz. I. Tr. Capsici. Tr. Nux Vomica a.a., drs. VI. Hydrarg. Bichlor., grs. I. Spts. Vin. Rect., oz. I and a half. Aquae ad., oz. VIII.

The Nux can be gradually increased. For ordinary forms a drachm of Bibor of Soda instead of the Hg.

For Onychia:—Cocaine and remove the nail. A useful dust is the following:—Sublimate and boracic equal parts, sometimes Silver Nit.

### TERTIARY.

The lesions spread and persist, are symmetrical. In the great majority of cases it means the formation of gummata. Viscera apt to be involved. May appear very early, when we expect nothing but secondary. Again the secondary may

go into the Tertiary without interruption, and in other cases interruption of many years.

**Gummata: Granuloma:**—Collections of small round cells grouped around vessels of structure involved.

On the skin and muc. mem. where exposed to injury and action of micro-organisms, they show a tendency to soften and suppurate.

The surface, becoming congested, breaks, exposing wash leather slough, very tenacious, and takes a long time to come away.

In deep Viscera, Liver, Spleen, rare for Gummata to break down and form abscess. In liver where common, get simple granulation with cicatrization, resulting in puckering and scarring of the surface.

**Brain:**—Chiefly affect the Dura and Pia.

**Changes:**—Vessels cut off by pressure, have fatty degen'n., sometimes cicatrization. Gummata resemble tubercles; they differ in containing no specific micro-org.; the virus cannot be inoculated into animals, and in gummata there is a tendency throughout to remain vascular. They vary in size from the size of a pea to a walnut. There is no tissue that may not be the seat of gummatous disease.

**Sclerosis:**—Spinal cord, tabes, thickening of the arteries. Veins rarely affected. Arteritis predisposes to aneurism. Sclerosis of the tongue and rectal walls.

Chronic irritation and trauma affect localization of Tertiary lesions.

**Treatment:**—K. I. in gummata, and sclerosis answers admirably. In arterial disease depend upon mercury. Use mixed treatment.

**Hereditary Syphilis:**—A healthy man or woman treated three full years, and having no symptoms the third year, rarely transmit the disease. Some subjects should never marry where a sort of cachexia is lighted up.

**Congenital, inherited and infantile:**—Woman known to have syphilis and pregnant; here active anti-syphilitic treatment by inunction will not prevent but greatly modifies the hereditary lesions.

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When inherited from either parent, same as acquired; few exceptions as interstitial keratitis. Disease less amenable to treatment. Tertiary lesions also harder to subdue than tertiary lesions from primary infection.

See methods of infection of child. Colles' law.

Early signs in the child:—Hoarse cry, snuffles, early appearance of bullae on the palms and soles, wrists and ankles; corners of the mouth and nostrils cracked. Cachectic, wrinkled, and senile appearance, Persistent erythema about the buttocks, swelling of the bones and epiphyseal lines; sometimes a gummatous periostitis; nose ulcerates, and septum perforated, giving saddle nose; palate often arched, dentition delayed, affects the whole dental system.

Teeth:—The teeth of children may be arrested in development by the use of mercurials, grey powder, but such mercurial children, and also those who have suffered from stomatitis, do not show affection of the central incisors.

Venereal Warts:—Not necessarily connected with venereal disease as found in lads and virgins. In the male they appear around the corona; if uncleanly wash; may grow to great size. Commonly accompanying gonorrhoea. In females accompanying leucorrhoea. May occur with syphilis, are then much more extensive; appears to be due to the degeneration of a papule, and to want of cleanliness; common around the Anus.

*Treatment*:—Nitric Ac., Ac. Nit. of Hg.; sometimes Acetic, snaring with silk ligatures. Where large excise with Actual Cautery. Cauterize with care around the Anus, owing to subsequent contractions.

Eruptions:—Papules are especially common on the buttocks and scrotum, and like the acquired form, tend to degenerate into condylomata, alopecia and onychia, and syphilitic dactylitis, interstitial keratitis; salmon patch, and ground glass opacity; occurs between 6 to 19, sometimes earlier or later, up to 40 years. Disease of the labyrinth with deafness. Tendency to general osteitis and sclerosis, sometimes necrosis.

*Treatment*:—Give artificial food, Hg. by the mouth,

or inunction over the abdomen, covering with a binder; 1 gr. dose of Hydrarg. cum Crete; guard against stomatitis; Cod Liver Oil; keep up treatment six (6) months; look after general hygiene.

### ANTHRAX OR CHARBON.

Is an acute infectious disease caused by bacillus got from animals with splenic fever. It is common in tanners, wool-sorters and butchers, and is transmitted by flies. It may enter through an abrasion or a fly-bite (external anthrax of malignant pustule), or through the resp. or alimentary muc. membranes.

Anthrax bacillus is a widely known germ, easily inoculated; ends abrupt; spores the most resistant known. It multiplies rapidly by fission, grows in the tissues, blood and outside the body if there is oxygen and proper temp.

Symptoms —General:—Stage of Incubation is from few hours to 8-to days, depending upon the amount of virus and site of inoculation.

With onset, Temp. rises, pains all over the body, sometimes shivering, quick pulse, sometimes small and irregular, tongue dry, delirium, sometimes headache, death may occur from syncope, exhaustion or suffocation from oedema of the glottis.

When infection is internal besides the above symptoms, get bronch-pneumonia, or gastro-enteritis. Death may occur before diagnosis made.

Local:—Small, red, itchy, angry pustule at seat of inoculation, soon a vesicle containing bloody serum; around the vesicle the tissues are red, brawny and indurated; soon vesicle bursts leaving small grey spot, which becomes black and gangrenous, and around this we have a ring of vesicles, the indurated area becoming more and more raised above the skin. The spot of gangrene may enlarge to the size of 50 cent piece, and oedema extend for several inches. This gangrene is quite dry, and becomes slowly depressed by the surrounding oedema. There is only a slight gnawing sensation, pain is absent. We sometimes get resolution, and sometimes vast

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sloughing of the surface beneath. When infection is interaerial there is no very decided papule, but large brawny surface covered with scattered vesicles.

*Diagnosis:*—There is no difficulty in the local form; it is more difficult in the general form, the occupation and surroundings being the only guide sometimes. Examination of the fluid from the vesicles is immediately diagnostic (large well-staining, wide-spread bacillus).

*Post mortem appearances:*—Are mainly those of blood poisoning. Ecthymotic spots occur beneath the serous surfaces, some of which may have begun to slough. Blood is partly fluid, dark, spleen congested. Mesenteric glands are greatly enlarged. At the seat of inoculation see only black slough. Bacilli occur in affected area, and in ecthymotic spots.

*Prognosis:*—In the external form and within surgical reach is fairly good and treatment is often successful. Internal form is always grave.

*Treatment:*—Cauterize any external abrasion with pure Phenol, or actual cauterity, suck out and apply solid Silver Nitrate. After pustule has formed, free excision, and mapping around wound with Phenol. Zinc Chlor. or KOH if necessary. Iodine is good when other things fail. Injection of Phenol 1-20 and 1-10 into infiltrated region every six to eight hours until toxic symptoms. Free incisions into surrounding tissues, and irrigation. Sublimate, 1-500, afterwards charcoal poultices.

*General treatment:*—Stimulants early with Ammonia. Quinine grs. XX every 8 hours. Sodii Sulphite grs. X. Sublimate internally. Treat sleeplessness and diarrhoea in the usual way.

#### GLANDERS (EQUINA) OR FARCY.

A disease of horses and asses, communicable to man by a wound or the mucous memb.; caused by small rod-like "Bacillus Mallei," shorter and thicker than Tubercle Bacillus, occurring in pairs or solitary; retain virulence after several cultures.

Glanders strictly is where the respiratory mucous memb. is affected (acute).

Farcy:—Where cellular tissue and lymphatics are affected (chronic).

Symptoms:—Acute:—After 2-3-7 days, get a distinct chill, great rise of Temp., even up to 106 deg., with general febrile symptoms, and nasal sero-fibrinous discharge, rapidly becoming purulent and foul. Nose is red and swollen, and ulcers rapidly form in it, which become rapidly large and irregular, with well-marked base and apex. A few hours later or next day get a papular eruption on the face, chest and abdomen; the respiratory and digestive muc. mem. soon become pustular. Pustules have a reddened, indurated base very much like small-pox, and soon break, leaving foul irregular ulcers. Ulcers also occur on the thighs and palate, and involve the periosteum and bone. If patient lives long enough, get farcy beads along the lymphatics, and in the muscles beneath the skin, which break down and cause troublesome ulceration. Sub-maxillary glands suppurate. Broncho and Pleuro-Pneumonia are apt to occur early. Death generally in 5 to 6 days.

Chronic:—Less serious, longer incubation. Farcy beads develop along the lymphatics, and cause deep ulceration. If nose is neglected, gangrene in rare cases may set in and destroy the bone. The chronic form may become suddenly acute, and may have fever and languor.

Prognosis:—In the acute form it is always fatal; there is hope in the chronic, as long as it is within reach of surgical treatment; about one-half recover, the ulcers healing.

Diagnosis:—Acute from rheumatism, acute suppuration, Small-pox and Typhoid.

Chronic from syphilis and tubercle—look for the bacillus in the pus, and nasal secretions. Inoculate the pus into the abdomen of the male guinea-pig. In 3-4 days the scrotum gets red, shiny and hard, acute orchitis and suppuration, which contains glanders bacillus.

Treatment:—Prophylaxis, destroy the suspected animal, care on the part of attendants.

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Acute :— Enormous amount of stimulants "Mallin," cauterize the part thoroughly, wash the nasal muc. mem. with Sodii Sulph., dil Sulph. Ac., saturated Boracic, Phenol 1-100; Cor. Subl. 1-5000, gradually increasing the strength. Scrape all abscesses and nodules and flush with antiseptic hot: Zinc Chlor. grs. XL to the Oz.

Chronic form:—Pot. Iodide, Syr. Fe. Iod., Sulphur bathis and tonics.

### ACTINOMYCOSIS.

A rare infective disease, due to presence in the tissues of a "Ray Fungus," which gains entrance through wounds of the resp. or alimentary tract. Herbivorous animals are likewise affected. It is characterized by the development of small fleshy masses like granulation tissues, from the size of a pea to a walnut generally over-lapping the seat of injury. These masses on section show a number of sulphur yellow bodies like a millet seed. Have a greasy feel on squeezing, and microscopically show a number of bulbs or thready filaments, either like a star fish, a hand or irregular. These are less marked when there is suppuration, which is due to the introduction of pyogenic cocci. This is probably a fungus; the bulbous ends are probably reproductive organs.

In Cattle it causes "wooden tongue," Lumpy jaw, or "swelled head," and extends to the cellular tissue of the neck, then to the submaxillary glands. In man infection is generally through a wound in the mouth, or decayed tooth, sometimes through a cutaneous wound. The organism has been found in the mouth, evidently awaiting a chance to develop.

Symptoms:— Begins as an ill defined growth on the border of the jaw, the alveolar border, usually where some tooth has been extracted; it looks like a cancer, and the cheek soon adheres to it. It creeps out of the mouth, or perforates the cheek, causing red proud-flesh bodies upon it. It grows steadily, involving all the structures it meets, and causes constitutional symptoms. Cellulitis of the neighboring tissues occurs. Metastases occur from the fungus getting into

the veins by ulceration, in one case into the jugular. It may extend from the jaw to the vertebral and the occipital bone, but it often shows a tendency to remain superficial. Lymphatics are never involved, nor are the glands until late. All pus contains the fungus.

Diagnosis:—By finding the fungus. From:—(a) Sarcoma, which never suppurates. (b) Syphilis; history of primary sore; gland enlargement early, benefited by anti-syph. remedies. (c) From Tuberculosis; glands early involved.

Prognosis:—Unless removed the entire mass containing the fungus will go on until death ensues from exhaustion or septicaemia.

*Treatment:*—1. Excise the infected area, going well into the healthy tissue; this cures if done early. 2. If this is impracticable, scrape out each spot as much as possible, and use the cantery. Do this to each suspicious spot as it appears. 3. Inject Phenol (5 per cent. in Glycerine) into the infiltrated area every 3 to 4 days. 4. Pot. Iod. grs. XXX daily, increasing rapidly up to toleration. 5. Protein in one case cured; this is extracted from cultures of the *Staphylococcus Aureus*.

### INTESTINAL OBSTRUCTION.

Causes:—(1) Strangulation by bands. (2) Volvulus. (3) Intussusception. Acute and admit of no delay:—(4) Stricture. (5) Obstruction by neoplasm. (6) Compression by tumors external to the bowel. (7) Obstruction by gall stones or Enteroliths (enteroliths are faeces coated with Fme). (8) Obstruction by faecal masses. (9) Obstruction by worms; the latter six are chronic.

How these causes act:—Some by (a) altering the normal outline of the bowel. (b) pressure on the bowel from without. (c) altering the wall of the cavity.

I. STRANGULATION BY BANDS:—1. In this connection it is important to remember Meckel's diverticulum, and the possibility of the bowel being twisted around it, when it is attached to the navel, or after detachment from there has formed adhesions elsewhere. Bowel may hang over or slip under it, or it may form a regular arch.

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2. After peritonitis the adhesions become stretched into fibrous cords, and the bowel may become twisted around these.

3. Hernia passing through the foramen of Winslow will cause similar obstruction.

If intestine is forced under a band, venous return is obstructed, nutrition is imperfect, and coats are altered, so that micro-organisms pass through and cause peritonitis.

II. VOLVULUS:—A twist of part of the gut on its mesenteric axis can only occur with a long mesentery. The situation is most commonly the sigmoid flexure (one fortieth of all obstructions), and next the lower ileum. Twisting of two parts of the intestine, one over the other, is sometimes called volvulus. It is rare under 30, generally between 40 and 60. Volvulus of the sigmoid flexure is always fatal in about 6 days, unless removed by operation.

CAUSES OF VOLVULUS:—(A) Predisposing:—1. Long Mesentery. 2. Advanced age, as signifying thin mesentery, less fat, and therefore more easily twisted.

(B) Exciting:—1. Unequally distributed Intestinal contents. 2. Excessive peristalsis.

III. INTUSSUSCEPTION:—A prolapse of one part of the lumen of the intestine into that of the adjoining part; it is generally a descending invagination, and forms 30 per cent. of all obstructions; it may be double or treble.

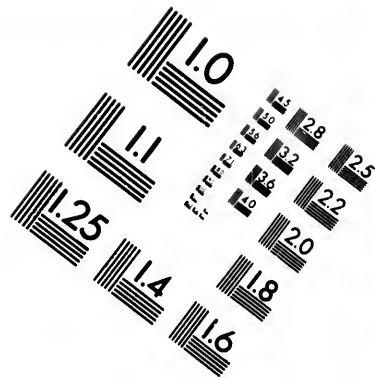
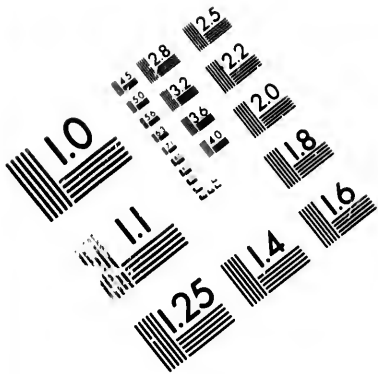
Acute Forms:—50 per cent. are in children under 10, and 25 per cent. under one year; this forms 75 per cent. of all intestinal obstructions in children.

Chronic Forms:—Generally occur between the ages of 20 to 40.

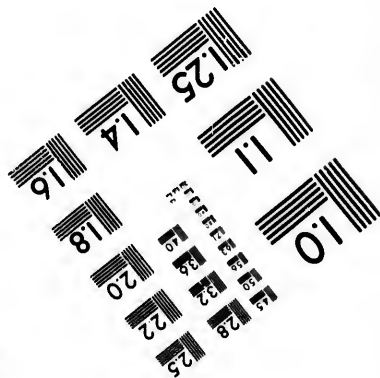
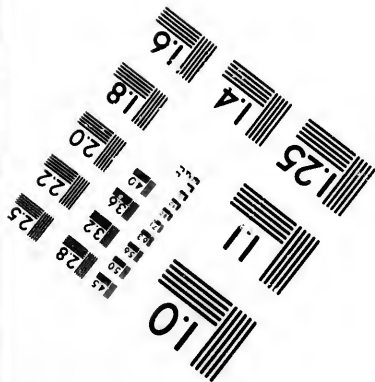
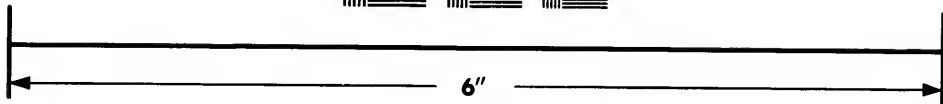
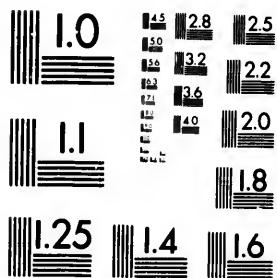
Classification:—1. Ileo-caecal, 44 per cent., apex is ileo-caecal valve. 2. Enteric, 30 per cent., generally lower Jejunum, generally only 3 to 10 inches, and upper ileum, in proportion of 4-1. 3. Colic, 18 per cent. 4. Ileo-colic, 8 per cent., sometimes reaches rectum.

Mesentery is drawn into the sac, the arteries, and more especially the veins, are obstructed, and we may get great engorgement. If the circulation is entirely interrupted, intussusception separates *en masse*. If only partly interrupted,





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may get ulceration, and perhaps perforation and peritonitis.

Engorgement causes bits of bloody mucous, as well as straining at stool. Obstruction is rarely complete.

Causes of Intussusception:—These have been proved by experiment to be two in number:—

1. By powerful electric stimulation, part of rabbit's gut was contracted into a small cord, and then, if stimulate the bowel above or below we get irritative or spasmodic invagination.

2. On crushing part of the bowel, the same thing occurred. Paralytic Invagination. Stimulation above had very little effect upon invagination, but stimulation below often reduced it, hence the value of injecting salines per rectum.

3. Polypi and intestinal tumors generally tend to cause intussusception by constantly pulling down.

Prognosis:—Ultra-Acute end in one day. Acute end in 2 to 7 days, 48 per cent. Sub-acute end in 7 to 30 days, 34 per cent. Chronic end in over 30 days, 18 per cent. Under one year the death rate is 80 per cent., generally by the 7th day.

There are two ways of spontaneous cure:—1. Invagination may unroll. 2. In 42 per cent.: often in females; generally the enteric form. After six days have intussusception, sloughing off *en masse* after adhesions have formed at the neck, but over 40 per cent. of these die from separation of the adhesions, etc. Adhesions don't form before the third day, sometimes not until after the 7th or 10th day. After adhesions form, operation is much more difficult and dangerous.

IV. STRICTURE:—Narrowing of the intestinal wall, not pressure from without.

They are:—(A) Simple, due to ulcers.

1. Typhoid during healing.
2. Dysenteric; generally in the rectum, though sometimes as high as the hepatic flexure.
3. Catarrhal; in the caecum, including stercoral ulcers, which may rarely cause perforation.
4. Peptic; in pylorus and first part of the duodenum may cause perforation, more often stricture.

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5. Syphilitic from breaking down of gummata, are often irregular, serpiginous, rarely annular, and rarely with undermined edges, not deeper than the submucosa, generally proceeding up with condyloma of rectum, in going up get ulcer.

6. Generally begins in the lymph follicles, following the vessels, forms an annular ulcer, commonest in the lower ileum, but have been found at the ileo-caecal valve.

7. Injury caused by strangulated hernia.

(B) Malignant:—1. Carcinoma; get generally cylindrical annular carcinoma:—Scirrhus, and medullary cancer are a rare occurrence. It is generally primary. Here stenosis is gradual, so that there is time for the bowel above to hypertrophy in the endeavour to overcome obstruction, and if patient is weak it dilates. Death may be caused by acute obstruction, by plugging of the narrowed lumen by some hard substance, or by a valve-like plug of mucous membrane. Distinguish between simple and malignant by the duration, and the constitutional disturbance, but character may change from non-malignant to malignant. Diarrhoea is often common; in fact, it is the only way in which some can pass faeces at all. Stricture may result in volvulus, especially old people.

CAUSES OF STRICTURE:—1. Neoplasms:—Adenoma, Lipoma, Angioma, Fibroma, Uterine Neoplasm, gravid uterus, pelvic abscess, tubal pregnancy.

2. Foreign bodies, jack-knives, needles, gall stones, ulcerating from the gall-bladder into the duodenum; masses of worms. Treatment for foreign bodies is to give solid food, especially potatoes, not purgatives.

3. Enteroliths:—(a) Calc. and Na Phosphate with Cholesterolin. (b) Faecal and vegetable (especially oatmeal) masses. (c) Mineral matters, especially Mag. Carb.

DYNAMIC OBSTRUCTION:—This is due to suspension of peristalsis.

Symptoms of Obstruction:—Very important.

1. Pain—generally referred to the solar plexus, just over the Umbilicus, hence its seat is no sign of the seat of obstruction. This is due to injury to the Abdominal? (intestinal) wall and peritoneum, pain also due to increased peristalsis, therefore increased by taking food, rectal enema, etc.



Treves thinks that when pain is constant, obstruction is complete; when intermittent it is not complete.

Tenderness occurs only where peritoneum is involved.

Diminution of pain in a case of some days' standing is often misleading, being due often to collapse from perforation, diminution of action of the sensorium, extensive intestinal paralysis or rupture into some other organ.

II. NAUSEA AND VOMITING: Initial vomiting is reflex, from injury to the plexus of Meissner. Often it is due to continuance of peristalsis, while there is obstruction. It used to be considered to be due to reversed peristalsis, but probably peristalsis is always downward, but contents flow in the direction of least resistance:—

There are 3 stages. (a) Vomiting of stomach contents. (b) Vomiting of biliary matter. (c) Vomiting of faecal matter.

III. COLLAPSE:—Is very significant, its amount depending upon the amount of intestine involved, susceptibility of the patient and the suddenness of the strangulation.

IV. CONSTIPATION:—Is not relieved by purgation. Urine may be diminished owing to diarrhoea.

Differential Diagnosis:—Is an extremely difficult problem. Enquire carefully into the whole history, mode of onset, seat and character of pain, character of vomit, ditto of stool, whether they contain bloody mucus. Examine all hernial orifices.

Acute cases are characterized by sudden pain, first without, and then with tenderness, and followed by vomiting of the three kinds mentioned, especially acute if it has resisted purgatives, and one or two enemata.

Think first of strangulation, by bands and volvulus, in an adult; in children of intussusception (frequent going to stool, gripping and bloody mucus; sausage like tumor).

Thorough examination should be made at the first visit, as the condition may be too far advanced afterwards to allow thorough examination.

Death may occur in 24 hours; generally 2 to 7 days.

CHRONIC OBSTRUCTION:—Non-malignant forms occur about early middle life. Malignant forms generally after 40,

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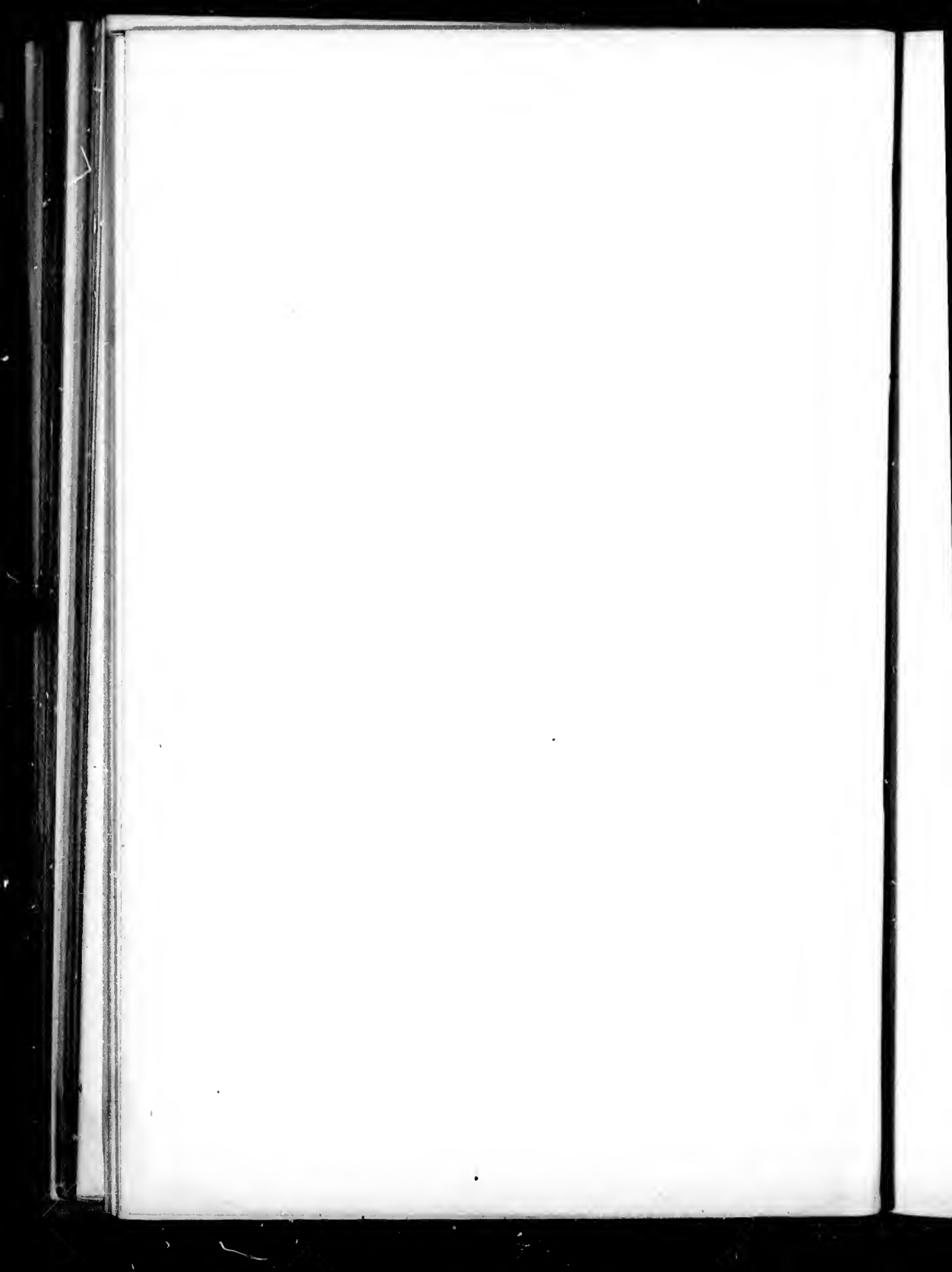
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(hard tumor not indentable.) To distinguish form one must rely upon the history. Chronic obstruction may at any time become acute.

Generally speaking, acute obstruction is common in small bowel from its greater activity, and chronic obstruction in large.

THINGS MISTAKEN FOR OBSTRUCTION:—1. Blow on the abdomen. 2. Crushed or inflamed testis. 3. Inflamed hydrocele. 4. Tuberc. Peritonitis. 5. Lead poisoning. 6. Hepatic and Renal colic. 7. Meningitis. 8. Hepatic cirrhosis. 9. Mesenteric Cancer. 10. Omental Cysts.

*Treatment*:—Opinions vary greatly.

Diet :—For acute cases give nothing, or only small bits of ice, or a drachm of hot fluid. In chronic cases give warm peptonized milk. Wash out the stomach every 3-4 hours. This first relieves intra-abdominal pressure.

2nd, it removes fermenting food from the stomach, duodenum and part of the ileum.

3rd, it relieves vomiting, peristalsis lessened, and gives great relief, but is apt to disguise patient's condition.

Lavage of the colon is very useful in chronic constipation.

Opium should be given in doses sufficient to relieve the suffering, but not to narcotize the patient. Ice may perhaps be applied locally; massage and electricity have been recommended. If there is doubt as to the diagnosis, give a purgative. For distension apply a binder evenly over the abdomen.

Injection of Carb. dioxide, Hydrogen, water or air per rectum may do good in intussusception. Water never passes the ileo-caecal valve in normal condition. Tubage of the colon is recommended, probably can never reach the caecum.

It is advisable to examine, etc., as follows:—1. Examine for stricture below sig. oid. 2. To relieve gaseous distension. 3. To administer highly nutritious enemata, giving 50 to 100 grammes solid.

Seymour advises manual exploration of the rectum under ether, but this is dangerous.

Hutchison advises kneading of the abdomen and bowels, under anaesthetic, with vigorous shaking up of patient, but this is not advisable.

Puncturing the bowel to relieve distension is advised by some; this may cause hemorrhage and escape of faeces from the distended bowel. If becoming worse, do an abdominal section, after stating condition plainly. Cut in the median line below the umbilicus, seeing that bladder is empty, and has receded. Explore the condition of the caecum, 1st, to differentiate the large and small gut—follow to where distension begins. If intussusception, unravel if possible; if not, establish bowel anastomosis if patient's condition is fairly good, or do an artificial anus, may do an end to end anastomoses if both ends the same size.

If of different size, do a lateral anastomosis, closing the end of one or both pieces. Suture the junctions, this better than bone plates and other mechanical contrivances.

#### COLOTOMY.

Three kinds according to situations:—1. Loin. 2. Lumbar, 3. Inguinal.

1. Loin:—Collisen, 1817, Vertical Incision. Amussat, 1837, Transverse Incision. Bryant, 1859, Oblique Incision.

2. Lumbar:—Sometimes easier, peritoneum is not opened, if colon is distended, but is if it is empty. In this operation, the glandulae epiploicae can't be felt until the peritoneum has been opened.

Bryant pulls down the bowel and leaves it, and it becomes adherent. Some put in a few mesenteric stitches and join.

3. Inguinal:—Is the best where the disease is below the sigmoid flexure; otherwise it cannot be done.

Maydl's operation is the best; make an incision one and a half inches long inside the Ant. Sup'r spine, pulling the bowel up, put a glass rod through, draw it tight both ways, because never know which is the upper end, so that bowel may not project after. If opening must be made at the time, put in a few stitches. If not protect, leave 24-48 hours, and then burn through, and evacuate the bowel.

Artificial Anus *vs.* Intestinal Fistulae:—

If the opening is but temporary, do an intestinal fistulae.

If permanent have a spur on the end, so that faeces cannot go into the lower piece of bowel.

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After Colotomy may have eczema, and if deeper cellulitis, if muscular walls are septic; therefore don't separate, but cut straight through; look out for peritonitis. There may be suppuration and death from exhaustion.

Gastrotomy is the opening of the stomach, and may be done for the removal of foreign bodies.

Gastrorrhapy:—The closing of a fistulous wound of the stomach.

Operation for Obstruction of Cardiac end of Stomach:—

Gastrostomy:—Making a fistula by bringing the stomach to the edges of the abdominal wound, suturing and establishing a permanent fistula, so that feeding may be carried on through this opening, when obstruction exists at the cardiac end.

Pyloric Obstruction:—3 operations:—

1. Pyloroplasty—Henike, Miculicy. Incision is made longitudinally, its ends are brought together, and the cut sewn up transversely. This is for non-malignant stricture.

For malignant either of the following:—

2. Gastro-enterostomy; this is done where the disease is so extensive that it cannot all be removed.

3. Pylorotomy; is the best operation where the disease can be removed entirely. The pylorus with all the diseased area is excised, the duodenum inserted into an opening made from inside the stomach; sew up with Wolfer's suture, not taking in the mucosae; then for safety, if necessary, sew the mucosae separately. The greatest difficulty is in tying off the greater and lesser Omentum.

Cregg-Smith questions the advisability of applying two serous surfaces, advocating applying raw surfaces, or raw surface to peritoneum. The orthodox view, however, is that the union of peritoneum to peritoneum gives a rapid union.

## HERNIA.

Is the escape of any organ from its containment, but, unless specifically mentioned, the small or large intestines are referred to.



Hernia is :—1. Femoral. 2. Inguinal. 3. Umbilical. 4. Ventral. 5. Obturator. 6. Sciatic. 7. Perineal. 8. Preperitoneal. 9. Postperitoneal.

Frequency of the occurrence of hernia is not accurately known. 1,500 out of 9,000 were under 5 years. It occurs twice as often in males as females.

Causes:—1. Laborious occupation said to be more apt to cause it. (?) 2. Abnormally long Mesentery; still, finding long mesentery on operation does not prove its presence before, as mesentery may have been stretched. 3. Another cause is abdominal operations. 4. Heredity. 5. Bronchitis. 6. Stricture. 7. Whooping-cough.

What forms a Hernia?

1. Generally small intestine—Enterocoele. Distinguished by percussion note. 2. Sometimes Omentum. Diplocele. 3. Sometimes both. Diplo-enterocoele.

Sac is thin in a recent, thick in an old hernia. Adhesions may occur between the sac and the gut.

Hernia is (a) Complete, or (b) Incomplete.

Incomplete :—When not right down, i. e., in the Inguinal canal. Reducible:—If it can be returned. Irreducible:—If it cannot be returned.

Incarcerated Hernia :—Is one in which the faeces cannot pass, but circulation can.

Strangulated Hernia:—Where neither the blood nor faeces can pass. Inguinal Hernia—(1) Direct. (2) Oblique.

Read in Heath the position of the External and Internal Abdominal rings; deep epigastric artery; covering of a hernia. In old cases the different coverings of a hernia cannot be made out.

Congenital Hernia:—Infantile—Funicular—Congenital Inguinal hernia is almost the only kind met with in females.

Symptoms :—Sense of weakness, followed by pyriform tumor. If obstruction, get vomiting and intestinal obstruction. Impulse transmitted on coughing. Can be held in by the hand. Is opaque. Comes down again on rising from recumbent position with a gurgling sound.

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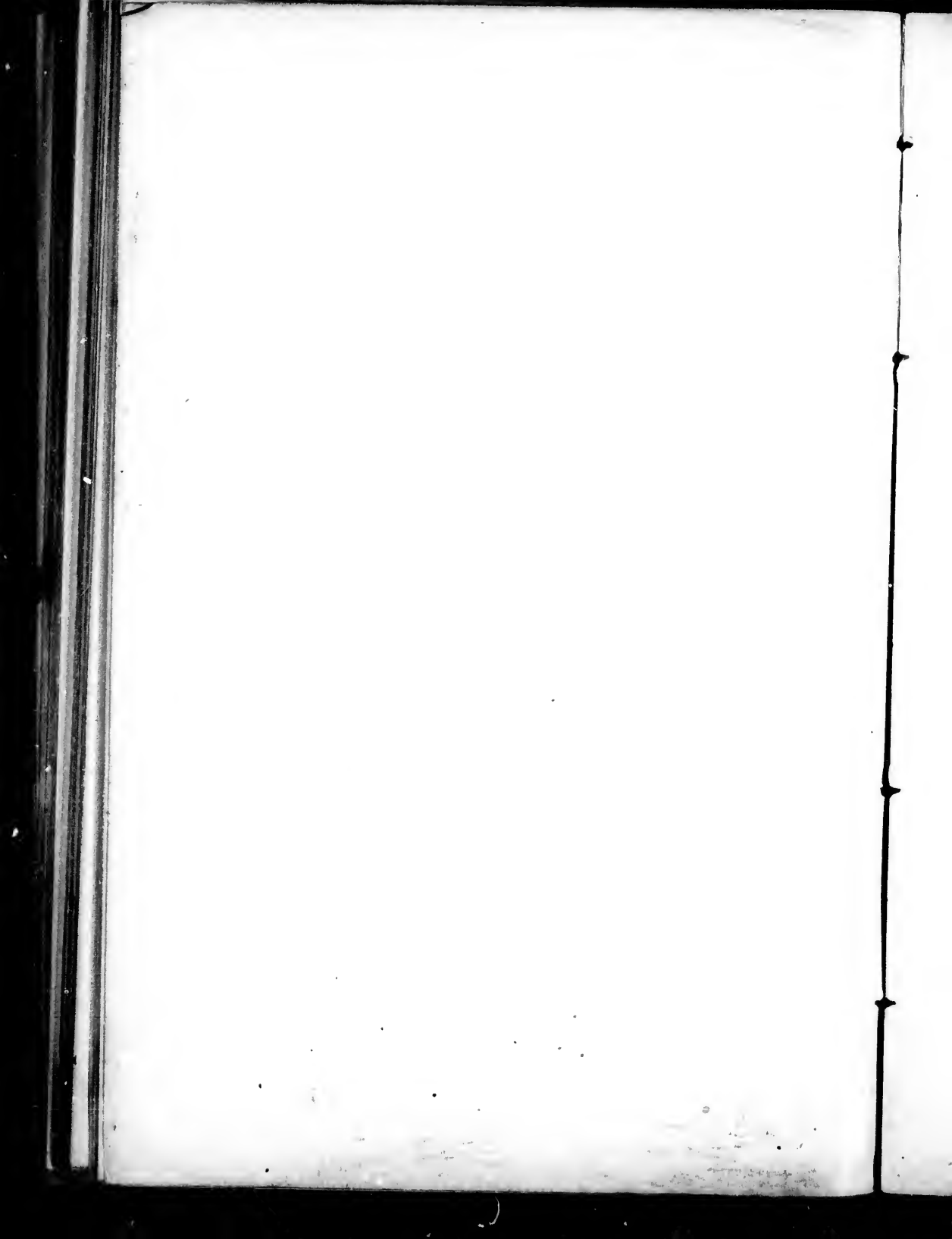
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Diagnosis from :—1. Hydrocele; this generally follows a local inflammation, or *trauma with inflammation*; get large inguinal glands. 2. Undescended Testicle—see that these are in scrotum. 3. Varicocele—feels like a bag of worms; if cannot be retained in the hand, when in the erect position, i. e., it slips down on rising in spite of pressure.

*Treatment*:—Reduce and apply a well-fitting truss. Try the truss by bending and coughing. Never stand erect without having truss on. If truss will not keep up the hernia, then operate.

*Strangulation*:—This is the most frequent cause of operation.

*Symptoms*:—Nausea and vomiting (early is from the sympathetic). Constipation and abdominal pain, anxious expression, tympanites, absence of impulse on coughing, rapid pulse, dry brown tongue, vomiting of food, then bilious and faecal matter. Nausea and vomiting are the most important; when persistent, and have symptoms of obstruction, examine all hernial orifices. If the symptoms increase, it may be necessary to open the abdomen and examine. A small knuckle of bowel caught in may cause the symptoms, otherwise get death in from 3-8 days. Gangrene may occur, then severe symptoms may decrease, and prove misleading. If it is strangulated Omental Hernia, the symptoms are less severe.

*Treatment of Strangulated Hernia*:—With pelvis elevated, and thigh adducted, try and reduce by taking sac in hand, so as to press equally, and firmly, but not roughly, on all the parts for 5-10 minutes. If this fails, give anaesthetic, and repeat efforts. Taxis should not be attempted—if hernia (strangulation) is of long standing, or if there is faecal vomiting or inflammation of the sac from previous manipulation.

If operation is refused, give opium; ice locally.

If cannot reduce, operate at first unless patient's condition is very bad.

Mortality is 30-40 per cent., but is not due to the operation.

If there is faecal vomiting, wash out the stomach first, and then leave boracic acid in the stomach. This lessens the shock, and prevents strain from after-vomiting.

*Operation to reduce Hernia*:—Make incision 1 ½ in. to 2

in. long over the External ring; sac is recognized by its smooth lining on opening. Separate the peritoneum for 1-2 in. round ring, and tie off, otherwise get tendency to recurrence of hernia. Make a clean cut through the sac, as separating with the fingers is apt to damage the blood supply and produce sloughing. Insert the finger or director—if very tight—into the ring, run a blunt hernia knife on the flat along the finger, and turn it up, taking care that no bowel has got between the finger and the ring. Tie up and return the omentum not forming attachment. The bowel may be returned if glistening and fairly healthy in appearance, even if rather dark. If unhealthy looking, put a stitch to anchor it, or pack with gauze for examination. If gangrenous, in hospital, where everything is conveniently to the hand, do an enterorrhaphy at once, but if assistance is not good, do an artificial anus, then afterwards, when properly prepared, do an enterorrhaphy. If moribund, only do an artificial anus.

Radical Cure of Hernia:—Three operations and several obsolete ones.

1. MacEwan's operation; he separates the sac, puckers this up with a purse-string suture, and fastens this pad just behind and inside the ring, the conjoined tendon is brought down and sutured to Poupart's ligament. He keeps patient in bed 4 to 6 weeks, and does not let him work for 8 weeks.

If work is laborious, wearing a pad is advised.

In children, 6 to 8 years, union is quite firm. He never changes the dressings.

In Congenital hernia, enough of the sac must be separated to make sac for the testicle.

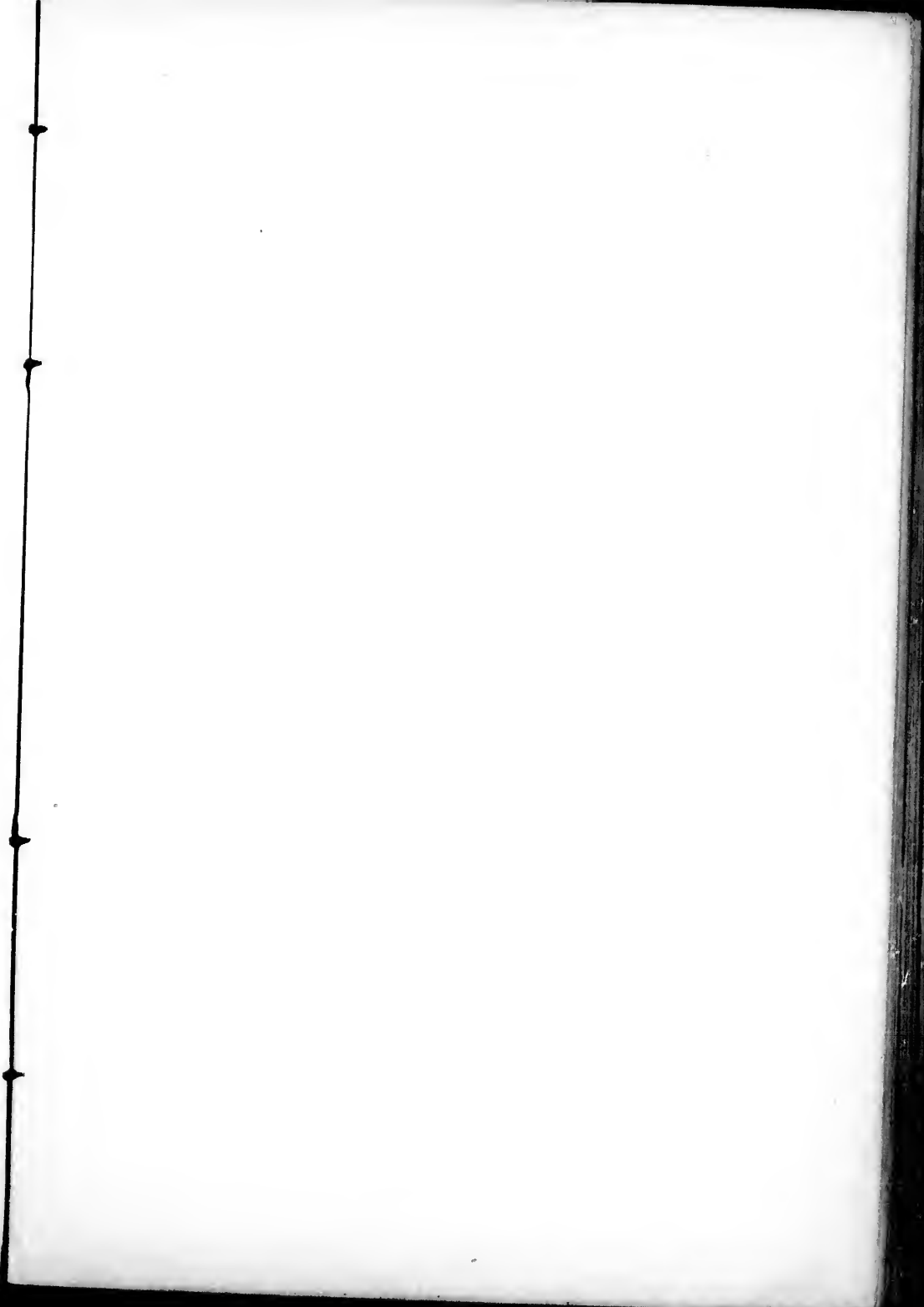
2. Bassini's Operation:—He brings the cord down between the External and Internal Oblique, so that the greater the intra-abdominal pressure, the harder for the hernia to get out.

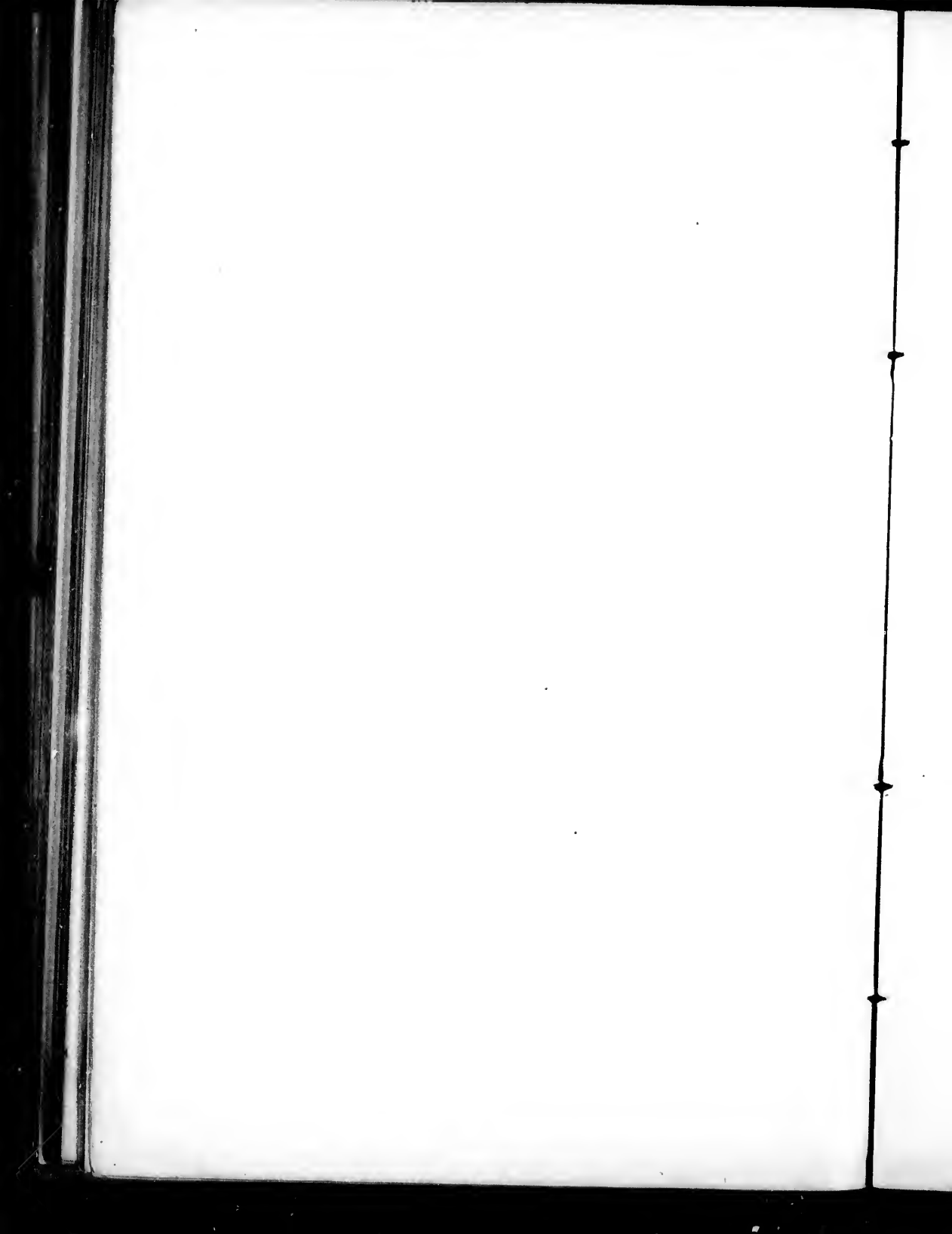
3. Halsted's Operation:—He brings the cord through all the layers, but the skin, high up where the abdominal wall is strong, and then carries it down inside the skin.

4. MacBurney's operation:—This now obsolete. He let the wound granulate up and got union by cicatricial tissue.

5. Czerny's Operation:—Was simply to sew up the cut.

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In women, the round ligament which is hard to separate from the sac is divided, and forms another attachment.

6. Kecher—Brings the sac out opposite the internal ring, and sutures it down over the canal. This does not secure firmer union, for it is pressed on only by the skin, and this dilates.

Sequelae:—Vomiting and constipation may persist after operations. Then must re-open in the middle line, and treat the adhesions, local peritonitis, volvulus, etc., causing it.

After treatment:—Give usual diet after abdominal operations; keep in bed 3 to 4 weeks, and from work 8 weeks if possible. If work laborious, wear a light truss 3 to 9 months.

The injection of irritants into the inguinal cavity to set up inflammation, and close it, are unwise, for a process is thus started, which cannot always be controlled.

Constitutional treatment:—Very important. Relieve stricture of the rectum, or urethra, or polypi of the rectum, see that bowels are regular. Tone up the system generally in lax states.

#### FEMORAL HERNIA.

Hernia into the crural ring. This always acquired. Usually small and tense. Stricture is always at the internal ring, generally due to Gimbernat's ligament.

Remember the abnormal position of the Obturator artery, which in 1-35 is liable to be cut in dividing Gimbernat ligament, hence use a dull knife.

Femoral form about 10 per cent. of all hernias. Are common in women, and more liable to strangulation than inguinal, and are generally formed by the ileum. Omentum if present should be tied up. Percussion note may be resonant.

Diagnosis from:—1. Psoas abscess; recognized by being outside and beneath the vessels, and by the presence of spinal curvature, which is nearly always concomitant. 2. Inguinal Hernia, recognized by its being above the spine of the pubes. 3. Varix of the saphena; can be held in by hand. 4. Single inflamed gland may be puzzling, especially if there is reflex vomiting from the genital branch of the genito-crural nerve. 5. Fatty tumour has a lobulated feel. 6. Hydrocele.



*Treatment*.—Hernia truss, bevelled, so as to avoid pressure on the vessels, may be sufficient. If small and irreducible, and only formed of omentum, a pad may be applied to prevent it increasing in size, but generally best to cut down, and tie off omentum, and do a radical cure. Never tie omentum down to the ring. Sheath which is hard to recognize is known by its glistening appearance and peculiar feel.

In applying taxis, remember the direction in which hernia has come. Sack may be made into a pad and fastened to the inside of ring, or tied off high up so as to have no depression for gut to rest in. Poupart's ligament is sutured to pubic fascia to prevent recurrence.

Cure is complete, or only a slight truss is necessary.

#### UMBILICAL HERNIA.

Three kinds:—(1) Congenital. Often large, containing different organs. If not too large, reduce, pare the edges, and generally get union. (2) Infantile:—Use large flat cork, covered with cotton and pinned to binder. (3) Adult—generally in fat people.

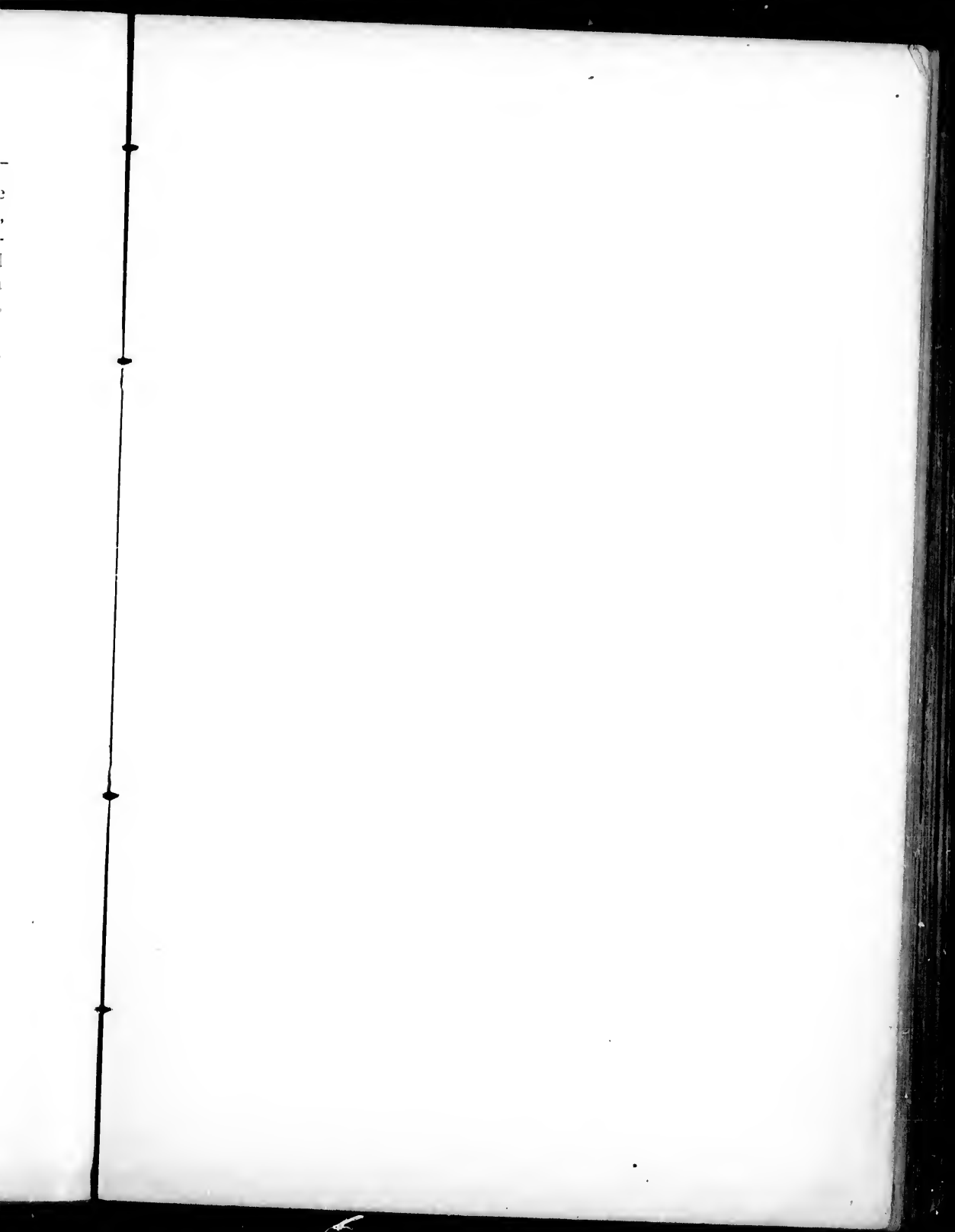
Ventral Hernia:—In different regions through abdominal parietes, are generally controlled by a truss. Lumbar Hernia:—In Petit's triangle. Perineal Hernia:—In women may be into the Labia. Ischiatic Hernia:—Leaves the pelvis through the great sciatic notch, either above or below the pyriformis. Diaphragmatic:—Protrudes through the diaphragm into the thoracic cavity. Pre-Peritoneal:—Dissects up the peritoneum from the abdominal wall. Retro-Peritoneal:—In duodeno-jejunal fold.

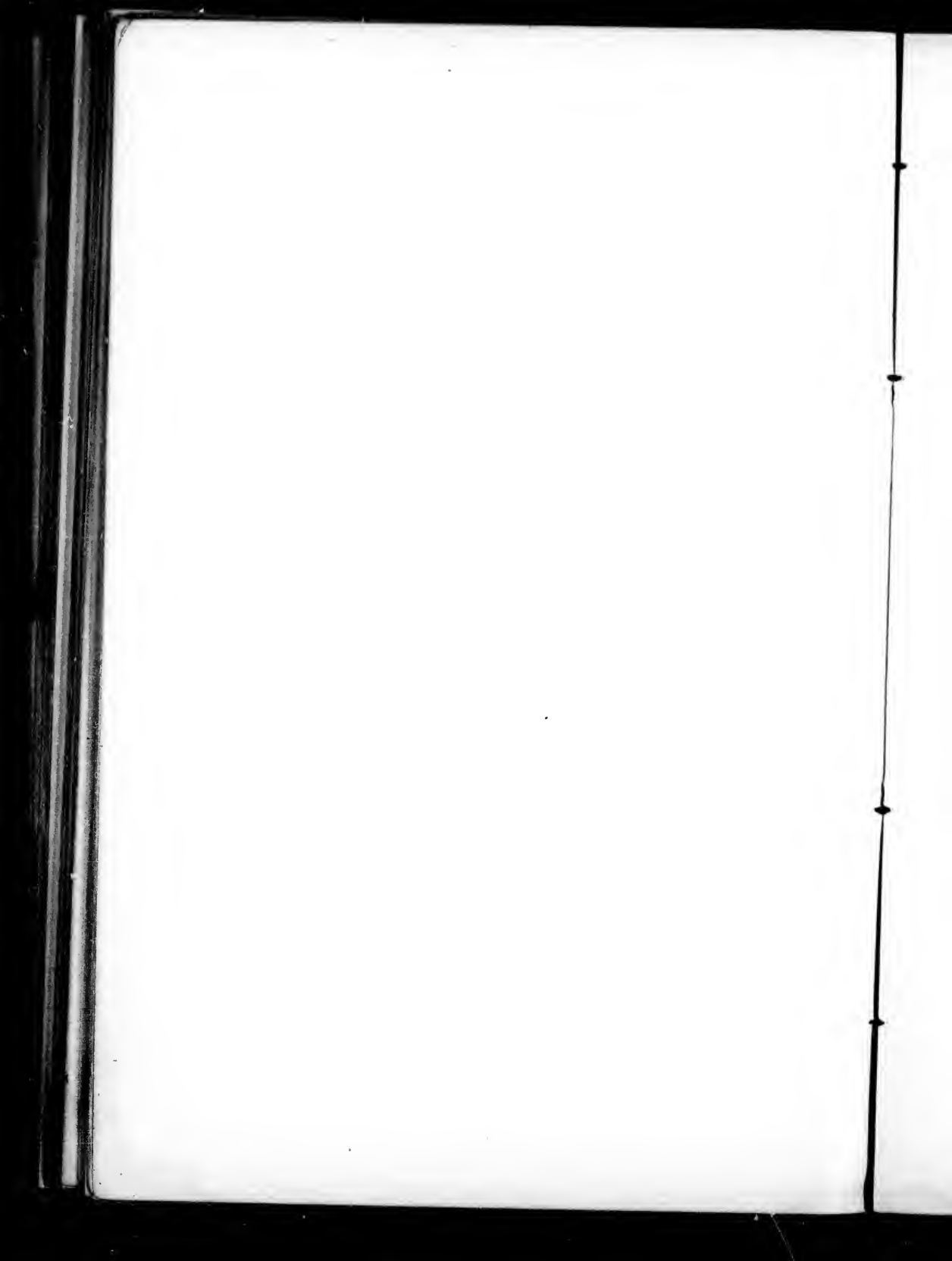
#### ABDOMINAL INJURIES.

Whether penetrating, or non-penetrating, they require careful attention. If their nature is obscure, put patient to bed, and apply ice.

Diagnosis between penetrating and non-penetrating wounds is often very difficult.

The passage of food through the wound and the vomiting of blood would indicate the wounding of the viscera. Abdo-





minimal distension with absence of liver dullness is strong, but not infallible evidence of visceral injury. Hydrogen gas, or injecting air per rectum, is a test for intestinal lesions; marked shock, especially with pallor and yawning, point to internal hemorrhage.

Non-penetrating wounds:—Are easily treated, aseptic precautions. Keep in bed 3-4 weeks, and wear binder 5-6 mos. to avoid hernia.

Penetrating wounds:—Fatal in 88 per cent., especially if stomach, intestine or gall bladder (unless bile is aseptic) are wounded, but chances are better if operation is immediate; for while 5 out of 32 operated on after 12 hours recovered, 18 out of 39 operated upon before the 12th hour recovered.

If there is evidence of perforations don't wait for symptoms, for then, when the shock is over, peristalsis will begin, and faeces, etc., forced into abdominal cavity.

If there is marked collapse, and think hemorrhage is not now going on, it may be well to wait for a partial improvement, but, if hemorrhage is going on, then stimulate patient in every possible way, and go on at once.

In shock, hypodermic of opium is very good. Follow up the original incision, or open in the median line. Insufflation of air or water may locate leak if hard to find. Suture the wound of the alimentary tract, and irrigate. If lesion is local, have irrigation local.

After operation, rest, good food. Opium rarely advisable, for by paralyzing the bowel it promotes the formation of adhesions. Salines or hot water injections help the pain much.

#### DISEASES OF THE RECTUM.

Anatomy:—The rectum begins at the left sacro-iliac synchondrosis, 6-8 inches long. It is said to be shaped like a large E, but Treves says it is "U" shaped. He says it begins at the 3rd sacral vertebra.

Under Treves' definition, which Dr. Shepherd agrees with, we get rid of one of the curves, and make it 2" only in length.

Rectum is divided into three parts:—3rd, lies under the membranous urethra. 2nd, Covers the prostate and seminal

vesicles. 1st, from the tip of the prostate to the 3rd sacral vertebra.

The rectum is a movable gut, as long as it has a completely surrounding peritoneum. The distance between the anus and the peritoneum is important in operating.

Folds of the rectum are the columns of Magagni. External sphincter is a voluntary muscle. Internal sphincter is an involuntary muscle, and merely a collection of the lower fibres of the bowel. The Recto-coccygeus passes from the coccyx to the rectum.

The Levator Ani opens the anus, and at the same time closes the urethra. The rectal centre is in the lower lumbar cord. The anus is very sensitive, the rectum but little.

Lymphatics:—2 sets. (1) Anal to the groin. (2) Deep from peritoneal and submucous coats.

Position for examination:—Lying on the left side with the knees drawn up is now thought much of by many specialists. Formerly patient leaned over a chair.

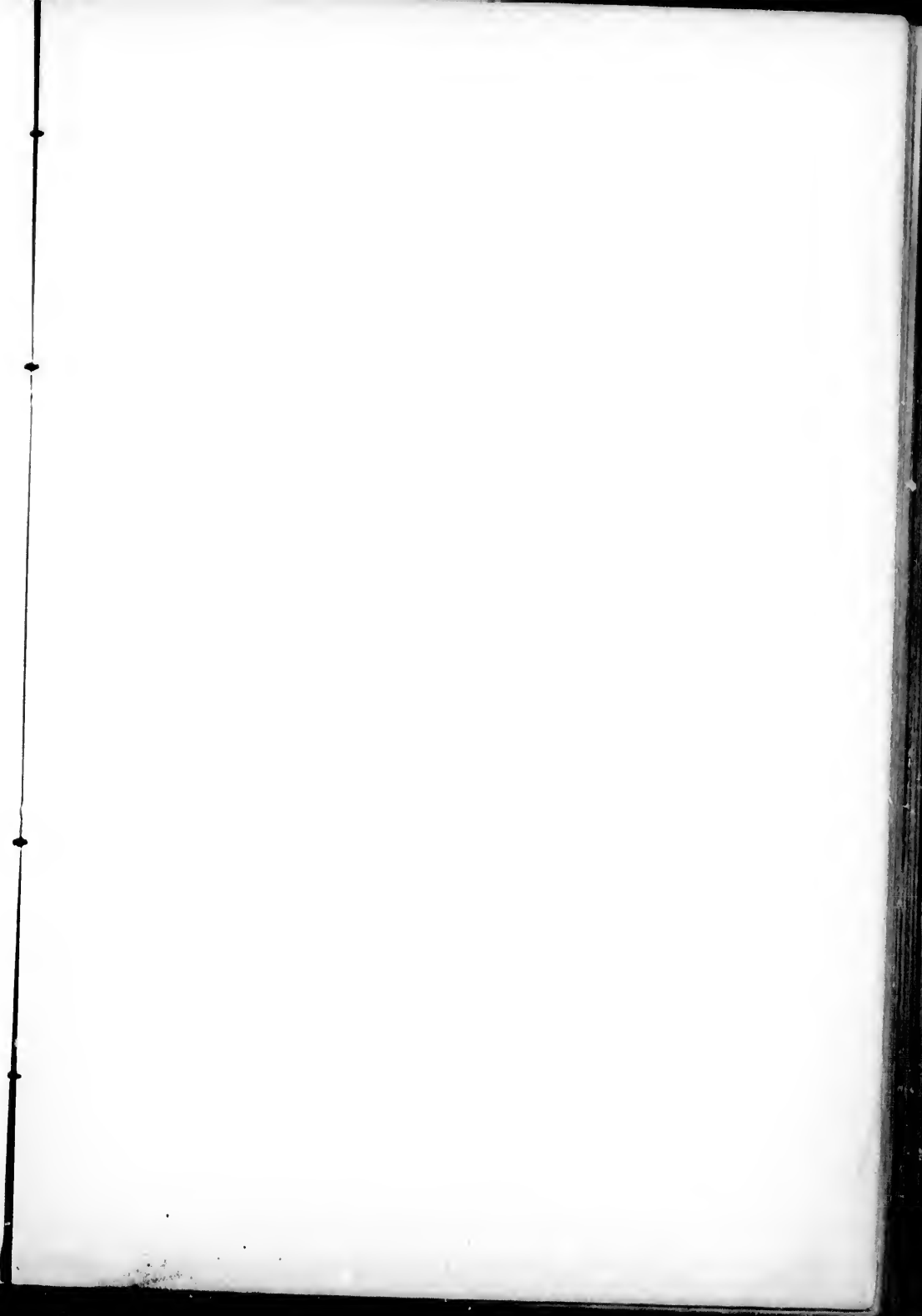
Prolapse of the Rectum:—Causes:—1. Occurs often in weak children, in defecation, may be only a weak, lax condition, constitutional cause. 2. A weak sacrum, or relaxed sphincter (in France supposed to mean unnatural coitus). 3. Worms. 4. Polypi. 5. Urethral stricture. 6. Piles in adults. 7. Pregnancy is often a cause. May have only prolapse of the mucous membrane. This is the commonest form in children.

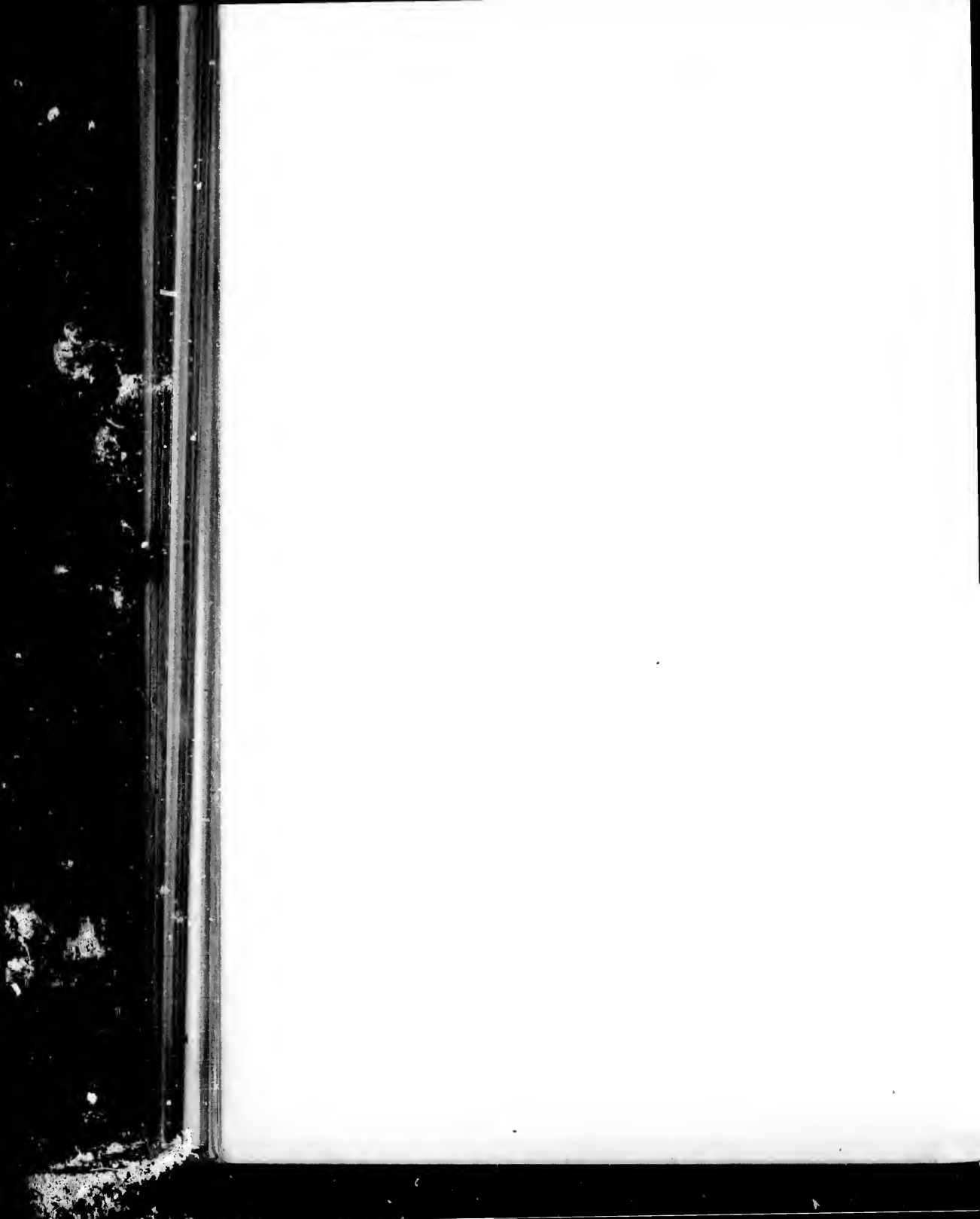
*Treatment:*—Remove the cause, such as worms, piles, stricture, phimosis, atonic condition by change of climate, outdoor life,—don't let child sit and strain at stool, have them defecate when standing, or have a very small hole cut. Wash the part with cold water is good, or bathe with Tr. Ferri Perchler., grs. XX, Oz. III, or use Hamemelis.

Painting with Nitric acid does well; not painful. Paque-  
lin's cautery when extreme, streaks not quite through the mucous membrane down to the bowel.

Hemorrhoids:—Two classes:—1. External. 2. Internal. Hemorrhoids are distended veins. There are the, 1. External hemorrhoidal veins. 2. Middle hemorrhoidal veins (French

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anatomists say they are not concerned in hemorrhoidal disease). 3. Internal Pudic.

External Hemorrhoids :—Three kinds:—

1. Simple—dilatations appearing externally as little lumps, cannot be permanently returned within the rectum. Astringent ointment may be used, such as Ext. of Belladonna, or Ext. of Opium, or Gall ointment with Plumbi Iodidi. Nitric acid sometimes

2. A little lobular form which is hard, and like a thrombosed vein, though some say it is rupture and effusion into the cellular tissue, probably they are clots in the veins; the size varies from that of a pea to a little finger, and are very sore.

The treatment for these is just to wash and to slit across, and shell out the tumor. Give opiate or 5 min. of cocaine solution (4 per cent.) if necessary. If bleeding occurs, apply a bandage for 5 minutes. If necessary (very rare) apply a compress and bandage 12-24 hours. If operation is declined, rest and hot poultices.

3. Cutaneous Piles. Like tags of skin, sometimes veins dilated, sometimes fissure or ulcer,—clamp and cautery.

They are called bleeding piles. Hemorrhage is nearly always arterial. Probably never have arterial hemr'g.; may be venous from ulcerating. Bleeding is generally of small quantity, but may go on for a long time, and cause anaemia.

Internal Hemorrhoids :—These generally increase in size. They form the lowest part of the portal system, generally they are pedunculated.

*Treatment*:—Clamp the pile, cut off a quarter of an inch from the clamp, and cauterize the stump of the pile. This is generally satisfactory. Do not get clamps too far up, or danger of getting secondary hemorrhage.

Allingham's operation, modified from an old one. He used a ligature, divide mucous membrane all around it down to the venous wall, then put the ligature around in the groove. This gives very little pain if the mucous membrane is thoroughly divided.



Another method of treatment is by injection of phenol, also used for External piles, although less frequently. Dr. Armstrong has never used it. There are some cases where it should be used.

Treatment consists in having 15 per cent., 30 per cent. and 50 per cent. solutions of Phenol. Inject 5-10 mins. into the base of pile. This cures hemorrhoids. Trouble is there may be severe sloughing, hence objection is that we cannot depend upon it.

Besides this treatment, we must treat the general condition causing it. Constipation is a common cause. Give tonic treatment.

#### FISSURE IN ANO.

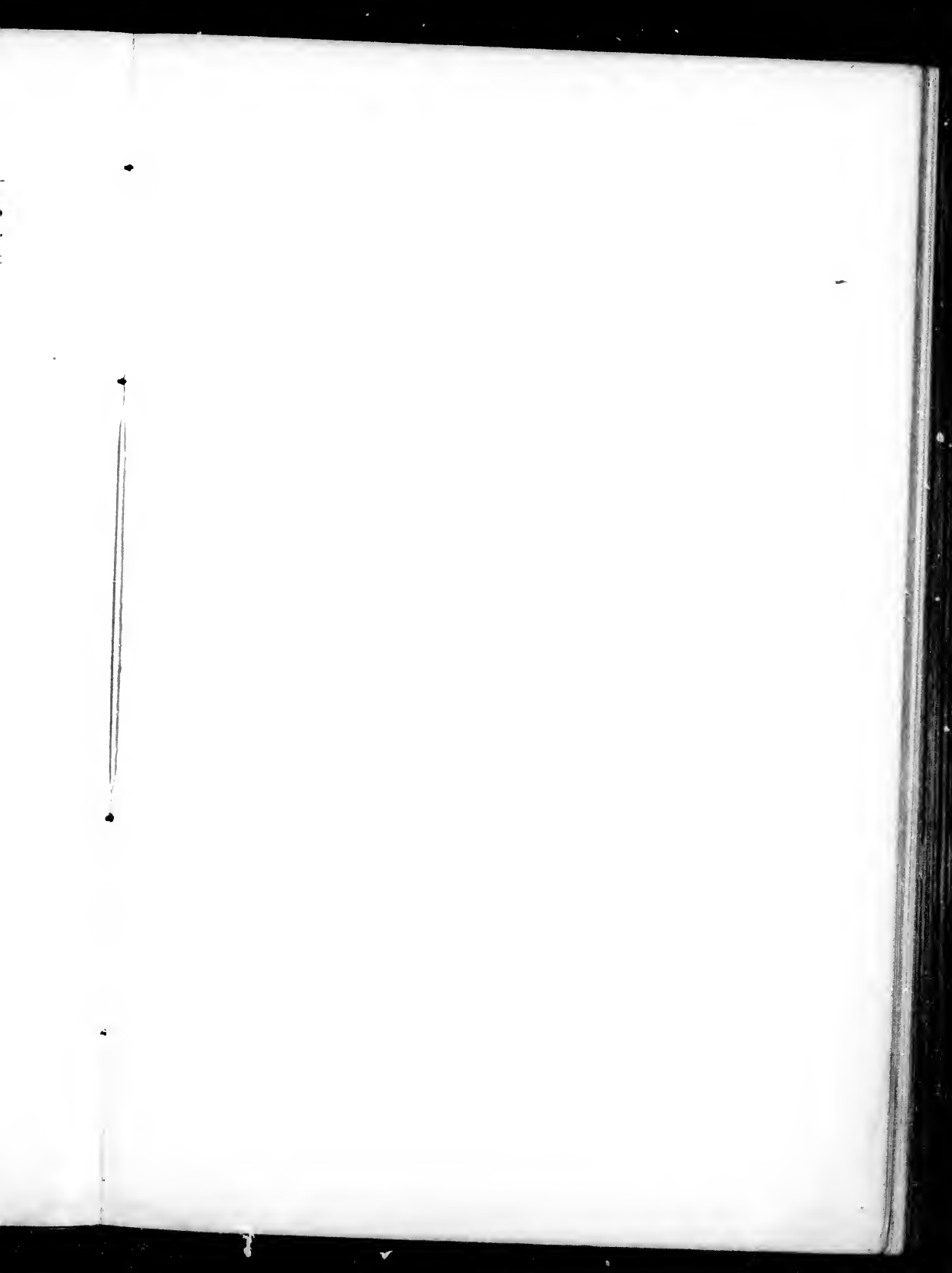
Is somewhat closely allied to piles, but is more painful; causes a great deal of irritation.

When patient complains of a very great gnawing pain after defecation or at other times, make an examination, and generally find a fissure; sometimes it is merely the tail end of the large ulcer above.

Diagnosis :—Be very careful in making diagnosis. The rectum should be examined in every case.

*Treatment*:—One way is to stretch and tear the sphincter, another way is incision. Stretch sphincter and rectum, and draw knife along the base of the ulcer about a quarter of an inch in depth, and begin and end incision in healthy tissue; examine higher if ulcer present, scrape with spoon. If deep scrape sides too. If hemorrhage touch with Nitric acid. A few days rest in bed without a motion will enable it to heal.

Another way is to stretch the sphincter under an anaesthetic. This tears the sphincter. Treatment is thoroughly satisfactory. Some do operations under Cocaine, 4-5 min. of 10 per cent. sol. Dr. Armstrong does not like cocaine. Sometimes if examining for piles see an elevated pile with granular surface; this is a bleeding pile, treat by brushing with Nitric acid. One application will stop hemorrhage.





## PRURITIS ANI OR ITCHING PILES.

Cause:—May be a little irritating discharge from a polypus, Hemorrhoids. Retroverted Uterus. Thread worms, etc., or it may be part of a general eczema.

It is very troublesome, and is often very hard to relieve. If there is a known cause, remove it. If thread worms, inject lime water, and give salines once or twice a week; some say plain water is best of all. Weak boracic solution is often used. If a polypus remove; if a hemorrhoid ditto. If eczema, constitutional treatment: occasional injections of Phenol, Sublimate and Lanoline, Saponis Viridis, Oil of Cade and Alcohol, one part of each is used:—

R.—Sodii Bibor, Drachms II. Morphine, Grains XVI. Ac. Hyd. Chlor. Dil., Oz. S.S. Glycerine, Oz. II. Aq. ad., Oz. VIII; always in these cases examine the condition of patient, possibly Bright's disease, irritative faeces, etc.

## ISCHIO-RECTAL ABSCESS.

Two (2) kinds. (1) Superficial. (2) Deep.

The Superficial Abscess is generally just under the skin, and is usually due to traumatism, such as a kick, falls, blows, etc., horseback exercise, piles, phenol treatment of piles, setting up a cellulitis, which may sometimes be aborted by the use of ice; if this fails, change the ice for a hot fomentation. These should be applied until there is a little oedema, and, so soon as can see the centre, puncture with a knife. For this a local anaesthetic, like Ethyl chloride, will do; but general anaesthetic will be better, because then abscess may be scraped out. Use antiseptic solution, and pack with Iodoform gauze; the object is to get healing from the bottom, and have no sinus.

The ordinary Ischio Rectal Abscess is deeper:—It arises in the Ischio-rectal fossae, between the Levator ani, skin, rectum and pelvis.

It may be traumatic in origin, but is generally from the rectum. It may be perforation from something swallowed, as needle, fishbone, etc. It is sometimes due to hemorrhoids of a sup-

purating character, or to ulceration of the mucous membrane, especially tubercular, syphilitic chancres, anything opening the mucous or sub-mucous spaces, and letting the germs get deep in.

Symptoms :—Pretty severe pain, heat, swelling, redness in the perineum, with constitutional fever, furred tongue, rapid pulse, and sometimes chill, when patient lies a week, generally get pain, swelling, probably oedema around perineum; such a condition cannot be aborted. As soon as this condition is distinctly defined, don't wait for evidences of suppuration, but, as soon as it is hard, red and oedematous, send a long straight bladed knife into the centre of the space, and should get a few drops of pus, then make opening large enough to insert spoon, scrape, wash with antiseptic, pack with Iodoform gauze. Never look for opening into rectum. If it is closed, leave it so, for then cavity can be made aseptic. The object is to get healing without fistula, or any sinus remaining.

Another condition described by Richet is a collection of pus between the upper surface of the Levator Ani and the Peritoneum. This is a rare condition, but it is as well to know it. May tap through the rectum, generally opening with forceps, or may need an abdominal operation and opening.

#### FISTULA IN ANO.

These fistulae follow naturally on Abscess in being both superficial and deep.

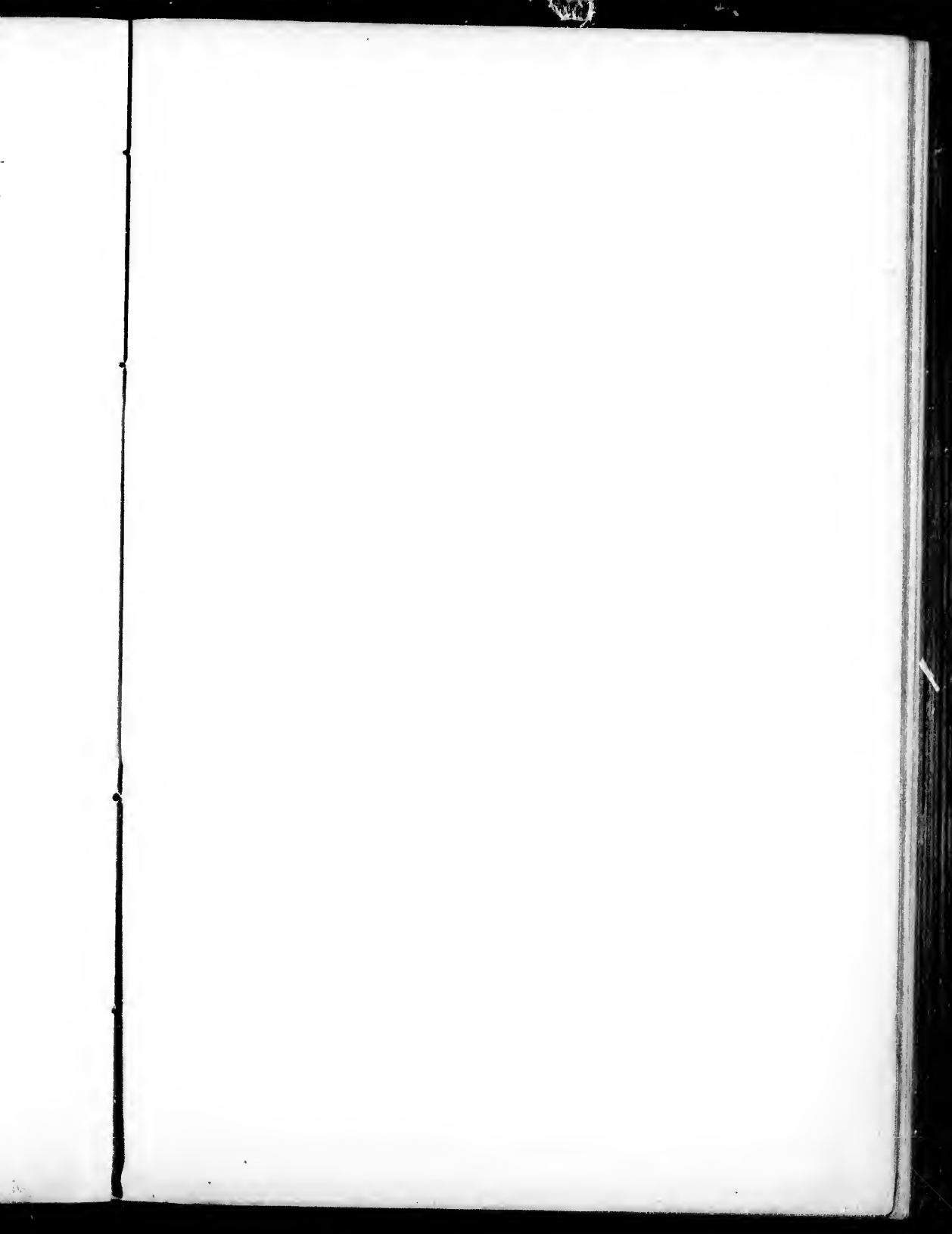
May have discharge about the anus. Probe may not go far; don't try to force into rectum.

Treat by slitting up and scraping sinus, and this superficial fistulae will rapidly heal. The deep variety result from deep Ischio rectal abscess.

It may communicate both with rectum and skin, and is then called "complete."

"Blind external Fistula" where it communicates externally only.

It may open into the rectum and not on the skin, and is then called "a blind internal fistula."





*Treatment* of these fistulae is of some importance.

Rule is division of the sphincter, pass probe up, and cut down on the probe from above down.

If blind internally, do the same thing. These fistulae are often complete, more often than is supposed. Sometimes the use of the speculum will be of use in finding the internal. Pass director in and divide all the tissues.

Sometimes these fissures can be closed by stimulation. This is rare, but sometimes passing the probe will stimulate closure, especially if it does not communicate with the rectum.

Some have stimulated by armed probe, i. e., Silver Nit. on the end. It is important to follow up the tract in every part. See that sinus is thoroughly followed up. Generally convert sinus into an open wound, which may be stimulated.

Complications are :—(1) Phthisis. It was said that in consumptives it won't heal if the sphincter is divided. The sphincter is now known not to be the cause; but in advanced phthisis do not operate, for the healing here is difficult, owing to the fact that with the coughing of the patient faeces are forced out. If, however, the disease is slight, it is now considered well to operate, as this removes one cause of debility, and prolongs life. (2) Bright's disease:—This is another contra-indication. *Contra-indicates all forms of operations.* It is of the utmost importance to examine the urine before giving anaesthetic; *it is more important to examine the urine than the heart.* (3) Diabetic and Cancerous patients also stand operation badly. Where patient complains of griping pains, after defecation, etc., and where there are no piles to account for this, it is imperative to examine with speculum for blind internal fistula.

#### CONGENITAL MALFORMATION OF THE RECTUM.

The Rectum and Anus come from different blastodermic layers, which unite in the 6-7 week of foetal life. Occasionally the rectum does not come down to the Anus, so that we have a fold between.



*Treatment*:—Simple incision, and then dilatation.

A worse condition is where the rectum comes down, and there is not any infolding of the skin to form anus. Here, go through at point where anus should be, until we get to faeces. Rip well back into the hollow of the sacrum, or may miss it. If a reasonable amount of dissection done, and rectum found, there are two things to consider:—

Some bring it down to anus and suture it, but generally the child is delicate, so often better to leave it until the child is older, and better able to stand the operation.

If don't find rectum, which is known by its bulging down; do an inguinal colotomy, and stop there, or, if health is good, pass bougie down, so as to show whether rectum is present or not. There may be a connection between the rectum and the bladder, and faeces pass per urethra.

Tubercular disease of the rectum begins in the lymphatic system, the lymph tissues gradually forming nodules. Syphilitic and Malignant disease generally pass upwards from the outside.

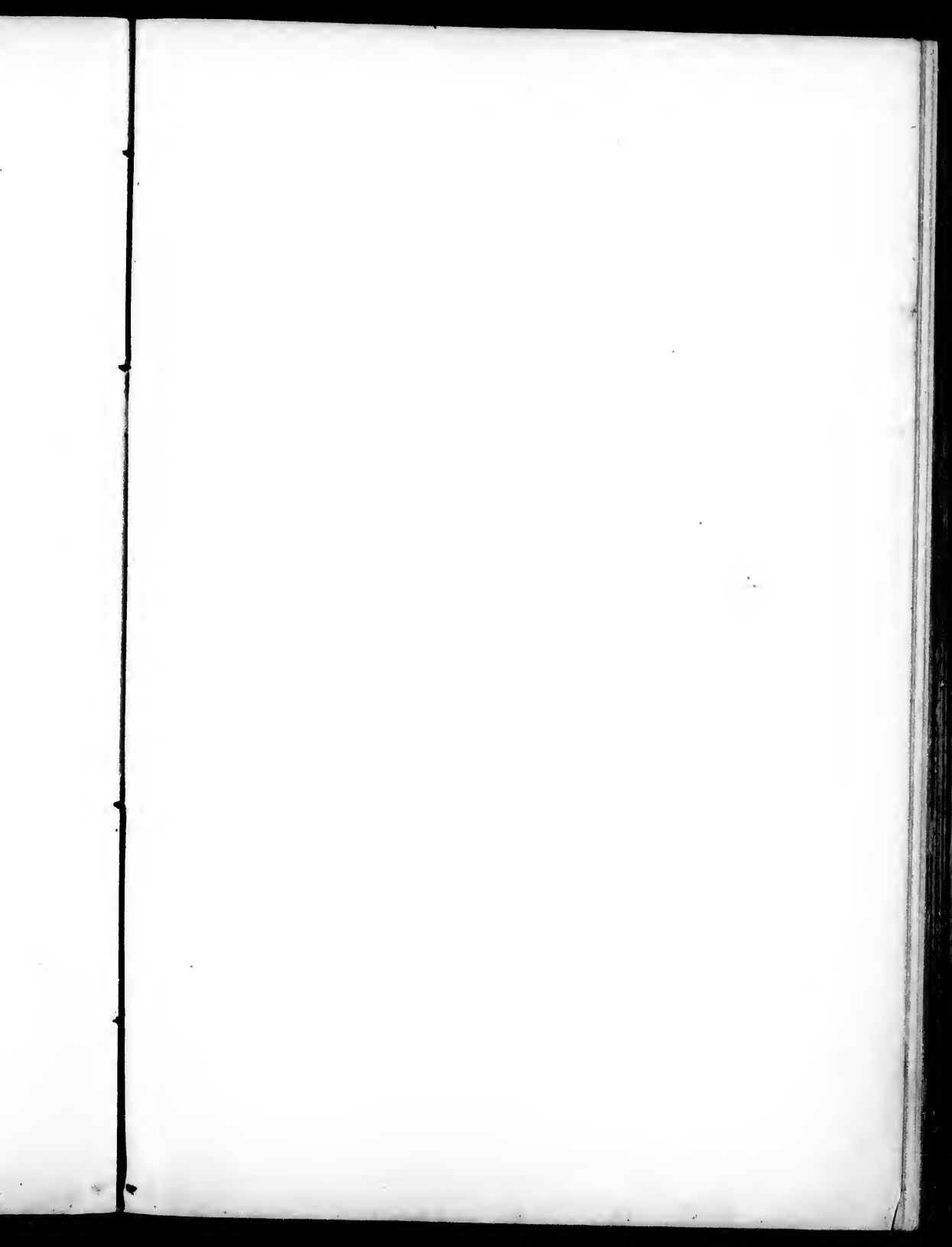
#### MALIGNANT DISEASE.

Malignant disease begins as hard nodules. If patient complains of pain and diarrhoea, then examine. If ulcer it is shown by loss of substance and velvety feel—may be piles, if it is malignant it will be hard and nodular; probably slight hemorrhage if frequent diarrhoea. Diagnosis depends upon this.

*Treatment*:—If on the posterior wall, as it often is, and one can get finger above the upper part, it can be removed generally. English surgeons generally operate only under these circumstances. Place in the lithotomy position; make incision right back to the tip of sacrum (can always cut sphincter once, especially back, without causing incontinence).

Divide the rectum, transversely, well above the disease. If one leaves a strip of mucous membrane, there is liable to be a stricture, therefore remove it widely or don't interfere at all.

If mass is anterior, and well down, remember the connection with membranes; therefore, in separating from urethra and bladder, insert a sound and divide transversely.





It is best to bring the rectum down, and stitch or leave it; the mortality is really diminished by leaving without stitching it. Now they are beginning to stitch it down, leaving wide parts unstitched, and packing round with Iodoform gauze. This gives the best results of all.

If one finds it impossible to get above the rectal disease with the finger, what is to be done?

*Kraske* turned the patient on the left side, and made an incision over the soft parts, turned the coccyx down, divided the sciatic ligaments, and chiseled off the 3rd sacral vertebra, and so could get in at a higher level up around the sigmoid.

This operation has been improved upon:—

*Schade* makes incision over sacrum, and divides it at the anterior superior spine, divides the ligament, and turns the sacrum up. Here he can get right into the pelvis. Through this he can remove the seminal vesicles for Tubercular or Malignant disease.

*Koussenbar's* Operation:—Divides the sacrum in the middle line as high as the 3rd, divides transversely, and unfolds the osteo-plastic flap. He thinks this interferes with the nerves less, and gets better union afterwards; much relief can be given by these high operations. They are not mentioned by English text-books. Another step (watch it; don't do it yet). Excision of the bladder, and removal of half the pelvis.

*Bordenheuer*:—Pulls the peritoneum off from the rectum, and reaches the sigmoid. This does not interfere with the vessels of the meso-rectum.

Ordinary way is to open the peritoneum in these high operations, remove the disease and enlarged glands, and unite the two ends of the bowel by sutures.

Establish external drainage from the suture line, which is lowest, pack with iodoform gauze, and look for infection of the peritoneum.

Another development *Dr. Armstrong* is greatly in favor of is to first do an inguinal colotomy, so as to have faeces carried out through this opening, while the ends of the rectum are uniting; otherwise never get union without suppuration.

Faeces always come out through the opening. Then can wash out the rectal end, and make clean, and get union without suppuration.

### FRACTURES.

Generally defined as a solution of continuity in a bone suddenly made either by violence, muscular action or disease.

Separation of epiphyses, and displacement of cartilages also come in here.

Fractures constitute one-half of all injuries. Ten times as frequent as dislocation, more frequent than sprains. Fractures of the upper extremity are twice as frequent as the lower, upper 52 per cent., lower 25.8 per cent. Other fractures 26.72 per cent.

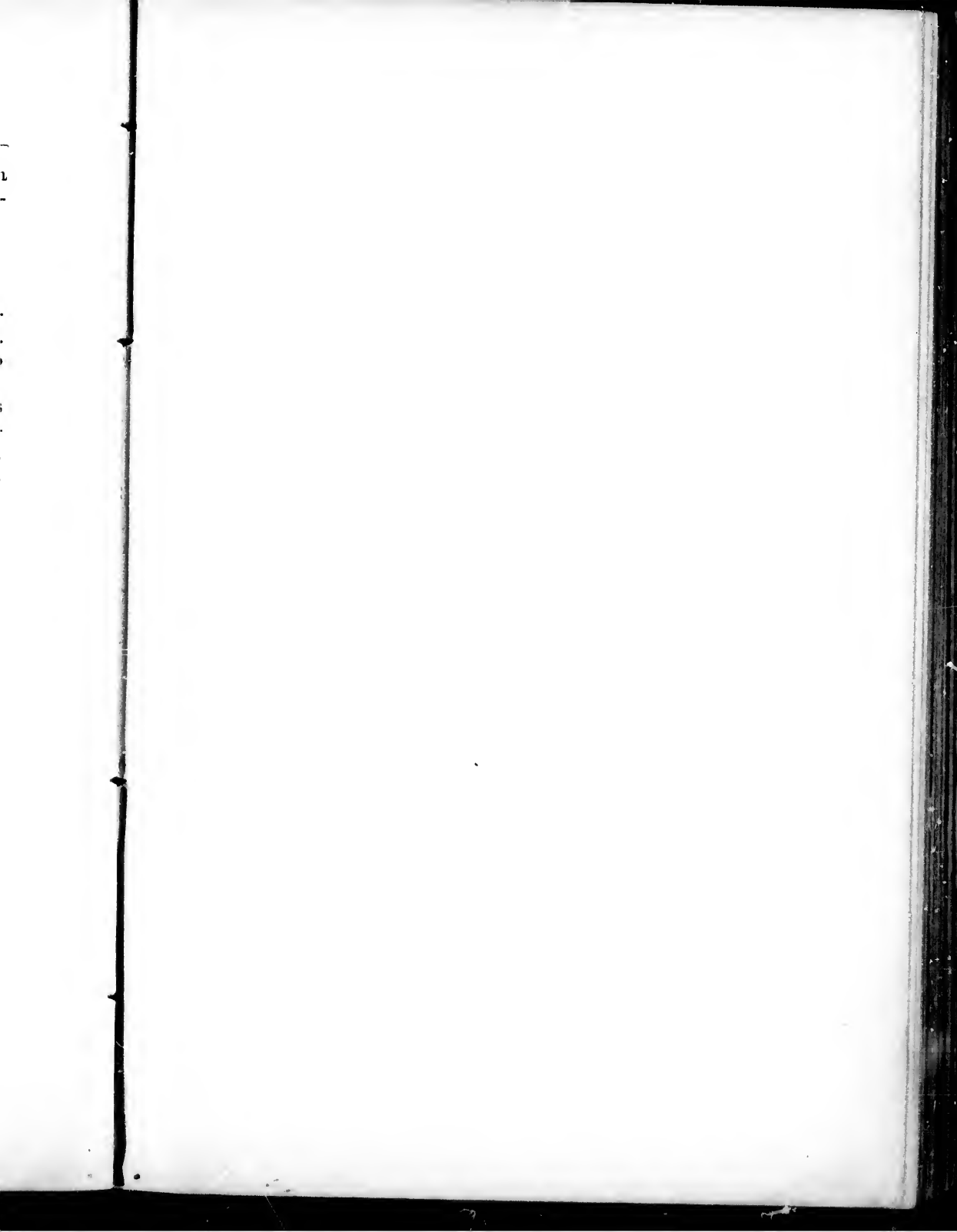
Causes of Fracture, almost always local. Liability to occur much modified by predisposing causes.

Local :—External violence and muscular action, or a combination of the two.

External violence may be direct or indirect. By direct violence is meant the bone is broken at the direct spot where the violence is applied, and is often complicated by injury of the soft parts. By indirect violence :—We mean that force is applied to two parts of a bone, the fracture taking place between the two parts; the fracture is at a distance from where the blow is received. Example :—Colles' fracture from the effect of a fall on the hand, weight of the body at the other end. Fracture of the base of the skull by *contre coup*. Fractures received by indirect violence are usually severe and tend more than others to be compound or comminuted.

*Muscular Action*—Rarer than the others, usually the bone thus broken is the seat of some disease which alters its structure, fracture of the patella from quadriceps extensor, sternum broken in the strain of labor, of ribs in coughing, humerus by throwing stone, femur by kicking at football and missing.

Muscular action often aids in fracture of bones by indirect violence, so that a drunken man falling is less liable to fractures than sober, because he does not try to save himself.





Predisposing Causes :—1. Normal. 2. Pathological.

Normal :—Chiefly position and shape of bone; exposed bones, and long bones; powerful muscular attachments. Age and sex :—These are normal causes. Fracture may occur at any stage. In children especially liable to separation of the epiphyses, especially the humerus and femur. In children one-half the cases in the upper limb are clavicle; in lower, femur.

Sex—Men more liable; in men, shafts of long bones, cranium and pelvis. In women, the clavicle, radius, tibia and neck of femur are commonest.

Below 5 years the liability of both sex is equal. After 5 years males are more liable up to middle age. After 45 in females, upper limbs exceed that in males, and this is especially due to fracture of the radius in woman.

Season especially in our climate in winter, more frequent in summer in children, owing to their games, etc.

Pathological :—Certain conditions of the bone predispose. *Fragilitas Ossium* (boy 6-7 years of age had had 27 fractures), slight falls, turning legs, or tossing in bed, breaking femur, by tossing around.

Frequently associated with rickets, often hereditary, most frequent in children, may persist throughout life.

*Mollities Ossium* predisposes to fractures.

Senile Atrophy, Rickets predispose to "Greenstick" fracture.

Carcinoma, Sarcoma, Strumous or Syphilitic (3rd stage) patients, Caries, Necrosis, Scurvy, Osteo-myelitis, Gout, Simple Atrophy from disease will predispose. Atrophy may follow injury to nutrient artery.

Fractures are complete or incomplete.—

1. Complete :—Entirely traverse the bone; they are Simple, Compound, Comminuted, Complicated, Multiple, Impacted.

2. Incomplete :—Only partially traverse the bone, as a "Greenstick" fracture.

Simple :—Fracture is one unaccompanied by any open wound, communicating directly with the seat of fracture.

Compound fracture communicates by a wound with the



surface of the body. The communication may occur in a variety of ways:—(1) Bullet injury. (2) Laceration of the soft parts by fragments protruding (commonly due to incautious handling). (3) Sloughing of the bruised tissue; simple may change to a compound. (4) By ulceration through the skin of a pointed fragment. A fracture compound at the first is more serious than those secondarily compound.

Comminuted:—Bone broken in several fragments, and differs from multiple only in the size of fragments.

Complicated:—Some important structure is injured at the same time, vein, artery, nerve, joint, or a dislocation.

Multiple:—More fracture than one has occurred in the same bone, or different bones.

Impacted:—The firm tissue of the bone has been driven into the cancellous tissue; as in head of femur, head of humerus, and lower end of radius.

Direction or line of fracture, important; runs through in various ways:—transverse, oblique or longitudinal may have a combination of two of these.

Transverse Fracture is seldom actually transverse, and is usually slightly oblique; almost always due to direct violence, or to muscular action, seen in the patella; separation of the greater epiphyses are always transverse.

Oblique:—Usually due to indirect violence, the bulk of fractures of the extremities are oblique; if one bone alone is broken, this is more likely to be oblique. The obliquity may be slight or very marked—may traverse half of one of the long bones. This more dangerous than transverse, and is more likely to cause compound variety, also harder to keep in place, one fragment over-riding the other.

Longitudinal:—Splitting of bone in the longitudinal direction, rarer in civil than in military practice, usually due to a bullet.

Fissured:—Most common in the skull; no displacement of bone.

Stellate:—Fracture radiates from a central axis, often seen in the skull, occurs sometimes in the patella, when due to direct violence.

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Spiral fracture another modification: it is a result of a violent twist, and a fissure has run obliquely around the axis of a long bone. This is apt to become complete by transverse fracture.

Incomplete :—The "Greenstick" is the best example, only seen in children, broken as a greenstick is broken across the knee, transverse at the point of injury and longitudinal above and below, and a permanent bending. Common in children in the clavicle and the upper arm; to correct the bend often have to break it through. This sometimes occurs in utero.

Diagnosis and Signs of Fracture :—History given by patients is often of assistance, especially in stout subjects, and in impactions. Patient will tell you of a snap followed by inability to move. Strip the part carefully, cut off clothing to prevent the possibility of simple form being converted into a compound. This will especially occur in fracture of the tibia, often necessary to give an anaesthetic.

Place in normal position, and compare with the other side: Signs :—1. Pain and tenderness. 2. Discolouration and swelling. 3. Preternatural mobility. 4. Function, impairment or loss of. 5. Position; inability to retain. 6. Deformity. 7. Shortening. 8. Crepitus.

Pain and Tenderness :—Are occasionally slight, especially in tabetics and paralytics; in others pain is intense, and strong person may cry out; aggravated in fracture of the ribs by respiratory movements; pain is aggravated by motion; tenderness is localized and constant.

Discolouration and Swelling :—More marked in superficial fractures as tibia, malar bone, etc.

Deformity :—May be due to swelling from extravasation or inflammatory changes, but generally due to displacement of fragments.

Deformity seen by comparison of the two limbs, by sight touch and measurement; always compare the two sides by sight and feel.

Deformity may be only slight, not distinguishable, especially if only one of the pair of bones broken, as the tibia and fibula.

Deformity is a good deal modified by the muscular action. There may be no displacement as in incomplete or dentate, etc. Fragments as a rule displaced.—1. Longitudinal—one bone riding past the other. 2. Angular. 3. Rotatory, or circular, one in which one bone fragment rotates on the other. Example of rotatory is, when femur broken at the lower end, the leg turns around. 4. Transverse or lateral; one piece resting just upon the edge of the other. 5. Fragments actually separated as in the patella. Preternatural mobility, and loss of function, and inability to retain position; take these three together:

Shortening :—Not always present. In transverse fracture do not get it, or it is very slight. Hamilton declares this always occurs. Shortening may be fallacious; there may be congenital shortening. There may have been a previous shortening, or disease causing shortening, as in the hip. There may have been a slight dislocation. Lengthening may occur if piece gets in between two fragments. If one only of a pair of bones is broken, may not get it at all. Lengthening may occur in fracture of the olecranon and patella.

Crepitus :—A grating sound, where the two ends are rubbed together, not seen in impacted or incomplete fracture, where a clot of blood, or where a piece of muscle, tendon or fascia are between the fragments. If one only of a pair are broken may not get it. In separation of the epiphyses, it may be very slight.

Crepitus may be mistaken for emphysema and other conditions :—1. Emphysema in broken ribs may make crepitus.

(2) Effusion into sheath of tendon or bursa gives a peculiar crackling sensation.

(3) In neighbourhood of joints, where bursae are inflamed.

(4) Osteophytes are thrown out about the diseased joints, and in old people this may cause false crepitus.

The harsh grating feel of true crepitus once felt can hardly be mistaken. We examine for crepitus by making extension; grasp the two fragments and rub them together. Crepitus is not always present, and in impacted fracture harm is done in looking for this sign.

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Diagnosis :—Is usually easily made :—From:—Dislocation (often mistaken). 1. No crepitus, or false or pseudo-crepitus. 2. Preternatural mobility, joint is fixed. 3. Deformity returns in fracture, while in dislocation, when part is reduced, it remains so without force.

In impacted fracture we have more difficulty.

Sometimes we have also a fracture and dislocation at the same time.

From Contusions :—Often difficult at first, especially about the joints. May get contusions and fractures combined. We have to wait until swelling subsides. Look for tender spot.

If in doubt treat as a fracture.

From separation of Epiphysis :—Often difficult, but separation of the epiphysis is usually diagnosed by the character of the crepitus, which is softer in character. It is important to make out the diagnosis if possible, for the epiphyses should be brought together to allow growth.

Repair of Fractures :—Bone is united by the formation of bone around, within and between the fragments. Where the fragments cannot be brought together, as in olecranon or patella, we only get fibrous or ligamentous union, instead of bony union.

If fracture be examined a few hours after accident, an abundant extravasation of blood is present surrounding the fracture, between the muscles, into the areola tissue, beneath the fascia, and beneath the periosteum, muscles are seen to be torn, the periosteum is torn and ragged looking and separated from fragments for some distance above and below.

Sometimes the periosteum is not torn, when violence not great.

Get also inflammatory conditions following the blood extravasation.

Stages of Repair :—1. Inflammatory or Exudation from the 3rd day.

2. Growth of soft callus 12th to 14th days.

3. Callus begins to ossify. This continues from the 10th to 16th day, up to the 4th to 5th week, or till healing occurs.

From 4-5 days or a week fragments will be seen to be



surrounded by a greyish red mass. This is not only found about, but is also infiltrating the neighboring tissues.

The periosteum is swollen, gelatinous like, and readily torn from the bone by the fingers.

The greyish red mass referred to is granulation tissue.

This exudative material, which is usually called "callus" or bone cement, consists of small round cells, with a small amount of firm intracellular material.

This inserts itself beneath the periosteum, replaces the blood there and lifts the periosteum up, forming a spindle-shaped tumor, usually called the ensheathing callus. At the same time get same formation from exudation into the medullary canal. An inch or two up and down the canal—this is called the internal callus. Later we get an exudation between the ends of the bones and this is called the Permanent, Intermediate or Definitive Callus. The internal and ensheathing form together the provisional or temporary callus. The latter are temporary, are thrown out more quickly, and are intended as a plint, while the permanent is forming.

From the internal layer of the ensheathing callus we get our periosteum formed. Earthy material and lime first appear 10th to 14th day and extends both above and below. The bone formed is soft, more vascular and spongy than the old bone for a long time. The absorption of provisional callus forms the final stage of the repair of fracture. It never disappears entirely in any case, and seems to assist the permanent callus.

In Comminuted fractures, the provisional callus throws out buttresses of bone, and a large amount of provisional callus formed.

If from any reason the callus between the ends of fragments is not formed, then the provisional callus becomes permanent.

In children there is a greater amount of callus than in adults, also greater in bones covered with muscles than those exposed. Seen in tibia, where little is thrown out in front. This shows how neighboring tissues help; where there is angular deformity and displacement there is much thrown out.

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In compound fractures there is often less amount, because exposed to suppuration and absorption (general compound fractures take three times as long to heal).

Somewhat the same process takes place in the epiphyses of the bone.

Time required for union:—Phalanges, metacarpals, carpals, metatarsals, tarsals and ribs, 3-4 weeks. Clavicle, forearm and fibula, 5 weeks. Humerus and tibia, 6-7 weeks. Both leg bones, 8 weeks. Femur, 10-12 weeks, i. e., union with sufficient firmness to allow of motion commencing.

When longer than this we get delayed union.

Delayed Union may be caused by:—(1) Constitutional debility. (2) Meddling with fracture, changing splints, or testing solidity. (3) Syphilis is a common cause. (4) Ill health and dyspeptic conditions, and when (5) Much phosphates found in the urine.

Delayed union is not serious, but is worrying.

*Treatment:*—(1) Improve the general health—tonics, nutritious food, fresh air, nitro-muriatic acid. (2) Make femur splints such as plaster of paris. (3) Good to let patient upon crutches, perhaps the confinement is bad. Massage of limb is good before putting it up. (4) In syphilis, treat this.

Non-union:—When many weeks have elapsed the fragments are totally ununited, or only held together by fibrous tissue, e. g., bone cement was thrown out as usual, but something changed it to fibrous tissue instead of bone.

In fibrous union, the bones are simply held together end to end.

Another form is false joint, or pseudarthrosis: non-union has taken place between the ends, but the ends are smooth and rounded, and medulla closed with bone, and the ends are kept together with dense fibrous tissue, or fibro-cartilage. This investment of fibrous tissue is really like a capsule, and the two ends are often found rubbed into a ball and socket joint; seen in the humerus, when the two bones are together, then we have a hinge joint. This capsule may have a pseudo-synovial membrane, giving out fluid.

Causes of non-union:—(A) Constitutional. 1. Often very

obscure; delicate people often have rapid union, while healthy people may have delayed or non-union. 2. Too long confinement to bed. 3. Some acute specific disease like pneumonia, fevers, etc., preceding or accompanying the fracture. Syphilis, scurvy, cancer, rickets, tabes, alcoholism, Bright's disease, gout, paralysis, especially paralysis agitans, pregnancy and advanced age.

Spontaneous fractures rarely unite. (B) Local:—1. Meddlesome surgery. 2. Imperfect apposition of fragments. 3. Too light and too loosely applied dressing. 4. Too early removal of splints. 5. Wide separation of fragments. 6. Oblique character of fracture. 7. Injury to important nerves. 8. Interposition of soft parts of all kinds. 9. Interposition of fragments of bone. 10. Occurrence of abscess, resulting in necrosis and caries. 11. Hydatids. 12. Interference of vascular supply of one or both fragments, seen in fracture of the neck of the femur in old people; the head and neck become carious. 13. Position of the nutrient artery with regard to the fracture. Ununited fractures are common above the point supplied by the nutrient artery.

Treatment of non-union:—Any fault in the general health should be corrected if possible; look more to the local means.

I. (1) Re-arrange the splints or try new splints, extend the limb.

(2) Anaesthetize, and rub ends of the fragments together, in order to set up an inflammation, and obtain new callus.

(3) Rub off fibrous tissue and bring the bones together. This is seldom sufficient, may add percussion with success.

(4) Put two or three layers of chamois leather over the part, and hammer over this in all directions; this causes an effusion, and may bring on union.

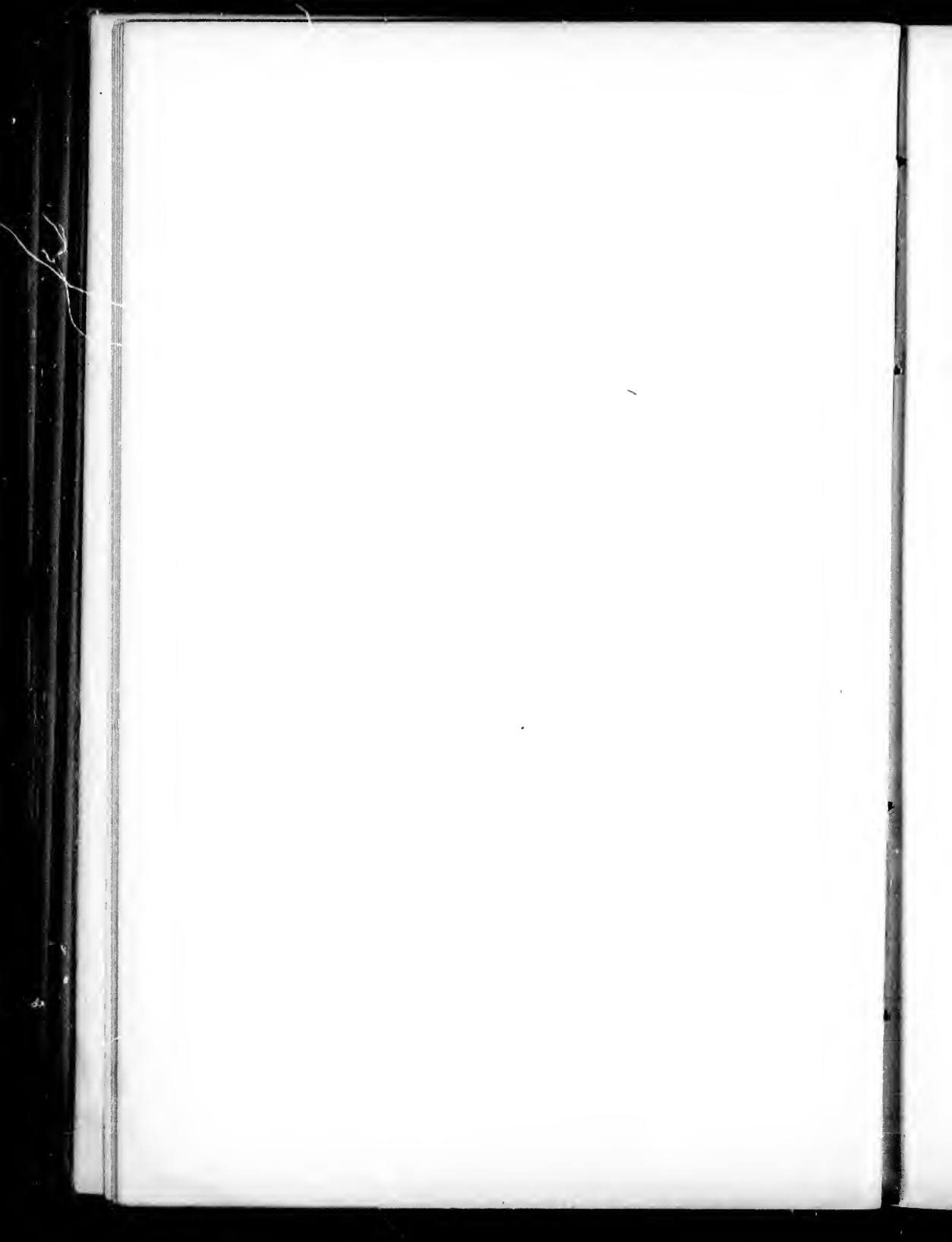
II. Introduce thoroughly aseptic aspiration needles and leave in several days (2-4).

III. Subcutaneous section of the fibrous bands with a tenotomy knife.

IV. Introduction of wire setons.

V. Subcutaneous introduction of some irritating fluid. Iodine mine. XV-XXX with a long hypodermic needle between the ends of the bones.

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VI. Disfenbeck's method :—Introduction of ivory plugs into the ends of the fragments. He tried this subcutaneously, driving them into the bones, and leaving them there for several weeks, or break them off, and leave them there for good. Dr. Roddick got good results from driving three awls into each piece of bone and leaving them there for six (6) weeks; no wound, except the holes left by the awls.

VII. Re-section of the ends of bones :—Since antiseptic surgery established, this method has taken the place of all others. This is not without risk, and is not always successful.

Extension is first applied for two or three weeks, and this tires the muscles so that the two ends come opposite one another. Then prepare the patient, and make incision on the side nearest the bone, and avoid vessels and nerves (outside of thigh). Incision 4-5 in. long. Incision made, then took for fragments, and clear all soft tissues from the ends, which are usually rounded, and perhaps one end smaller than the other one (usually the upper one).

Various methods :—1. Saw end of each off, and bring ends together and wire them together or use silk, or cat-gut: wire by far the best; the wires should be cut off short, and wired down (hammered down); this not always satisfactory.

2. Better results from an oblique incision, which gives a large surface of bone, and wires easier applied, or may use MacEwan's pins, the same as used in excision of the knee-joint. One long pin which is removed at the end of 4-6 weeks is the best, or use two short pins, to be left in.

3. Another method is removing bone on opposite sides of the two ends and fitting together, which gives a still greater surface; two short permanent pins are the best here. Saw off parts according to which fragment is over-riding, so that the upper will hold down the lower.

4. Dr. Roddick did not see Treves use any pins, but he made a very oblique incision, and trusted to his splints alone.

5. Besides passing a wire through the fragments, some pass a wire around the fragments.

6. Grafting pieces of bone between the fragments when the gap was large has been tried.



Keep fragments in warm boiled salt water while changing. Another surgeon filled the gap by turning down the pieces of bone, or sawing off pieces, and placing between. In some cases amputation has been necessary.

Malposition, Malunion or vicious union.—May follow the improper setting of fractures, too early removal of splints, neglect to straighten green-stick fractures; whatever be the cause the parts have joined in bad position.

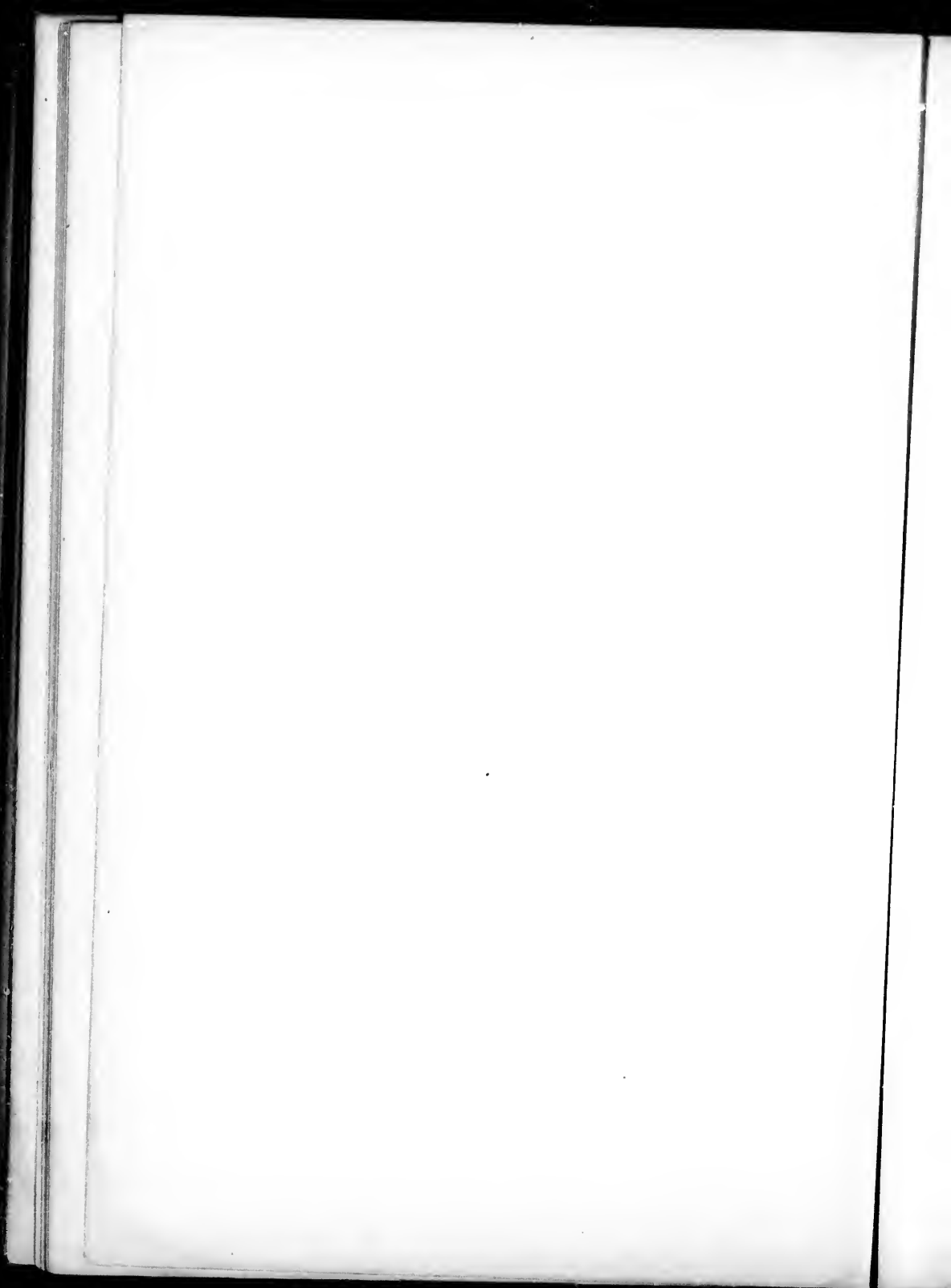
In early cases (6-10 weeks) refracture under an anaesthetic. If you fail to break, use an osteoclast (not much used). The surgeon now prefers a subcutaneous osteotomy, i. e., introduce a chisel, and break up the bad union. If this fails may use an Adams' saw, or may have to take a wedge-shaped piece out.

Compound Fractures :—Require immediate and prompt attention. The first dressing largely influences the prognosis. No meddling with septic fingers should be allowed. If nothing at hand, put on a boiled water compress until we get something else. The technique should be as complete as in major operations. Compound fractures are sometimes very severe. The first question is whether to do a primary operation and amputate, or try conservative processes. Lacerations may be too great, shock and loss of blood may prevent patient from being in a position to stand a long illness, and amputation is necessary.

Give anaesthetic; cleanse the part very carefully in and about the wound; use alcohol, ether and turpentine, cleanse any protruding bone.

If you have bone protruding, what do you do with it? Shall I remove it, or enlarge the wound to put it back. Very often necessary to do both. The fragments must be brought into apposition. Enlarge the wound, displace the soft parts that are in the way, and try to replace the protruding piece. If this fails, saw or chisel off the protruding piece. Then irrigate wound thoroughly with sublimate; thorough flushing, attend to bleeding vessels. Bruised and soiled muscle may be cut off with scissors, any cut tendons or nerves should be caught up and sutured.

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Drainage :—Should be dependent; the drainage tube may be rubber, or iodoform gauze drain may be necessary along sides of fragments. In small fractures, as fingers and toes, silkworm gut, or cat-gut drain. Where plugging is necessary always use a drain.

In a small clean wound all that is necessary is to flush it out and dress it with Iodoform gauze, and introduce a piece of Iodoform gauze for drainage; parts put up in a heavy antiseptic dressing, and put splints on the outside; it must be dressed again in a few days, any kind of splint, but plaster of Paris if used may cause a good deal of disturbance in removing to dress the wound.

Comminuted Fractures :—If fragments small and uncovered by periosteum, they should be removed. If covered, place back and leave. Even in aseptic wounds these often die. Where one of the two fragments is stripped of periosteum, it is best to remove a piece of it to prevent necrosis. Don't remove too much.

Hemorrhage:—Occurring in compound fractures is troublesome; oozing may continue for days; elevate the limb and apply heavy dressing, especially above the wound. Should the oozing continue, may have to open up wound, and look for the bleeding spot.

Sutures are sometimes of use in a compound fracture, wound is usually left open. In favourable cases wound closes in from 10-20 days; does not in poor health. During this period no callus seems to be thrown out, now then put ends accurately together, remove heavy dressing, and apply accurate splints.

If on the contrary compound fracture goes wrong, this is indicated by the Temp. keeping up, and unhealthy signs about the wound.

Expose the wound, and remove any sutures, and, if wound is small, enlarge it; then irrigate thoroughly with sublimate, cleanse afresh, redress, and wait for results. If you are afraid to cover it up, put a compress on of sublimate, and tell the nurse to keep it wet. This encourages the unhealthy fluid to come out, and keeps it disinfected. If this fails, irri-

gation must be practised; continuous, either with boiled water, with tube or lamp wick, or antiseptic solution. Sublimate 1-1000; Carbolie 1-200, Creolin, Lysol, Pot. Permang.

Keep these running day and night, and may carry it through drainage tube.

Solution may be cold, lukewarm or hot; if much inflammation, cold is the best. If circulation is poor, hot water—this is called continuous irrigation. In case of arm, continuous immersion is the same thing.

These prevent infection of discharges and collection of germs.

By these methods we can usually get recovery, but the fragments of bone suffer. In these cases always remove all the small pieces for they will die, and freshen the ends of the two fragments.

Where things go on from bad to worse, where patient is worn out, suppuration is going on, high Temp., hectic, numerous incisions, etc., then we have to do a Secondary Amputation.

Amputation, whether Primary or Secondary, is always very serious. In many cases there is no question but that primary amputation should be performed. (1) Is it possible to render wound aseptic? (2) What is the condition of arterial supply? (3) Is the condition of the nerves such that the limb will not be paralyzed subsequently? (4) Are the tendons not lacerated too much? 5. Is repair of bone possible? Ask yourself these questions in primary amputation.

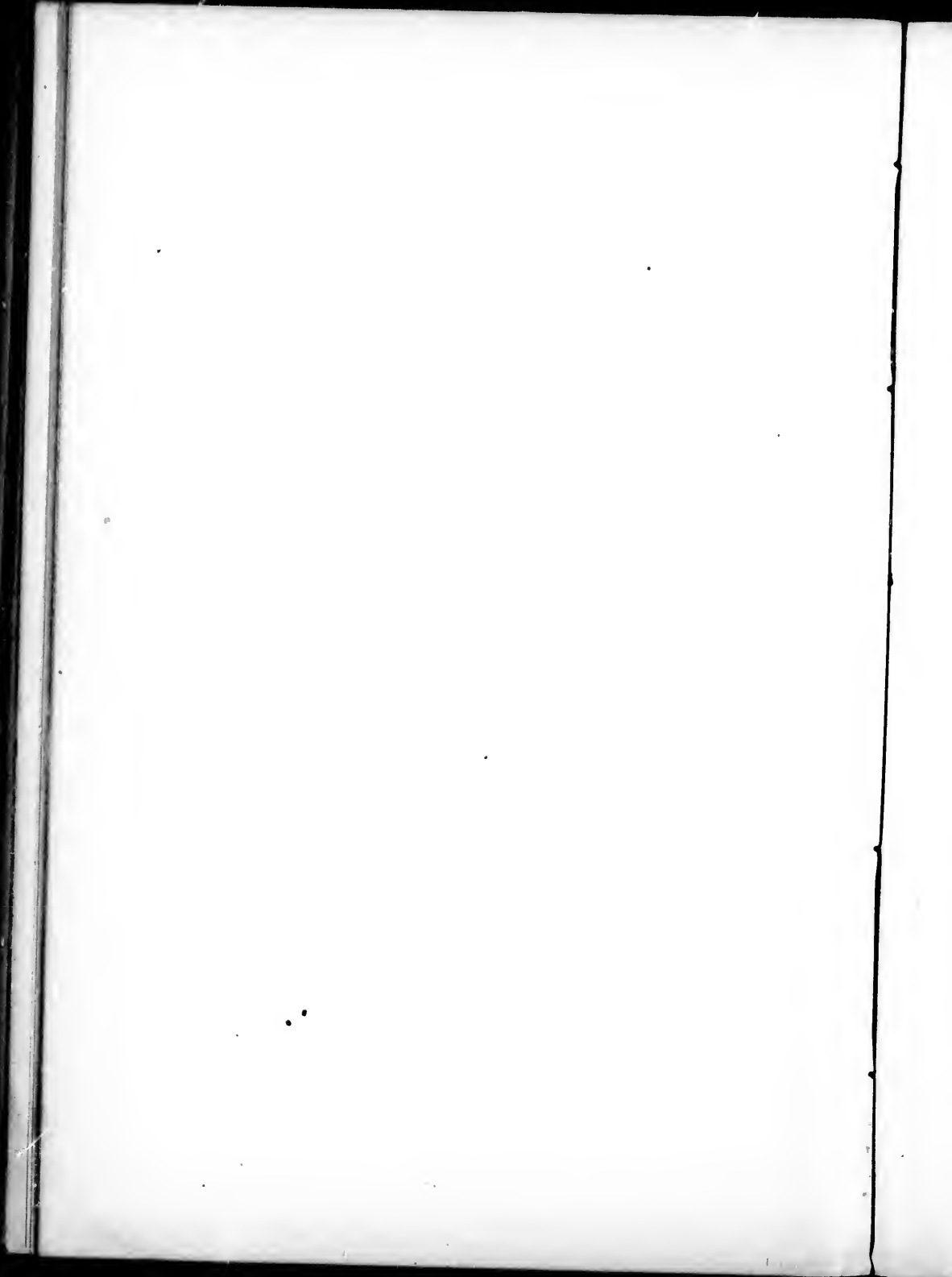
Secondary Amputation :—Rule is that if limb be not removed within 24 hours of accident, 8-10 days should be allowed before amputating. Operations during that stage are notoriously fatal, septic and traumatic fever present.

Many exceptions to this rule; limb may go bad so suddenly between the first 24 hours and the 8th to 10th day that there is no choice but immediate operation.

Accidents and Complications of Fracture :—During the treatment of all forms of fracture may get the following accidents :—I. Local. II. Constitutional.

(1) Swelling :—Constriction of the limb at some point; imperfect reduction of fragments; extravasation of blood.

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(2) Formation of Bullae or Blebs :—Especially in simple fracture, and comminuted fracture, especially in lower limbs. These are due to extravasations of blood into the skin, size of split pea to a dollar, contain blood and serum: they are best left alone, and allow absorption to take place. If opened they may ulcerate.

(3) Spasm of muscles of a limb are often very troublesome, and, if continuous for over a day or so, likely to lead to displacement of fragments: may be due to the nerves occasionally. Have to cut a tendon to relieve this; as Tendo Achilles, use opiates, etc.

(4) Fracture with dislocation :—Very puzzling, under anaesthetic, with manipulation, endeavour to reduce the dislocation; failing this, see what can be done by applying splints to the fracture, and then attempt reduction; some advise to put up fracture, and when union has taken place to then reduce. Better way is to cut down on the joint, as if for excision, and cut away the muscle of the ligament which interferes with reduction. When fracture high up near the joint, generally have to do excision at once. Occasionally amputation is necessary.

(5) Rupture of vein, artery or nerve of large size, usually in compound fracture. If you know where rupture is, cut down and tie, or suture; if you do not know the site of rupture, then tie in situ.

(6) Gangrene, due to rupture of vessel. 1. Rupture of vessel. 2. Pressure of swelling or exudation on vessels of limb. 3. Tight bandaging. Bandage well applied, and extravasation subsequently occurring, may cause bandage to tighten, and thus produce gangrene.

*Good rule:—It is a mistake, except for specific reasons, to apply bandage directly to the skin, except in cases of the ribs and pelvis.*

(7) Delirium Tremens :—In beer drinkers and those who imbibe a good deal, the sudden abstinence following upon an accident prevents sleep, and in two or three days apt to develop D. Ts.

*Treatment:—Give small portions of alcoholic stimulants,*



beer probably answers well. Give Bromides, Chloral Hyoscyamus in the beer. If severe give Morphia cautiously.

(8) Traumatic delirium.

(9) Emphysema :—Entrance of air into the subcutaneous tissues, seen in fracture of the ribs. Air sucked in which does not get exit. This may appear very serious, and looks like decomposition, but it is emphysema. Sometimes in injury of the lung, where emphysema present in large quantities, may have to interfere. Usually it is absorbed, even in severe cases.

*Treatment*:—Puncture in several spots, or enter trochar in various places In emphysema due to putrefaction, free incision or amputation.

Tetanus :—Invariably in compound fracture, due to the entrance of the bacteria of tetanus with dirt, especially in fractures of the fingers and toes.

II. Fat. Embolism :—Important after fractures. Fat enters the circulation, and is excreted with the urine 2-3 days later. Fat cells of the marrow of the medulla broken up, and liquid fat set free. The same may occur of severe contusions of fat persons, also seen in the acute inflammation of the marrow of bone.

Only when fat enters in large amount and blocks a large number of vessels is it of importance; if near the heart it is also more dangerous; fat is carried into the Rt. heart, and then to the lung, where the first symptoms arise; as a rule within 36-72 hours after injury you get sudden and violent dyspnoea; patient is pallid and cyanosed, coughing, frothy sputum streaked with blood, and may have distinct Haemoptysis, eyes bulging, and subsequently in some cases pneumonia follows, temp. low—small, rapid, irregular pulse.

Many affirm that fatality is due to obstruction in the brain; have shock (called secondary shock, long after accident), the patient becomes excited; early delirious, then drowsy and comatose.

*Treatment*:—Where suspected dry cup all over the chest, mustard to the chest, stimulate freely, warmth. Ether injected into the veins to dissolve fat.

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Where dyspnoea continues, bleed the patient, drawing oz. 12-15. Artificial respiration should be kept up until fat is got rid of. Alcohol, hypodermically, and Strychnine for the heart.

12. Exuberant Callus :—viz.:—out of all proportion to the needs of the case. A sharp irregular mass extending into the tissues, and pressing on the parts, and upon the nerves; may form between bones (exostosis). When between tibia and fibula it is of little moment, when it is between the radius and ulna it prevents supination and pronation.

Remove callus by cutting down on it. 13. Implication of nerve, causing pressure. 14. Paralysis from the use of crutch. 15. Venous Thrombosis. 16. Erysipelas. 17. Formation of ulcers, by pressure or from too early rupture of blebs. 18. Decubitus.

Nasal Bones :—Fracture, the result of direct violence involving one or both bones, and neighboring osseous structures, such as the vomer, nasal process of frontal, ethmoid, and nasal process of the superior maxillary.

Simple, or Compound, or Complicated :—Compound, without a wound through the skin but through the mucosa.

Complicated :—The most dangerous is injury to the cribriform plate, which may cause septic meningitis.

Emphysema may also complicate it. Face, eyelids and nose, air driven into the cellular tissue on attempting to drive blood out of the nose.

Epistaxis is serious and difficult to check.

Twisting of bones may occur, without being broken; may get decided fracture, without displacement; usually, however, the lower fragments are found considerably depressed.

*Treatment*:—Always good practice to inject hot antiseptic into the nostrils; this stops the hemorrhage, then raise the lower fragments with a broad director. If much force is required, a pair of forceps may be better, viz.: gradually separate the blades, or guard the forceps with rubber, and place one arm outside, and the other in, and so bring the fragments into position. Then keep them in position with a pad on each side of the nose, and a piece of adhesive plaster. If

fragments can be kept together for a few hours, that is all that is necessary. If septum is broken, it should be straightened at once, and nostril plugged with lint; piece of rubber tube surrounded with lint will allow the patient to breathe. When the mucosae is ruptured pack with Iodoform gauze for 2-3 days.

Fractures of other bones of the face:—Except the lower jaw are rare, except the zygomatic arch.

Upper jaw :—Manipulate into position with one finger in the mouth; rapidly unite.

Lower jaw :—Very common. Simple or compound. Single or Multiple.

Laceration of the Gum makes the fracture compound. The favorite situation is a little to one side of the symphysis, occasionally through the angle, ramus, coronoid neck of the condyle.

Deformity depends upon the situation; to the side of the symphysis it is considerable, angle little, neck considerable.

Signs of Fracture :—Crepitus nearly always. Deformity; irregular line of teeth. Evidence of laceration of the gum. Large secretion of saliva.

If dental canal is not implicated, there is no trouble of any gravity to be looked for.

*Treatment*:—Application of an ordinary four-tailed bandage is sometimes sufficient of itself; a splint is however usually necessary in addition; cut splint from gutta percha or pasteboard long enough to go to zygoma of each cheek, and wide enough to cover the chin, cover this with four-tailed or plaster bandage. Much depends upon whether the teeth are present in the upper jaw, for if present they are a splint of themselves. Wiring of the teeth helps. A dentist is sometimes very useful; he helps by making an interdental mould of vulcanite; this fits the teeth like a cap; failing this, may make yourself a wire splint, or may have to drill fragments, and wire them together, twisting the wires at the openings.

Antiseptic mouth-wash should be used. Union usually in four to five weeks.

Diet is difficult:—Liquid food for several days to give rest, sometimes necessary to remove a tooth.

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Union occasionally delayed; necrosis occasionally occurs; it, however, nearly always gets better sooner or later.

*Hyoid bone*:—Very rare, caused by direct violence as in strangling, usually at junction with great cornua.

*Signs*:—Cough, difficult breathing, salivation, oedema of the glottis, difficulty in speaking and swallowing.

*Treatment*:—Not successful, manipulate, pasteboard round the neck. Chloroform may be necessary during the manipulation.

Rectal alimentation may be necessary in cases of difficult swallowing.

*Sternum*:—Fractures here are very rare, 4 per cent. of all fractures. Its elasticity explains this; usually caused by direct violence. Has occurred during parturition. Usually single and simple, occasionally multiple and almost always transverse. Favorite place is between the first and second bones, occasionally lower down. Displacement is usually slight; may get crepitus, especially in coughing.

*Treatment*:—Little can be done beyond putting on a compress, held in position by broad straps of adhesive plaster, reaching half way around the body, 2 inches in width, and overlapping each other, and also passing over the sternum.

Rest in bed and pad between shoulders gives great relief. In cases of deformity operation is not justifiable. Wiring is often followed by extensive necrosis.

*Ribs and costal cartilages*:—Ribs, common; 18 per cent. of all fractures, rare in the young; 4th to the 8th inclusively, most common. 7th commonest of all. Common among the old and insane. 1st rib unknown. Commonest site, at or near the angle, or about 4 inches from the vertebral column.

*Causes*:—Direct or indirect violence or muscular action.

*Signs and symptoms*:—1. Stabbing pain increased on breathing. 2. Breathing abdominal and diaphragmatic. 3. Passing finger along can usually get irregularity. 4. Can get crepitus usually by hand or leg; stethoscope. 5. Emphysema may be very extensive. 6. Where fragment has penetrated the lung, we get haemoptysis, haemothorax and pneumothorax may occur, also haemo-pericardium. 7. If compound, or in



case of gunshot wound, it is not rare to have wounding of the intercostal artery.

*Treatment*:—Ordinarily simple immobilization of the chest walls by strips of adhesive plaster is sufficient. Ordinary adhesive plaster is very little good.

Rubber plaster or Mead's rubber plaster is the thing to use. Measure from a little to the uninjured side behind to a little to the uninjured side in front, i. e., one and a half inches past the middle line, strips 2 inches wide. Apply from behind firmly, wrinkling the skin in front of you; each strip should cover the other by about half an inch.

Always follow the line of the chest. Begin below and work up. Even if only one rib broken, it is best to cover the whole side of the chest; good also to put strips across these, which help and keep others in place; good also to encircle the chest with a broad flannel bandage, reaching from axilla down; should encircle the chest only once. Keep plaster strips over shoulders to the flannel bandage to prevent it from slipping down. In applying bandage allow patient to take a fair breath, so as to prevent constriction of good lung.

In compound fracture may get severe bleeding from the intercostal artery. In such cases have to apply bandage over the dressing. Catch vessel and tie it if possible, if not plug with Iodoform gauze; insert piece of gauze into cavity, and plug into this.

In Emphysema, the air is usually absorbed.

*Cartilage*:—Fracture at juncture with rib or in middle of cartilage itself.

*Causes*:—Same as the rib symptoms, and treatment the same.

*Fracture of the Pelvis*:—Very rare. *Locations*:—(1) Along crest of ileum. (2) In pelvic basin. (3) In Acetabulum. The crest alone is much less serious than the other two. *Causes*:—Heavy vehicles passing over the pelvis, coupling cars; heavy weights falling on pelvis. In old people a fall alone on the trochanter may cause it.

In fracture of the ileum alone we get:—(1) Intense localized pain. (2) Crepitus always. (3) Marked Ecchymosis. (4) Inability to move the muscles; too tender.

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In Fracture of the Basin:—Fracture usually passes through the upper ramus, or where the pubic bone joins the ischium.

Signs:—(1) Localized pain. (2) Crepitus, deep and hard to localize. (3) Inability to lift limb from bed. (4) Ecchymosis. (5) Prominence due to displacement.

Complications, more serious than fracture itself.

(1) Urethra often wounded by lacerations, torn across, therefore always pass catheter to find out the condition. In bleeding or inability to pass catheter may have to do a Urethotomy.

(2) Rupture of the bladder, especially if full, is very serious, rare if empty; signs are if pass catheter and find only blood, or inject antiseptic fluid, and none, or only a part returns.

(3) Rectum and Vagina are also sometimes injured.

Fractures of the acetabulum :—Often mistaken for fracture of the neck or great trochanter of femur (because trochanter cannot be felt).

Treatment of Pelvic Fractures :—Rest and position are here the main indications; for the ileum, or if no complications, a firmly applied cotton flannel bandage is all that is necessary, reaching above the ileum, and down below the trochanter, If trochanter is injured, this cannot be done.

Very good to cover this with two or three turns of plaster. Four to five weeks in bed is usually enough; they as a rule unite very well.

In fracture of the Acetabulum, a gutta percha splint should be used, or, better, a long side splint with weight and pulley.

In rupture of the bladder may be obliged to do a laparotomy. Expose the bladder, and, if possible, avoid the Peritoneum. Wash out thoroughly, and sew up with Lembert sutures.

Fracture of the Sacrum :—Very rare, except in gunshot injuries. Death ensues in almost all cases. Uncomplicated cases never mentioned. Transverse fracture, the upper part is pushed forward. Nerves always injured.

Treatment:—Same as of pelvis.

Fracture of the Coccyx:—This commoner.

Causes :—Kicks, falls, parturition, defecation.

Symptoms :—Pain is very severe, especially while sitting and walking, fragment of the tip always displaced forward, often followed by life-long neuralgia, which is called coccygodynia.

Treatment :—Keep in bed for 2 or 3 days, with a strap of belladonna plaster applied to the part.

Subcutaneous division of the muscles and nerves to the coccyx may be necessary if union fails. Sometimes resection of the whole bone.

FEMUR :—Very important; 6 per cent. of all fractures.

3 parts :—(1) Upper or pelvic end (*a*) within the capsule; (*b*) outside the capsule; (*c*) fractures of trochanters.

(2) Shaft (*a*) upper; (*b*) middle; (*c*) lower thirds.

(3) Lower end; fracture of condyles.

Intracapsular Fracture :—Occurs within the capsule of the joint. This is peculiar to old age. Seldom under 50 years of age. More common in women. Occurs from slightest causes as (1) Tripping. (2) Misstep on going down stairs. (3) Even turning in bed.

In old age, especially on account of the change in the structure, shape and position of the head of the bone. Neck said to be more horizontal, and about the middle and under part of the neck compact bone is softened.

Signs :—(1) Inability to raise limb from the bed. (2) Eversion. (3) Alteration in shape of hip. (4) Shorter distance between Trochanter and Acetabulum. (5) Less rotation of the limb. (6) Pain at the seat. (7) Shortening. (8) Crepitus.

These signs will be modified by the presence of or absence of impaction.

If impacted Crepitus is absent, and shortening almost absent.

When not impacted, we will find the neck drawn above and behind the head, and twisted a little forwards, with Crepitus and shortening marked.

Eversion is an important sign; nearly always present.

Due partly to external rotators, but perhaps as much due to weight of limb, unsupported by muscles, which have nothing to back them.

Inversion will sometimes occur, and will make the diagnosis extremely difficult; this is difficult to explain, and is probably

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due to the capsule in front having remained. The lower fragment may be caught in such a way as to cause this. (7) Shortening is at first exceedingly slight, especially in impacted femur, a quarter of an inch is usually the amount; half an inch is more rare. All depends upon the amount of impaction and the amount of rupture of the capsule. Later on the shortening is more apparent, due to movements of patient and relaxation of muscles, may increase to 2 or 2 1-2 inches.

Methods of estimating shortening:—1. Ant'r. Sup. Spinous process to inner malleolus; measure both legs in the same position; eversion; pass down inner side of Pelvis.

Fallacies are :—(1) Congenital shortening. (2) Previous forgotten fracture. (3) Lessened development of one leg in length and diameter.

II. Bryant's Triangle:—Bryant took two fixed points, the Ant. Sup. Spine and the great Trochanter, encircled the body with a line crossing the Ant'r. Sup. spines; then draw a line from either side from great Trochanter up to the circular line, and on affected side get a shortening; this converted into a triangle by connecting the Ant. Sup. Spine and the great Trochanter.

III. Nelaton's line :—A line drawn from the tuberosity of the ischium to the Ant'r. Sup'r. Spine, always passes over the point of the great Trochanter. In shortening the great Trochanter rises up above this line.

Diagnosis:—Make this with as little disturbance as possible. No attempt should be made to elicit crepitus because intracapsular fracture should be looked upon as impacted; hope for this at any rate, for without this there will be no bony union.

Make diagnosis from the age of the patient, slight shortening, flattening of trochanter, eversion and inability of patient to turn limb in, and localized pain.

Treatment of Intracapsular Fracture :—Always put such a person on a narrow bed, without springs or very strong springs, convex on upper surface. Next have firm mattresses on this.

All this is necessary on account of the time the patient has



to stay in bed, besides a nurse cannot work about a double bed. From the first give instructions about the parts of person resting on bed; alcohol and alum rubbed on daily to prevent bed-sores. If old person and no impaction, don't expect to get bony union. Just keep leg between sandbags, and allow patient to sit up in three weeks, and apply after this a flannel or plaster of Paris bandage and let patient get into a chair.

Where there is impaction, no matter how old the patient, try and get bony union; apply extension with weight and pulley; a long splint is seldom required for these old people; they usually keep pretty quiet with sand bags on either side. A leather splint, or even a belladonna sheepskin plaster covering the region is very good; always apply extension however. If you are not going to apply a long splint always apply a bandage up the leg, and a piece of cotton bandage (batting) over each malleolus, then apply Mead's plaster dressing above the knee joint, the piece of wood for extension should be 2 inches below the sole, secure the plaster strips with a plaster spirally or spiral bandage. If a vigorous old man, use a long splint. A long splint should reach the level of the navel: 5-7 lbs. should be used, rolling on a pulley.

Foot of bed should be raised. If confinement is well borne keep in bed 6-8 weeks, and then allow upon crutches, first applying a light plaster spica over the region of the hip. One of the difficulties is the eversion which you should try to correct by sand bags, or a guide to the other side; nearly all walk with everted foot afterwards.

Extracapsular Fractures:—May occur in early life by great direct violence. In old people a fall on the hip may cause it.

Signs:—Similar to Intracapsular form; owing to the amount of comminution it is always possible to get crepitus. Eversion marked. Inversion may occur, limb shortening from the first one-half to 2 inches; shock great, and extravasation of blood greater than Intracapsular fracture.

Diagnosis between Intracapsular and Extracapsular:—1. Cause slight and indirect. Usually severe. 2. Age rarely below 50 years. Below 50 years and in vigorous adults. 3. Con-

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stitutional disturbance and pain slight at first. Severe from the first. 4. Shortening slight at first, increasing. Shortening marked from the first. 5. Often no external evidence of injury. There are marked swelling and ecchymoses. 6. Crepitus not elicited, except by manipulation. Often readily felt from the first. 7. If break up impaction do not get bony union. May manipulate and still get bony union.

These may be confounded with dislocation on the pubic bone, both give eversion.

In fracture of the Acetabulum with dislocation may get crepitus.

In chronic arthritis may get osteophytes giving a soft crepitus, but we get rheumatism elsewhere.

Treatment of Extracapsular Fracture:—Expect in all cases to get firm bony union; apply weight and pulley, long splint, and in the application of long splint never attach it to limb by means of a bandage; attach splint at only two points, at the top around the body by a broad bandage, and at the bottom to a piece of wood. In a young man of 30 or so, put on a leather splint as well to envelop the hip, or may use rubber, or para-plastic. Raise the bed 2 inches higher, viz.:—6 inches, and add a greater weight up to 12-16 pounds to prevent shortening. Expect union in six weeks; go about on crutches then with a plaster spica, and a thick sole on the good foot to swing the bad one. Treat eversion also.

Compound Fracture of the Head of the Femur:—Generally by a gunshot wound; clean out the wound and remove the fragments. If this fails do an excision.

Fracture of the head, neck and trochanter:—Same as Intracapsular.

Fracture of the great trochanter:—Very rare.

Fracture of Epiphysis of great trochanter:—Only a few cases reported, from indirect violence or muscular contraction. Always in young subjects.

Symptoms:—Pain, swelling, soft crepitus, fragment felt freely movable, and limitation of movement.

In the 11 cases reported, 6 had suppuration, and 5 died of septicaemia.

*Treatment*:—Draw fragment down, and keep it in position with a pad and spica bandage; keep leg at rest.

Separation of Epiphysis of Lesser Trochanter:—Only one case in Canada. Dr. Fenwick's son. Died of suppuration.

Fracture of the shaft of the Femur:—Very common, especially in children. A quarter of all the fractures of children under ten years. In children transverse. In adults oblique, usually overlap and much shortening.

*Signs*:—Nearly all the signs are well marked. Displacement and deformity. In the upper third get an unusual amount of displacement, owing to the Psoas and Iliacus. Lower fragment is drawn inwards by the adductors, and up by the hamstrings.

Middle third the same.

In lower third, the upper fragment is drawn in, and lower drawn backwards by Gastrocnemius.

*Treatment*:—Depends upon situation.

Upper third:—Owing to the tilting of the upper fragments, if we extend the limb, we make things worse. Hence, we treat on a double inclined plane, and make extension to thigh by means of strips attached to upper end of lower fragment. Extension is brought to the foot of the bed and attached to a high fall. In muscular people, put coaptation splints on front and side of thigh; good result. This is double inclined plane on McEntyre's splint.

Middle third:—Burk's extension, viz:—extension with long splints; plaster up above the knee, and 4 coaptation splints (Gooch's or rib splinting). One on the outside from the knee joint to the crest of the ileum; one behind, long also, the upper and anterior a little shorter. While putting these on make forcible extension to foot; one hand pulling on heel and one on the foot. Coaptation splints are held together by plaster. Coaptation splints should not be too wide; 1 inch between each; 3 strips of plaster usually necessary; then put on long splint.

If you have nothing at hand, you can use temporarily a long side splint, with three pairs of holes at the top; secure

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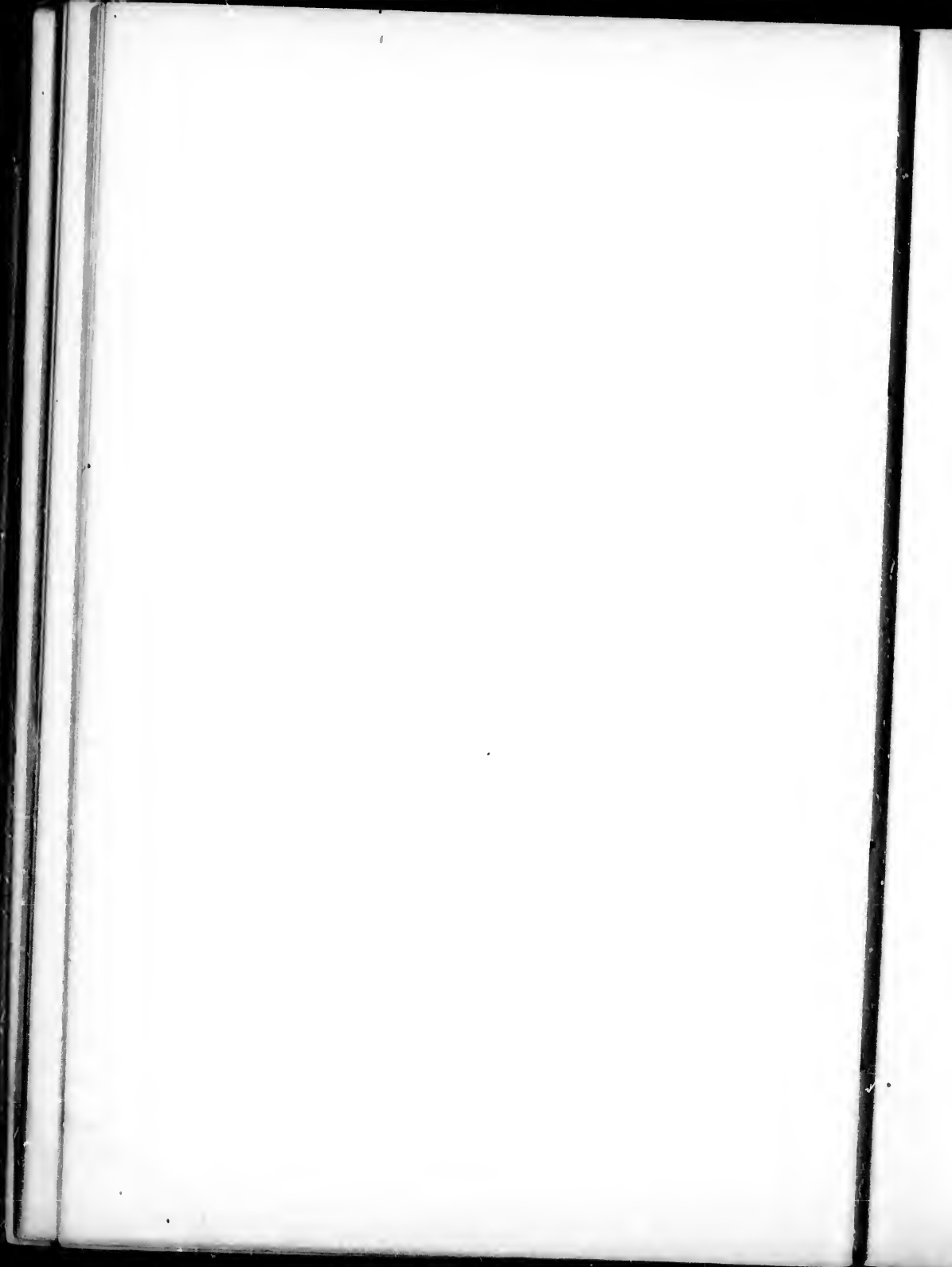
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this to the foot by a bandage around the foot, and into grooves at the end of the splint, then pass a piece of cotton (rolled up to about the size of a large handkerchief) between the thigh and scrotum (perineal belt), and pass it across and into two of the holes at the upper end of the splint. Very good temporarily.

In children and young adults fair results may follow plaster of Paris put on immediately. It may be good in children, but often get bad results; shortening going on in spite of you. In young children do better with a double splint, along each side a long splint, and a piece across the bottom, attaching the two. Also put on coaptation splints; no extension necessary; child can then be carried about. The trouble in children is the discharge of faeces and urine upon the dressing. Vertical method for children is good (extension and coaptation splints).

Fracture of the lower third.—Whether "T" shaped, or supra condyloid, owing to proximity to knee joint, you need the double inclined plane. This overcomes the Gastrocnemius, and allows the upper fragment to come into contact with the lower. Extension cannot be done, and is not necessary. Mould a whole leather cap over the entire knee joint. In these fractures we get a good deal of synovitis and effusion; use the ice bag and gentle pressure. In troublesome cases division of the Tendo Achilles has been advised. Fracture here should call for early passive motion to prevent the joint from becoming stiff. In the case of a child, dwarfing of the limb may follow.

FRACTURE OF THE PATELLA:—Cause:—Direct violence; Muscular action when the knee is semi-flexed. Fracture may be transverse, oblique or vertical; simple, compound, or comminuted (stellate).

Both patellae may be broken simultaneously, bone seldom broken in the centre. Large upper fragment, and small lower as a rule. When from muscular action, the soft covering of the bone is lacerated, and greater separation of the fragments: in direct violence not so much separation, nor tearing of aponeurosis, and more likely to get bony union.



Symptoms plain; snap heard when bone gave away; groove, indicating the gap between the fragments always is found, swelling comes on quickly, the joint is full of synovia and blood.

*Treatment*:—Bony union is exceedingly rare, ligamentous is the rule; occasionally there is absolutely non-union. Good short strong ligamentous union is as good as bony so far as usefulness is concerned. Immobilization of the extended limb, when not widely separated, and aponeurotic tearing slight. Immediate application of plaster of Paris is good, with knee extended as much as possible. Where there is much effusion into the joint apply ice, aspirate carefully, and then apply pressure, keeping the limb all the time in a McEntyre's splint in the straight position, and at the same time it is well to be making some pressure on the upper fragment (the lower fragment is not displaced) by a figure of 8 bandage, a pad being placed over the fragment, so as to keep upper fragment down. A rubber bandage may keep the upper fragment from being drawn up further. Take a piece of Mead's plaster and apply it over the front of the thigh, to pull down the upper fragment, the upper wide part to be stuck to the skin, lower ends to be attached to elastic webbing from the foot up. This draws the upper fragment down—tighten from time to time. Limb in McEntyre's splint, and bandaged up to the knee.

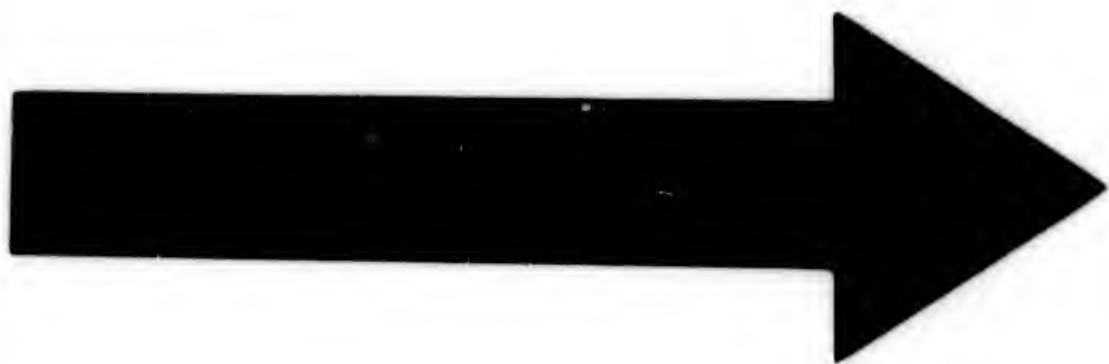
*Malgaigne's hooks*:—Used with antiseptic precautions. Introduce the hooks into the patella above and below, and lock them together by means of screw and key. Malgaigne had marked success. They are now often used. Cover whole with large antiseptic dressing and leave for ten days.

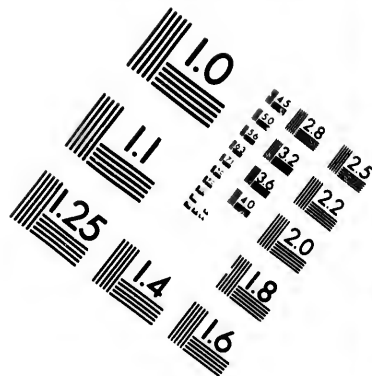
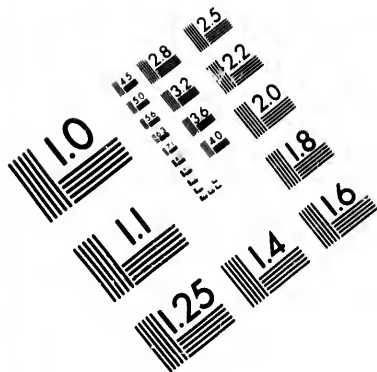
*Barker's plan* is very good; he takes a curved needle, threads it with wire or silk; passes it from below upwards through the ligamentum patellae, and makes it come out of extreme upper border; this is under the bone, and through the same opening another thread passes superficially. Has had good and solid union in 6 weeks.

*Mayo Robson* takes two pins and passes them through the skin and fascia above and below the two fragments, and

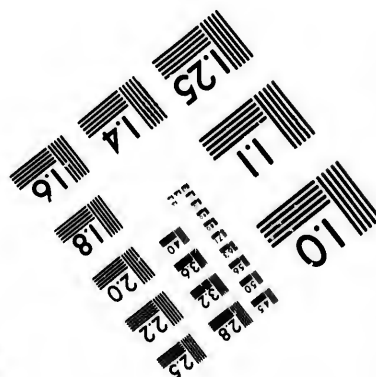
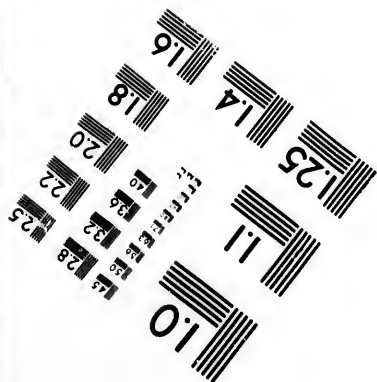
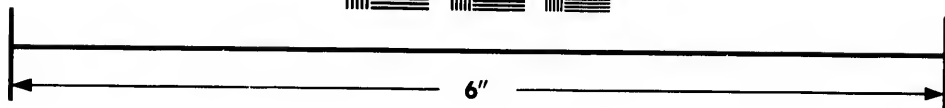
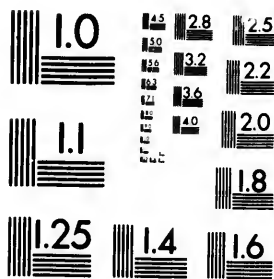
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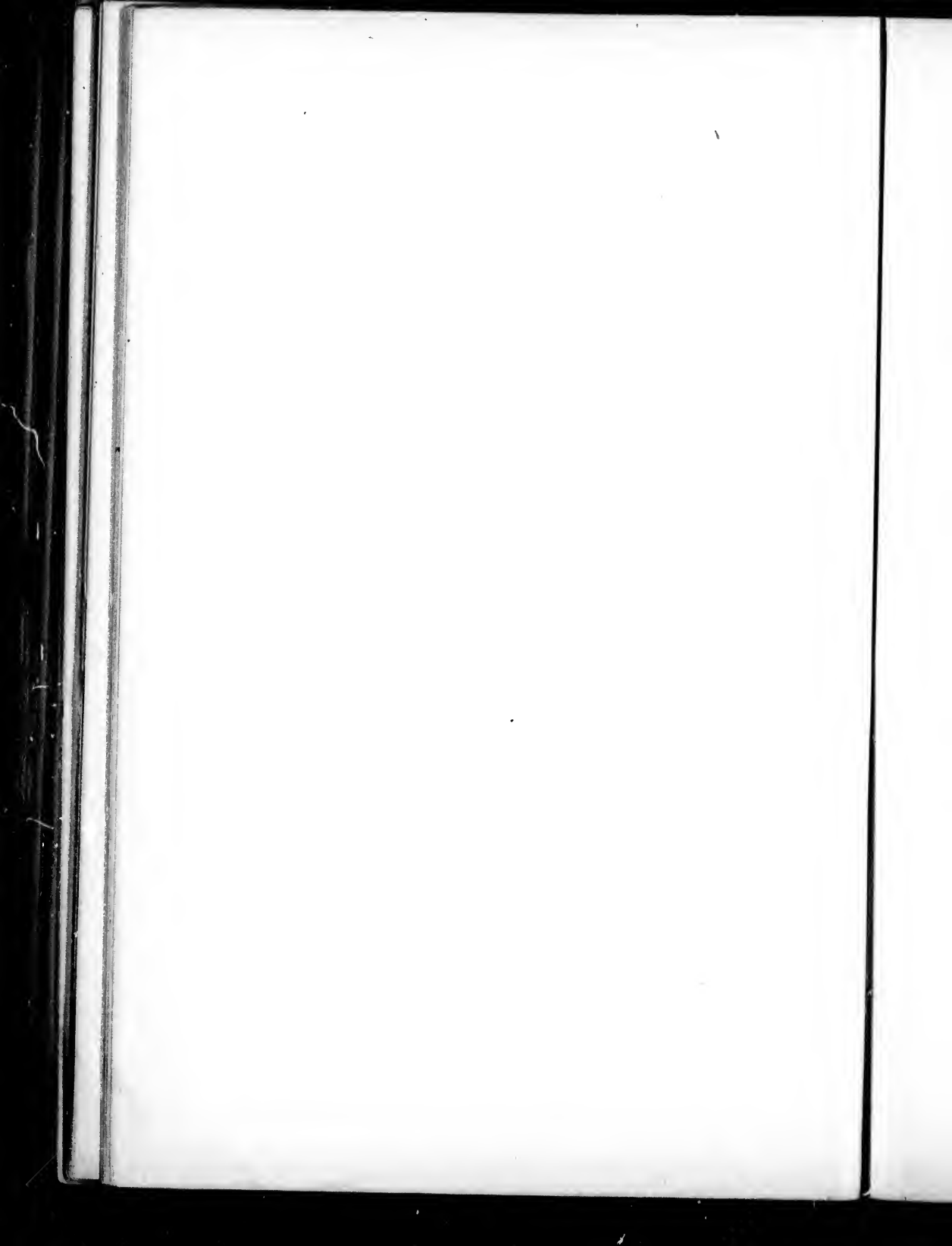


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draws the two pieces together by wire. Care must be taken in both these cases to rub the two surfaces together.

*MacEwen* found that he could not get good results by any method. He found, when fractures take place, that the soft structures covering the bone fell in between the fragments, and so prevented union, and he thought nothing but opening the joint would remedy this, done as follows:

Operation of suturing the Patella :—Antisepsis; incision vertically over the patella, and expose the fragments, remove the blood clot, and irrigate the joint with Sublimate 1-2000. Take the two fragments and saw through them, making perfectly plain cut surfaces, bring them together with silk (best) cat-gut or wire, two sutures generally employed, one on each side. Make a dependent opening on one side well down behind for drainage. Put on a posterior splint, and keep on for 4-6 weeks without disturbing; result is bony union. Care must be taken in beginning passive motion lest the bone snap again. Before flexing, massage and oil the limb.

Compound and Comminuted fractures—falls from height, and gunshot wounds. Irrigate the joint, remove all bone fragments, and suture together fragments with cat-gut, antiseptic dressing and posterior splint.

Open suture of the patella should be approached with care, as many result badly. Stiff leg often results; Bryant, Barker, and Mayo Robson have given it up entirely. In hospital practice it may be advisable, as patient is watched carefully.

FRACTURES OF THE LEG:—The bones of the leg may be fractured together or separately, and by direct, or indirect violence. Direct violence here as elsewhere nearly always causes a transverse fracture, and bones broken opposite each other. In indirect violence we get of the tibia an oblique fracture downwards, forwards and inwards, and you look in vain about for fracture of the fibula, and overlook it, as it is frequently broken up near the head of the bone, and this therefore often overlooked. Always examine up high. In transverse there is little displacement, in the other great displacement. The calf muscles pull the upper end behind the other fragmen.

Compound fracture is here commoner than in any other part of the body, owing to the sharp end of the tibia perforating the skin. Simple fracture often converted into a Compound by moving, e.g. attempting to walk, etc.

Signs of fracture of both bones:—Usually unmistakable; we get crepitus by rotating the foot inwards and outwards. Preenatural mobility when both bones are fractured.

Treatment fracture of both bones in the shaft:—Where displacement and extravasation is slight, put the limb in plaster of Paris at once, but when swelling is considerable, and blebs are present, it is better to put the limb, temporarily, in a MacEntyre's splint for a few days, or better still in a lax splint (two sides and a bottom, with foot piece and sides movable). Pad box splint with cotton wool, then assistant making extension fastens foot to foot-piece, bring the sides up and put strap across. Sides of box should be higher than the level of the tibia; if they are not put a pad under your straps. Have an extra pad or two at the seat of fracture. With an appliance you can apply ice and watch the blebs lest they burst; if they do, dress antiseptically. Better always to leave them alone. At the end of 10 days may substitute a plaster of Paris bandage, or put on side splints such as "Klein's;" these should be padded; they have openings opposite the malleoli. Carefully pad here. In a pair of Klein's splints, the outer has a foot piece, the inner may or may not have a footpiece. Keep on with bandage for a week, then remove, and put on plaster of Paris until cured, which may not be for 6 weeks or more.

For Compound Fracture:—Do the same thing.

In using MacEntyre or box splint it is advantageous to sling the leg from an ordinary cradle, the knee being bent by this means; the patient can move about, without disturbing the fracture. Patient can sit up in bed with this.

FRACTURE OF THE TIBIA:—(1) Upper end:—Usually transverse (upper  $\frac{3}{4}$  inches), always by direct violence, the soft parts much bruised and contused. The fracture is often an inverted "T" shape, and in these cases acute synovitis often sets in. The two fragments are often separated by a blood



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clot, and this results in a broad end on healing. If fracture involves the joint it requires special treatment.

Double inclined plane, angle not too acute, or we may get tilting of upper fragment by the quadriceps.

To joint apply ice-cap and pressure to remove effusion, and in an inverted "T" fracture a compress on either side to keep the two pieces together.

When joint not involved, not much contusion. Use a plaster of Paris bandage, but begin passive motion about the end of the third week, or may get ankylosis.

Any other part of shaft:—No special treatment, the Fibula if intact, is the best splint, and so apply immediately plaster splint, or if much swelling, and in doubt, apply an inside splint (one of Klein's with foot piece), and apply ice for a few days.

FRACTURE OF THE FIBULA:—May occur at any point, and should be treated, provided it is single, as ordinary fracture of the Tibia, i. e., plaster, or outside single Klein splint.

Fracture of Fibula:—Two and a half inches above the Malleolus.

This is constantly mistaken for sprain. It is caused by an inturning of the foot, and frequently where the foot has been caught and locked, and body thrown out. People kept lame for months and years by this mistake.

In this fracture there is no pain about the joint itself, but it is detected by pressure on the fibula from above down, and, when you get to 3-4 inch from the bottom, you see patient wince.

There is very little crepitus, no displacement as a rule. No sprain will give tenderness at this spot. Give the patient the benefit of the doubt, and keep bone quiet. It is occasionally called Dupuytren's fracture, because he described it.

*Treatment:*—A single inside splint (because you want to make a little on it).

Use a Dupuytren's splint if you like on the inside; it is like a short "Liston's" splint; pad it thoroughly and opposite the ankle, a large pad, attach foot the same as in a Liston's, and roll foot in, so as to put fibula in extension (prevents flat

foot), and then bandage. A single inside "Klein" just as good. If no sprain accompanies the fracture, plaster of Paris is just as good.

"Pott's Fracture."—This is Dupuytren's fracture plus fracture of the internal malleolus, a laceration of the Deltoid, or internal lateral ligament, with displacement of the foot outwards; pointed toe and raised heel. This is very serious, and is diagnosable a mile off or less. Foot is drawn up forcibly by tendo-Achilles, and where cannot put limb in position cut the tendon. Best thing is a box splint, or a MacEntyre and ice; after a week or so when all muscular action has been overcome put on plaster. If much swelling at the end of 10 days put on side splints.

Where: either malleolus is fractured separately, put on plaster of Paris bandage.

Compound fractures of the leg :—The same as other compound fractures.

Fracture of the Tarsus and Metatarsus :—Very hard to make out; give patient the benefit of the doubt. For tarsus put on leather or gutta percha (hot so as to mould).

Metatarsal, gutta percha, dorsal and plantar surface the same, and cover with plaster.

Fracture of the os calcis :—Falls on the heel, etc., when the whole posterior part is pulled off and drawn up by the "tendo." Not good practice to do tenotomy, blood supply to the bone, cut off, and so liable to get necrosis.

Slipper dressing and draw up by leg bandage to thigh.

FRACTURE OF THE SCAPULA:—Rare on account of the mobility of the bone, and on account of protection by muscles. Fracture may be through the body of the bone, anatomical or surgical neck; through the glenoid fossa, coracoid, or acromion process.

Body of the bone:—Not uncommon, and generally infraspinous fossa fractured, and from supraspinous fossa through the spine into the infra.

Causes:—Done by heavy weights, kicks, gunshots.

Signs :—Irregular outlines, pains, crepitus when arm raised, ecchymosis is usually considerable.

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*Treatment*:—Can do little; keep fragments in position by means of "Mead's" plaster in strips over path of ribs, and compress over any part that is prominent, and over all a figure of eight bandage across both shoulders.

Fracture of the neck of the scapula :—Very rare of the anatomical, surgical more common. Fragment consists of the glenoid cavity and the coracoid process, and on examination find that the whole shoulder has dropped; flattening of the shoulder, prominence of the acromion; tension of the deltoid, lengthening of the arm, and crepitus on elevating the arm; elbow rests against the side, and on pressing the arm up you relieve the deformity. It resembles dislocation very much:—Two (2) differences, crepitus and return of deformity when you remove pressure, and again in dislocation you can never touch the side with the elbow (Duga's sign).

Anaesthetize for diagnosis; put wedge-shaped pad of cotton wool in the axilla, and cover the shoulders with a splint of leather, or a gutta percha cap, which should go down to the elbow joint, and a properly adjusted sling to hold the bone up (i. e., the elbow up).

Fracture of the Glenoid Fossa:—May occur with dislocation, direct force. Diagnosis, by excluding other fractures, and by detecting crepitus, when arm is at right angles to the body, and humerus is pushed against the glenoid cavity, crepitus not being found when arm hangs by the side.

Fracture of the Acromion :—Very rare, generally direct violence. Transverse and oblique.

Signs:—Great pain; point of shoulder drops; cannot raise the arm. Crepitus on raising the arm, gap on moving the finger along the spine.

*Treatment*:—Cap, fix the arm to the side by a sling, and raise the elbow.

Fracture of the Coracoid process :—Near the tip, or near the root. Most often accompanies subcoracoid dislocation of the humerus. Biceps draws fragment down when tip is affected; when root there is little displacement.

Diagnosis:—Very difficult; pain and tenderness, crepitus not common.

*Treatment*:—Same as acromion.

FRactURE OF THE HUMERUS:—(1) Upper end. (2) Shaft. (3) Lower end.

Upper End:—1. Anatomical neck, or Intracapsular fracture. 2. Surgical neck, or Extracapsular fracture. 3. Epiphysis *reported*. 4. Great tuberosity.

Fractures of the humerus, 8 per cent. of all fractures.

Anatomical Neck :—Very rare, only from the greatest violence, or old people.

Signs :—Usually rather distinct, depends upon whether impacted or not.

In all cases get great pain, swelling, some prominence of the acromion; slight flattening of the shoulder; slight shortening.

If impacted get crepitus as well. In nearly all cases it is more or less so (i. e., impacted).

*Treatment*:—May unite by bone, but, if disturbed in old persons, get non-union, or ligamentous; sometimes the callus is so great as to interfere with the movements of the arm. Apply shield or cap to the shoulder; a small pad in the axilla, and confining the arm to the side of the chest. Best not to apply any splint.

Surgical Neck:—The most common fracture about the shoulder joint, seen constantly in practice. This may be impacted, or unimpacted, caused by violence, usually direct.

Signs:—Decided flattening of the shoulder; the flattening is below the head. Decided shortening of the bone, often an inch if impacted, felt in natural position, find the upper extremity of the lower fragment just below the coracoid process, pointing beneath the great pectoral. 1. Get pain shooting down the fingers. 2. Increased mobility. 3. Swelling. 4. Patient supports arm to prevent movement. 5. Crepitus distinct, if not impacted. 6. Lower fragment is drawn up by the deltoid, and inward by the muscles in the bicipital groove. 7. Upper turned outward by the muscles attached to the spine of the scapula.

*Treatment*:—Use a splint which will occupy the axilla, and push out the lower fragment; so arrange splint with a pad on the upper end to fill up the axilla; cap over the shoulder.



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Another is Ericson's leather "T" shaped splint, arm piece long enough to extend from elbow to axilla, and as wide as the arm. Chest piece 15 inches or so by 7-8 inches. Gutta percha cap on the shoulder.

These are put on while the assistant is making extension on the arm; secure the cap on the shoulder with a spica bandage.

If a strong man keep in bed 2-3 days; weaker people no bed at all. Passive motion to prevent ankylosis.

Great Tuberosity :—Very rare; violent action of three muscles inserted into it. Carried upwards and backwards and usually get subluxation of joint itself. Shoulder from this looks broader; get crepitus.

Treat:—Bring into place, and keep there by means of compresses; put pad in the axilla, and arm close to side.

Epiphysis:—Very rare after 21 years. Same symptoms and signs as fracture of the surgical neck. Crepitus is softer.

*Treatment*:—Is the same.

Shaft of the Humerus:—In any situation. Direct or indirect violence, or muscular action.

Situation and obliquity of the fracture; modified by muscles; Deltoid, Latissimus Teres Maj. & Pectoralis Maj. may modify.

Treat :—In weak people and where little displacement may apply plaster of Paris at once, using extension while applying. Better—by coaptation splints applied exactly as in case of fracture of the Femur. Gooch's splinting—use four of them. The outer and posterior should be longer than the other two. Bandage arm from hand up to elbow, pad splints and cover them with plaster; much depends upon the sling, which should be *applied to the wrist only*, so as to have the weight of the arm pulling on the fracture. In strong people must apply extension. by weight and pulley, which are held by Mead's plaster (say 4-5 lbs. weight).

May use three coaptation splints, with back splints. Sling should always be about wrist and no higher.

Lower end of the Humerus:—1. Simple transverse fracture, separating the articular surface from the shaft. 2. Form running into joint. 3. Separation of the Condyles; one or both. 4. Separation of Epiphysis.

All caused by blows, and usually when elbow-joint is bent.

They are important, very common, and often very hard to make out, usually need an anaesthetic to diagnose.

Signs :—Much swelling; great effusion; swelling may need several days of ice before can diagnose.

Diagnosis:—Expose both elbows, and carefully compare, feel and compare the two condyles and the olecranon with other side; look for widening, narrowing or separation. Some stiffening, and deformity nearly always follows.

*Treatment*:—If the bones of the forearm are not involved, best to treat with an anterior splint, not exactly at a right angle; may use any firm material; best with a hinge. Leave elbow bare, use compresses for condyles, apply ice to bare elbow for some days. If, however, you have a doubt as to the fracture of other bones, position between pronation and supination is the best, with thumb upwards, and apply internal splint. More comfortable, and best position in case of a stiff joint. Apply cold to the outside of joint for several days.

FRACTURE OF ULNA:—(1) Olecranon. (2) Coronoid. (3) Shaft.

Olecranon:—(Like the patella), from direct violence, or muscular violence (triceps). 1. Oblique, perhaps comminuted and little separated. 2. Transverse, great separation.

The upper fragment is drawn up, joint involved, and much effusion into joint, and cannot extend.

Union, by bone (direct violence). Ligamentous (muscular action).

Treat:—Arm in almost straight position, slight flexing. Long anterior splint, and figure of 8 to draw fragments down. Passive motion early; fortnight.

Coracoid Process:—Rare. Only seen in connection with dislocation of the forearm. Keep arm perfectly quiet in a sling, and an internal splint.

FRACTURE OF THE RADIUS:—(1) Neck. (2) Shaft. (3) Lower extremity (Colles).

1. Neck:—This is rare, occasionally connected with dislocations; can be diagnosed readily in a thin person by holding the head firmly, and rotating the hand, find that head does not move. Internal angular splint, with thumb uppermost, use little compress over the head of the bone.

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2. Shaft :—From direct or indirect violence, and should be treated as a fracture of both bones.

Fracture of both bones of the Forearm :—Same rule should be followed as in both bones of the leg, when from direct violence the fractures are directly opposite, when from indirect the radius in upper third, the Ulna in lower third, i. e., at their weakest points.

Greenstick fracture a very common form from falls on the hand, etc.

Diagnosis :—Easy, crepitus nearly always, preternatural mobility.

Treat :—Apply anterior and posterior splints well padded, ordinary wooden splint to metacarpo-phalangeal articulation, posterior down to the wrist, not further unless fracture is very low down (rare); the anterior should have a pad at the end for the hand, put arm in the semi-flexed position, midway between pronation and supination. Splints should be always *wider* than arm, or we get permanent disabling from loss of the interosseous space, i. e., callus thrown out between the two bones, and so no pronation and supination; pad the posterior especially well about the wrist; the interosseous pads advised by some are unnecessary, and besides may press on the nerves and cause paralysis, arm across the chest, supported by a sling from wrist to elbow.

If in children correct the bend, overcorrect it by giving anaesthetic, and completing the fracture, or greenstick may remain bent. Dr. Roddick does not believe in plaster of Paris for the forearm, on account of the danger of destroying the interosseous space. Use light splints in children.

COLLES' FRACTURE :—Occurs about three-quarters of an inch above the lower articular surface of the Radius, results from falls on the palm of the hand; especially common in old people, it is usually impacted, and is accompanied by characteristic "silver fork" deformity; the upper fragment is thrown forwards, the lower fragment backwards; find a distinct elevation on the back of the wrist, while on the front of the wrist there is a corresponding prominence. Opposite the annular ligament there is a remarkable hollow, due to drawing of

soft parts; radius is adducted, and slightly rotated; the styloid process of the ulna is slightly displaced.

*Treat*:—Usually impacted, and one would be inclined in an old person to leave the impaction, but here in spite of age we must break up the impaction, because the circulation about the wrist is very vigorous, and fracture about the wrist will unite by bone in the oldest person.

If we fail to reduce, we get an unsightly, disabled arm, and a neuralgic condition.

Variety of splints suggested :—1. Thin board 1-4 inch, and an anterior splint often sufficient with bandage at the end for fingers to grasp.

2. Some splints with hole for the thumb and wooden end, from the back of the wrist a piece of pasteboard leather, or gutta percha about four inches long, to two and a half wide, moulded in hot water to fit the back of the wrist comfortably; pad with lint; no danger of the interosseous space here, a couple of pads of lint should be placed over the points where prominences were to prevent the return of deformity; need also a couple of pieces of plaster.

Break up the impaction; get crepitus; use forcible extension on hand and abduct hand. Assistant keeps up abduction and traction, while you apply splints—over the splints and plaster put a gauze bandage.

Support the whole length of arm in a sling, and instruct patient to keep fingers quiet for three days, and after this encourage him to move the fingers, and so prevent the callus from entangling the tendons, and prevent stiff wrist,—at the end of two weeks remove, reapply for another week and then get good union; remove and apply plaster of Paris bandage for two weeks more; perfect in five weeks.

Metacarpal bones :—Ordinary anterior splint, or Lewiston's splint, to fit the palm of the hand.

Phalanges :—Anterior curved Lewiston's splint, or whalebone.

CLAVICLE:—Very frequent, owing to exposed position, and shocks conveyed through the arm. Fracture may occur at any point. Direct or indirect violence. Commonest point



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is just external to the centre, usually "greenstick" in children, and often overlooked.

Signs :—Depend upon the seat. When about the middle the displacement is usually very great; deformity is due to the weight of the arm, and the action of the pectoralis. Outer extremity of the inner fragment is elevated, and may push through the skin; the outer fragment is the one that moves. Attitude—supporting arm.

Treat :—1. By rest and position, is by far the best to prevent deformity; remain perfectly quiet in bed for a fortnight, the pillows should not press upon the afflicted shoulder; allow affected shoulder to drop, and so cause extension.

Pressure of weight over the affected part, such as with a bag of shot, extending from the sternal end to the acromial end, and held there by guides. The shot moulds the fragments into place, and so get excellent results.

2. Plaster of P. bandage sometimes does well in people who have to go about, figure of "8" may do for a day or two, but the best for going about is :

3. Sayres' adhesive plaster dressing.

Two (2) strips of Meade's plaster three and a half inches wide are required. It should be measured so that the plaster goes once around arm and once and a half round body.

Attach to the arm by a safety pin with adhesive side to the body; put once and a half around the body, and attach to the middle of back by sewing or a safety pin; the second piece is attached to the posterior part of the opposite shoulder, and is brought down the back of the arm to the point of elbow, where a slit is made to receive olecranon, then carry the pressure up the whole length of the arm and hand, and attach over the sound shoulder. Sayres used a thick plaster, but a wide gauze bandage is better. This is to hold arm to side, and should go around the body from elbow up to shoulder. Dr. Roddick takes a pad of ordinary lint and places it over the outer end of the inner prominent fragment and holds down by a piece of adhesive plaster; this should be left on for a fortnight. This allows patient to go about.

## DISLOCATIONS.

A dislocation is a solution in the contiguity of bones where they touch each other, being in contrast to fractures which are a solution in continuity. They are in proportion to fractures as 1-8.

Classification.—I. Simple. When joint displaced without injury to other structures, except ligaments which may be torn.

II. Compound.—When displacement is of such a character as to open joint and expose it to the air.

III. Complicated.—When, in addition to dislocation, we have a fracture, tearing of nerves, etc.

A complete dislocation is one in which the joint surfaces are completely separated from each other. An incomplete or partial dislocation where they touch in some part.

Dislocations of upper extremity form 3-4 of all. Most frequently the shoulder, then elbows, fingers, hips, etc. More frequent in males than females, except jaw. At extremes of life dislocations common.

Varieties of Dislocations.—I. Congenital. II. Pathological or spontaneous. III. Traumatic.

I. Congenital.—Due to malformation of part, as in club foot. The joint most frequently affected is the hip, particularly in females. Many causes given as: Abnormal uterine contractions during pregnancy. Obstetrical disturbance. Unfortunately this may not be recognized till child begins to walk. Other joints are shoulder, knee, ankle, patella, tarsus and phalanges.

II. Pathological or spontaneous.—Occur as a result of joint disease, destruction of ligaments. Movements of patient and muscular contraction does the rest. Sometimes caused by Morbus Senilis, and may also occur in Septic Arthritis.

III. Traumatic dislocations occur in any joint from violence. Causes: Predisposing and exciting.

I. Predisposing.—Male sex, particularly during adult life. Occupations: mining, machinists, millers. Congenital laxity of ligaments; weakness of ligaments from previous dislocations. Ball and socket joint more liable to dislocation than hinge joint. Paralysis of muscles surrounding joint.

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II. Exciting Causes.—Violence, muscular action. (a) Violence. Direct, not very common, shoulder. Indirect violence; the force being directed through shoulder, humerus acting as a lever. (b) Muscular action.—Throwing cricket ball. In action of yawning, as lower jaw. In tetanus, uraemia, epilepsy.

Symptoms.—Pain, loss of function of joint.

Signs.—1. Alteration in shape of joint. 2. Alterations in landmarks. 3. Abnormal position of bone. 4. Preternatural immobility. 5. Shortening, rarely lengthening. 6. Alteration in direction of axis. 7. No tendency for deformity to return after reduction. 8. Occasionally after a time get pseudo-crepitus due to presence of blood clots, lymph or eroded cartilage. If there is much effusion of blood or serum, these signs are often obscured.

Pathology.—The severity of lesions depends on the force of violence producing dislocation. Any wrenching or twisting movement will prove peculiarly disastrous. The whole capsule and associated ligaments are more or less lacerated; short muscles may be completely ruptured or tightly stretched; neighboring vessels and nerves may be contused, torn or pressed upon. Much blood extravasated in substance of contused muscle.

General treatment in dislocations:—1. Reduce, i. e., bring bones back to natural position. 2. Hold them there until soft parts have had time to recover themselves, as a rule till serous and sanguineous effusions have been absorbed.

Impediments to reduction.—1. Powerful contractions of muscles. 2. Interposition of soft structures, muscles, tendons, ligaments. 3. Hitching of one bone upon another.

Impediments in old unreduced dislocations:—1. New adhesions. 2. An adaptive shortening of soft structures, ligaments, muscles, blood vessels, and nervous structures. As a rule, shortening is the common deformity.

In ball and socket joint the rent may be completely closed up, and in old cases the misplaced bone will become changed in shape, it being partly absorbed, the cavity will become filled up with fibrous tissue and more or less ossified.

Methods of Reduction:—1. Manipulation. 2. Extension with counter extension. Manipulation, simple and more scientific. By this we attempt to make bone retrace steps taken in becoming dislocated, by putting it in a position to relieve those muscles which are stretched. Must know anatomy.

Extension and Counter Extension:—Is particularly useful in old standing dislocations, in which the alterations of outline have prevented reduction by manipulation.

*Treatment*:—For larger joints 10-12 to 21 days in splints; for smaller joints sometimes begin passive motion about 5th day; but this depends on inflammation.

Friction; shampooing, massage to excite the absorption of inflammatory products. Sometimes use galvanism to prevent atrophy of muscles.

Treatment of Compound Dislocations:—1. Reduction, usually simple. 2. Wound may be enlarged; so treat as a wound of joint. 3. Drainage should be employed.

When a fracture complicates a compound dislocation, wire parts together. Excision often the better treatment, allowing the space to be filled up with fibrous tissue, thus getting movement.

One should not attempt to reduce a dislocated joint after an elapse of time equivalent to the time which the corresponding bone if fractured would take to unite.

### SPECIAL DISLOCATIONS.

LOWER JAW.—Causes:—1. Muscular action. 2. Indirect violence. Once having occurred is liable to occur again. In unilateral dislocations, symptoms are same; but not so marked as in bilateral, in which the mouth is open and jaw fixed. When left unreduced, muscles and articulating surfaces adapt themselves to new position and parts become firm.

Sub-luxation of lower jaw occurs in young individuals, usually those who can snap their thumb joints. When the mouth is opened, there is a little click and jaw slips out. It is due to relaxed ligaments, muscles and capsule.

*Treatment* of Sub-luxation:—Preventative. Avoid eating fruit, yawning, crying out.



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*Treatment of Dislocation:*—1. Recent cases easy. Employ an anaesthetic; wrap thumbs in towel and press down and backwards on molars, at same time lifting chin with little fingers, and lower jaw goes in with a snap. Don't forget to cover thumbs. 2. Wedges between teeth and use tourniquet. 3. Pressing down lower jaw with lever. 4. Cooper's forceps.

Constant dislocation:—Treated by, 1. Injection of pure iodine into joint. 2. Opening joint and stitching cartilage to periosteum. This dislocation very difficult to reduce after fifth week, owing to cicatrization of capsule.

### CLAVICLE.

*Sternal end:*—As a result of a blow; sometimes as child is being born; positions forwards, backwards, upwards, Sternal end not so frequently dislocated as acromial end.

*Diagnosis:*—Measure distance on whole side, and then injured side; between distal end to sterno-clavicular articulation; sterno-mastoid is put on stretch.

*Reduction of forward dislocation:*—Easy when early. 1. Put knee in inter-scapular region and draw shoulders well back. 2. Place a wedge in axilla, and using humerus as a lever pry out the shoulder. 3. Bandage shoulder.

*Backward dislocation—Diagnosis:*—Marked depression, pressure symptoms as shown by absence of radial pulse, dyspnoea and dysphagia, tearing of posterior ligament.

*Reduction:*—Draw the shoulder outwards and backwards, and maintain in this position by a fig of 8 bandage and wedge in inter-scapular region.

*Upward Dislocation:*—Rare, as it cannot occur unless anterior, posterior and rhomboid ligaments are torn, or else a fracture occurs. Sternal end of sterno-cleido mastoid very prominent, clavicular portion relaxed.

*Acromial end of Clavicle:*—Exception to general nomenclature. Clavicle displaced on to acromion instead of beneath it. Cause, a blow or fall on shoulder.

*Symptoms:*—Arm hangs by side, seems longer, shoulder depressed; clavicle rides up on acromion, boundary of posterior triangle prominent and tense, motion very limited.

*Treatment*.—The over-riding is overcome by drawing shoulder outward. Retention in position. Stimson's method.—A long strip of plaster, 3 inches wide, is placed with its centre under the point of the flexed elbow, and its ends are carried up in front of and behind the arm, crossed over the end of clavicle, and secured over the front and back of chest; while the bone is held in place by pressure upon the clavicle and elbow. Support forearm in sling and bind arm to chest.

Displacement of scapula may be due to paralysis of serratus magnus and rhomboid muscles.

### SHOULDER.

Dislocations of the shoulder, as frequent as all the others taken together, rare in youth and old age; more frequent in men than in women.

*Predispositions*.—Shallowness of cavity, large size of head of bone, exposed joint, freedom of movement, great laxity of capsular ligament, great leverage, mobility of scapula.

*Causes*.—Direct and indirect violence, pathological and congenital.

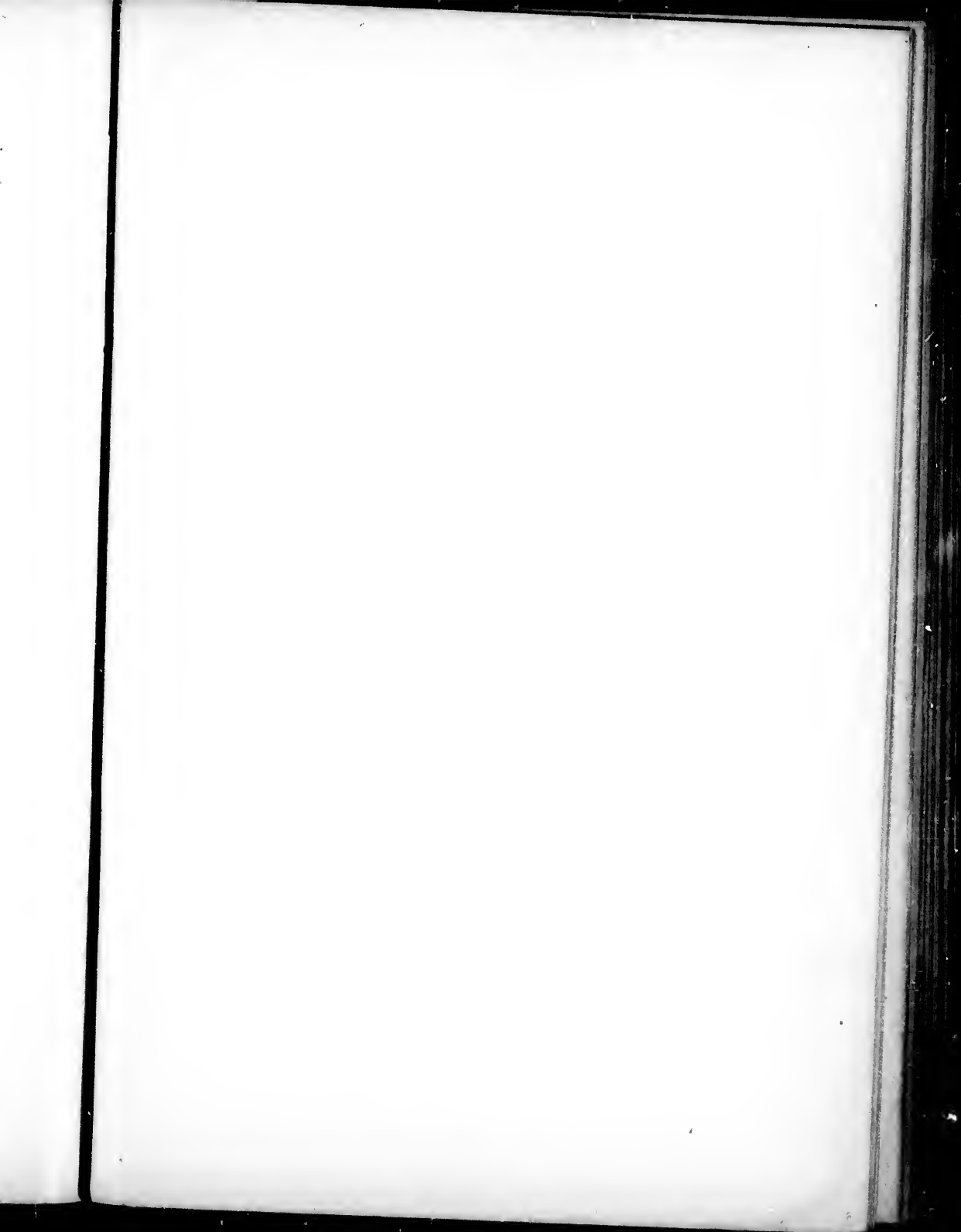
*Classification*.—1. Subcoracoid; dislocation forwards and a little downwards. 2. Subglenoid; dislocation downwards and a little forwards. 3. Subclavicular; dislocation forwards and inwards. 4. Subspinous; dislocation backwards. 5. Supracoracoid; upwards and forwards.

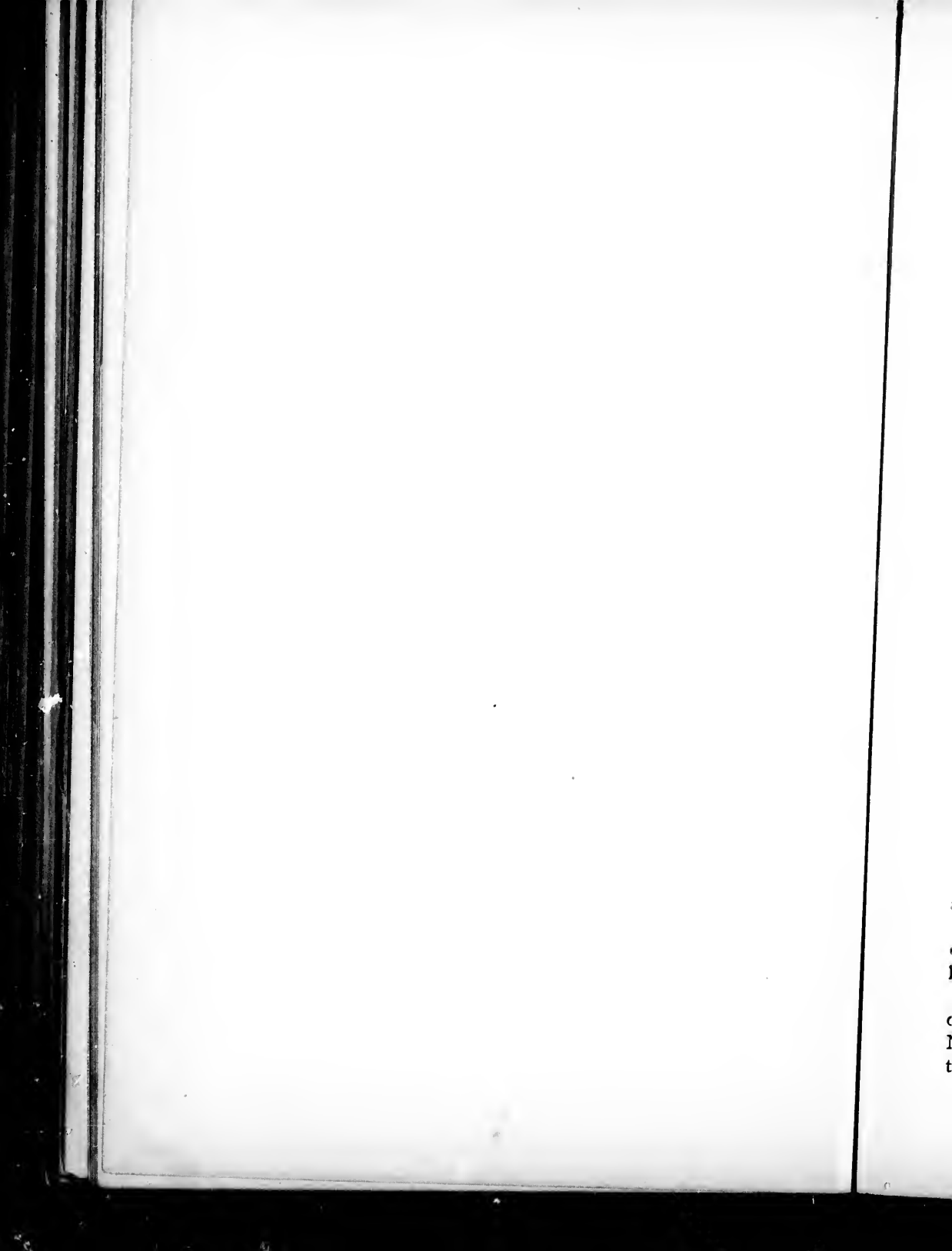
1. Subcoracoid Dislocation.—Cause.—Direct and indirect violence; muscular action.

*Symptoms common to all dislocations of shoulder*.—1. A depression immediately beneath acromion. 2. Pain about part with more or less immobility. 3. Alteration in axis of limb, and head of bone in abnormal position.

4. *Dugas' Test*.—If fingers of injured limb be placed upon the sound shoulder, in dislocations the elbow cannot be brought against chest.

5. *Callaway's Test*.—A tape round acromion and under axilla will measure about 2 inches more on the dislocated than on the sound side.





6. *Hamilton's Test*.—If a straight edge be applied to the outer side of arm, it can only be made to touch the acromion and external condyle at same time, when head of humerus is absent from glenoid cavity.

In subcoracoid dislocation we have in addition:—1. Elbow carried backwards and directed away from side. 2. On deep palpation in axilla upper part of shaft of humerus is felt, and when elbow is raised, the head is felt anteriorly and internally.

Subglenoid Dislocation.—Cause:—Fall on abducted limb, or heavy blow on upper and outer end of humerus. Symptoms.—Arm lengthened; elbow thrown away from side; hollow beneath acromion marked; head easily felt in axilla. Can pass fingers beneath coracoid above head of bone. Anterior axillary fold markedly lowered.

Luxatio erecta.—Rare. Cause:—A fall, the patient clutching something. Symptoms.—Arm abducted and raised, axis of humerus being directed upwards and outwards.

Subclavicular Dislocation:—Arm shortened; elbow thrown backwards and outwards. Head of bone felt and seen below clavicle.

Subspinous Dislocation:—Elbow advanced; arm rotated inwards and close to side; a marked hollow beneath coracoid process and a prominence under spine of scapula.

Supra-coracoid Dislocation—Rare. Caused by violence in an upward direction either to shoulder or elbow. Symptoms.—Acromion or coracoid process usually fractured.

*Treatment*:—I. Kocher's Method. Flex forearm, then grasp it by wrist and elbow, abduct, and rotate outwards until resistance is encountered. Secondly. Bring elbow forwards, upwards and inwards until opposite median line, still maintaining external rotation and abduction of wrist. Thirdly. Rotate arm inwards, carrying hand towards opposite shoulder.

II. Traction with knee in axilla against head of bone, make extension outwards; then lower the arm, bending down the humerus over the knee.

III. Extension with heel in axilla:—Patient lies on mattress or floor; the surgeon presses his heel against head of bone. Now make traction downwards and outwards at the same time, swinging humerus inwards, using heel as a fulcrum.

Treatment after reduction:—Bandage arm to side over a large soft axillary pad, forearm in sling; apply spirit lotion over joint. After a week begin massage and movement, increasing gradually. In a fortnight a sling is all that is required. In a month encourage patient to use limb.

When dislocation is complicated by fracture of shaft of bone, the head may be replaced by manipulation of upper fragment and direct digital pressure in axilla on the head. If this fails must treat as a fracture, unless you expose the upper fragment and employ traction by inserting a hook into it. In this way the dislocation is readily reduced and then fracture is treated.

Nerves and blood vessels sometimes injured. After treatment, immobilization of joint for a fortnight.

Unreduced Dislocations:—After 4th week almost impossible to reduce shoulder joint, the healing of capsule, which takes place early, being a great impediment to reduction. Arthrotomy sometimes practised.

Recurrent Dislocations:—Usually due to unhealed capsules or ligaments, or gap being replaced by fibrous tissue.

#### DISLOCATIONS OF ELBOW JOINT.

Early diagnosis called for. Amount of swelling and great pain makes it almost impossible to diagnose; so give anaesthetic. May have dislocation of both bones or each bone separately.

Both bones—Backwards, inwards, outwards, forwards.

Radius—Backwards, forwards, outwards and downwards.

Ulna—Backwards.

Both backwards, commonest variety and usually the result of fall on outstretched hand. Common in early life, due to coracoid process giving but little support to bone. In this anterior ligament is torn; biceps stretched; brachialis anticus torn and lacerated; partial dislocation the rule. Triceps stretched, carried backward, drawing olecranon upwards. Coracoid process frequently torn off. Radius frequently retains attachment to ulna; forearm slightly flexed and fixed. Decided shortening when measured from styloid process of radius to internal condyle; olecranon distinctly prominent be-



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hind. Lower end of humerus presents a marked bulging. In a dislocation backwards olecranon rises above condyle.

Hand and forearm are midway between supination and pronation; where reduced has a tendency to remain so.

*Treatment*:—Overcome opposition of muscles by anaesthesia and reduce by traction, or over-extend the elbow and then reduce by traction on forearm.

*Lateral Dislocation*:—Usually from falls on closed fist or on back of hand; from direct blow on forearm, either inside or outside; or from machinery accidents. The radius and ulna may be dislocated incompletely to either side or completely to the outer side.

*Incomplete inward Dislocation*:—The sigmoid cavity of olecranon lies below and embraces the internal epicondyle, and the radius lies in front of and somewhat below the epitrochlea. Both lateral ligaments are torn. Forearm pronated and slightly flexed; olecranon and external condyle prominent; head of radius below and to inner side of normal position. Flexion and extension easy and not very painful.

Reduction by traction on extended forearm and direct lateral pressure at the elbow.

*Incomplete Outward Dislocation*:—The radius and ulna displaced outwardly, the radius lying below or entirely beyond the external condyle. Both lateral ligaments torn and sometimes epitrochlea is broken off. Elbow flexed; forearm pronated. Internal condyle prominent, external marked by the projection of head of radius. Olecranon prominent.

*Treatment*:—Disengage ridge of sigmoid from groove between trochlea and capitellum, by traction, hyper-extension or abduction of extended forearm. Then push bones latterly into place by pressure on head of radius.

*Complete Outward Dislocation*.—Cause:—A fall on hand or elbow, or a blow upon inner side of forearm near elbow.

*Diagnosis*:—Broadening of elbow and direction of bones of forearm. Elbow may be extended or flexed. Reduction easy on account of extensive laceration of the ligaments.

After treatment:—Immobilization and rest.

*Forward Dislocation*—Rare. Cause:—Violence received on back of flexed elbow.

Dislocation of ulna alone—very rare.

Dislocation of radius alone—backwards, outwards, forwards, downwards.

Backwards:—Head displaced backwards and sometimes a little upwards behind humerus. Reduce by pressing forwards on head of radius.

Outwards:—Very rare; head of radius being outside normal position; ulna normal.

Forwards, the commonest dislocation frequently accompanied by fracture of shaft of the ulna, due to fall upon hand. Head of radius is displaced forwards and upwards, resting when elbow is flexed, against the anterior surface of external condyle. Head is felt in fold of elbow.

Reduction:—Abduction of extended forearm and direct pressure on head. Keep forearm flexed for three weeks.

Downwards or Dislocation by Elongation. Clinical history characteristic. A child, 3 years, is pulled by hand, cries out with pain and refuses to use limb which hangs by side, partly flexed and pronated. Diagnosis: sensitiveness on pressure over head of radius; passive motion free in every direction, except supination. On forcible supination a click is felt as head goes into position.

Practically can never reduce dislocations of elbow after fourth week. After this time unreduced dislocations demand excision.

#### DISLOCATIONS AT WRIST.

Lower Radio Ulnar Joint.—The ulna by usage is spoken of as the dislocated bone. May be forwards or backwards.

Backwards. Cause—exaggerated pronation either voluntary or by external violence. Ulna forms a marked prominence on back of wrist. Reduce by direct pressure.

Forwards—due to violence. Ulna projecting anteriorly, overlapping radius as in previous. Reduce by direct pressure.

*Dislocation of Carpus from Radius*:—Backward, forward, sometimes outward. Complete and incomplete.

Cause.—Forcible flexion or extension, or direct violence.

*Colles's* fracture may be mistaken for dislocation of wrist



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backwards. Differential diagnosis is made by noting the position of styloid process of radius to its relations with that of the ulna and the projecting mass on back of wrist and with the metacarpus. Reduce by traction and pressure.

*Dislocation of Carpal Bones*:—Backwards and forwards. Reduce by traction and pressure.

*Carpo Metacarpal Dislocation*:—The metacarpal bone of thumb most frequently, usually backwards, more often incomplete than complete. Reduce by direct pressure and apply splint for a week or so to prevent recurrence.

*Dislocation of Thumb*:—Very common; great difficulty is frequently found in reducing backward variety; due to the interposition of the anterior or glenoid ligament and sesamoid bones. Backwards dislocations.—Incomplete, complete and complex. Incomplete form seen in people whose thumbs are double jointed; the first phalanx moving backward and standing at right angles to metacarpal bone. In the complete form the phalanx is carried backwards and upwards on the dorsum of the metacarpal. Anterior ligament is torn and drawn backwards with sesamoid bones past articular surface of head. The first phalanx is in extension at a right angle; terminal phalanx in flexion and head of metacarpal is prominent in thenar eminence. By forced flexion of thumb this is changed into complex form, the glenoid ligament being turned upward so as to lie between the phalanx and head of metacarpal. Base of thumb can be felt as a prominence behind, and the head of metacarpal in front. Care must be taken in reduction to avoid transforming the complete into the complex form, Maintain extension; press thumb bodily downward until it overlaps the articular end of metacarpal; and then by flexing it, it is put in place. In this way the glenoid ligament and sesamoid bones are pushed before phalanx. In complex form same method but more force needed.

Forward Dislocation of thumb:—Reduce by pressure.

## DISLOCATIONS OF HIP.

Form from 2 p.c. to 10 p.c. of all dislocations, occurring at all ages; more frequent in men than women.

Backward Dislocations.—In which the head of femur passes over the posterior lip of acetabulum, and lodges close behind it. In the common dorsal form the limb retains an attitude of flexion, adduction and inward rotation.

I. Dorsal Dislocation.—The most common form. It includes those on to the dorsum ilii; into sciatic notch; iliac; and ischiatic.

Cause.—External violence acting from below upwards, pushing knee towards pelvis.

Symptoms.—Limb adducted, rotated inwards; more or less flexed; knee resting in front of opposite thigh. Voluntary movements lost; there is passive flexion and adduction, but extension, outward rotation and abduction are impossible.

*Treatment*:—Relax capsule and Y ligament; replace head of bone by traction and manipulation or by abduction and outward rotation. Place patient on his back; steady pelvis; flex knee to right angle, rotate thigh inward and flex to right angle; lift upwards, rotate outwards and lower in abduction.

II. Dislocations Downwards and Inwards:—In which the head escapes at the lower and inner part of socket; lodging in obturator foramen, or in perineum.

III. Obturator Dislocation:—Caused by violence on back of pelvis while thigh is flexed and abducted. The Y ligament is untorn and head is displaced downward and inward; limb being held in abduction and flexion, foot pointed forward and everted; extension or adduction impossible. Adductor longus stands out like a tight cord.

Reduction:—Flex hip to right angle; adduct while making traction; lower the knee, rotating inwards.

Perineal Dislocation.—Caused by forcible extreme abduction with laceration of soft parts. Symptoms: marked flexion and abduction of limb; shortening 1-2 inch or more.

Reduction:—Under ether by flexion, traction, adduction and then lowering limb.



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IV. Inward and forward dislocation.—In which head of femur rests on ramus of pubes either at the ilio-pectineal eminence; or near symphysis. The former is the more common, limb being markedly everted and slightly flexed. Outer and posterior aspects of hip flattened.

Reduction.—Traction so as to bring head down past ramus; then flexion, pressing at same time against head to prevent it moving upward again; then rotate inwards.

Briefly, the methods of treatment by manipulations in the four common dislocations of hip are:—

I. Flex thigh in adduction in dorsal and sciatic dislocations; flex thigh in abduction in the obturator or pubic form, the object being to relax Y ligament.

II. Abduct and rotate outwards in dorsal and sciatic dislocations. Abduct and rotate inwards in obturator and pubic dislocations. These cause head of bone to retrace its steps through capsular rent, relaxing at same time rotator muscles.

III. Extend in all cases so as to make head of bone enter acetabulum.

General Treatment of Dislocations of Hip.—Rest in bed for two weeks; passive motion 14-16 days; application of ice bag.

In fracture of rim of acetabulum, traction must be employed to prevent displacement upwards. Rest in bed six to eight weeks.

*Congenital Dislocation.*—Not one produced during delivery, but when child is so born, usually associated with club foot, etc. More common among females than males.

Acetabulum more or less obliterated. Frequently associated with paralysis. Not infrequently bilateral, one dorsally, the other anteriorly.

Symptoms.—A peculiar waddling gait; prominent abdomen and buttocks and well-marked lordosis. Nelaton's line runs through both trachanters. All movements fairly free except abduction.

*Treatment.*—Lateral or posterior incision, free division of capsule from neck of bone, also separate muscles sub-periosially; then extend thigh while head is in acetabulum. Put up for eight months. Sometimes necessary to chisel out new acetabulum.

## DISLOCATIONS OF KNEE.

These are not frequent. May be forward, backward, outward, inward and by rotation, in order of frequency. The dislocation is frequently complicated by injury of popliteal vessels; sometimes resulting in gangrene.

Forward Dislocation:—Complete or incomplete. Cause: hyper-extension of knee, or direct violence on front of thigh or back of leg.

When complete:—Tibia lies in front of condyles, and may be displaced upwards; laceration great.

Incomplete:—Articular surfaces of tibia and femur partly in contact; laceration less.

Reduce by traction and direct pressure.

Backward Dislocation:—Complete or incomplete; caused by violence on front of leg or back of thigh; patella sometimes dislocated outwards.

Reduce by traction and direct pressure, or by flexion and rotation of leg with traction in flexed position.

Lateral Dislocations:—Less frequent; outward, inward, complete (rare); incomplete. Cause: Forced adduction, inward dislocations, and forced abduction. outward form.

Symptoms.—Projection of head of tibia on one side, and condyle of femur on other. Reduce by traction and pressure, then immobilize limb for several weeks to allow lateral ligaments to make firm union.

Dislocation by rotation.—Outward or inward according to direction in which toes are turned. Condylar surface or surfaces are displaced according to axis of rotation. Injury rare.

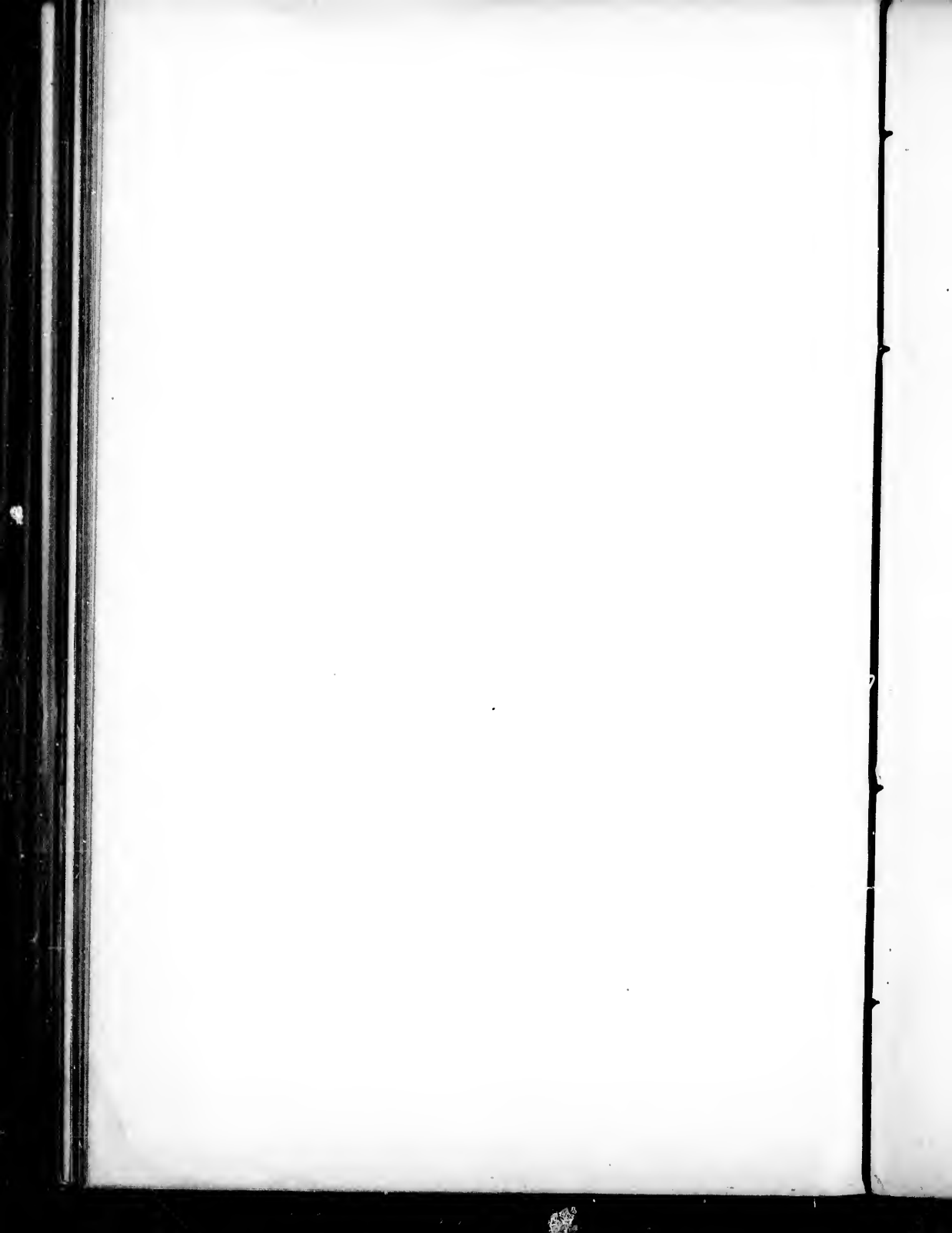
*Dislocation of Semilunar Cartilages.*—They may be detached at either end or peripherally displaced inwards or outwards or lacerated.

Cause.—Dislocation, flexion or sprain of knee. Rotation of leg. Symptoms:—Sudden painful locking of joint, frequently recurring.

*Treatment.*—Bandage or pads to prevent displacement, or too great flexion of knee. Sometimes suture cartilage to tibia.

*Dislocations of Patella.*—Outwards, inwards, edgewise,

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vertical, upwards or downwards. The last two due to rupture of ligamentum patellae and quadriceps tendon, respectively.

**Outward Dislocation:**—Patella rests against outer surface of external condyle, either by its inner, posterior, or anterior surface. Outer border is directed forward. **Diagnosis:**—Patella in abnormal position. Reduction by direct pressure, first relaxing quadriceps by extension of knee and flexion of hip.

Inward dislocations same as outward but less frequent.

**Dislocations of Fibula:**—Upper end. Outward and forward or backward and upward—rare. Is easily recognized and reduced by pressure on head of fibula. Backwards and upwards very rare.

**Dislocations of Foot:**—Backward, forward, inward and outward.

**Backward:**—Cause.—Extreme plantar flexion, lateral ligaments torn, foot slips backwards, astragalus becoming fixed behind tibia. Symptoms—Foot shortened in front, heel lengthened.

**Forward:**—Rare. Astragalus in front of tibia. Foot lengthened in front, heel shortened.

**Inward Dislocation.**—By supination and adduction of foot, the astragalus is turned down, so that its upper articular surface lies below and in front of external malleolus. In the other form the toes lie in a transverse plane. Reduction easy.

**Outward Dislocations.**—Nearly always prove to be Pott's fractures.

**Dislocations of Astragalus.**—Usually caused by a fall from a height or forcible twisting of foot. Outward and forward most frequent; head of astragalus resting on outer cuneiform and cuboid bones. Symptoms.—Foot adducted and inverted, external malleolus prominent. Reduce by downward traction on foot and pressure backward on head of astragalus. If this be impossible may be necessary to incise.

**Inward and Forward.**—Astragalus lies in front of and below internal malleolus, foot abducted and everted. Reduction sometimes prevented by neck of astragalus being caught by tibialis anticus.

**Forward and backward dislocations rare.**—In the latter the

body of astragalus can be felt behind ankle and absence of head from normal position. Sometimes there is persistent flexion of great toe. Reduction difficult.

### DISEASES OF THE BONES.

Inflammation of bone attacks the soft parts:—1. Periosteum. 2. Medullary membrane. 3. Soft tissues in the Haversian Canals and cancellae. We have:— I. Periostitis. II. Osteitis. III. Osteo-Myelitis.

Periostitis:—1. Simple Acute. 2. Acute diffuse, or infective. 3. Chronic periostitis.

1. Simple Acute:—This may arise from a blow, more frequently following Acute articular rheumatism, Typhoid, Measles, Scarletina, Syphilis.

The periosteum is swollen and vascular, easily separated; resolution may take place. Often suppuration and burrowing abscess, lifting the periosteum from the bone, bursts into the soft parts; resolution is still possible, but frequently followed by superficial necrosis of more or less of the bone, with exfoliation.

Symptoms:—Pain, especially at night, of a boring character, tender swollen part, oedema follows, perhaps fluctuation, local Temp., some constitutional disturbance, depending upon the extent or presence of suppuration.

*Treatment:*—Rest, elevation and leeching, hot stupes with laudanum, cold in localized forms, but this usually increases the pain, and not as effectual as heat.

Where Syphilis is suspected, K. I. early, Calomel purge early.

If from fever give a generous diet, stimulants and tonics if a regular fever has aborted.

After this treatment, if swelling increases, make an aseptic incision down to the bone and scrape; this if possible before suppuration takes place; this relieves the tension; irrigate with Sublimate, plug with Iodoform, and dress.

If there is Suppuration, Incision should be enlarged, drainage with hyperdistension by Sublimate.



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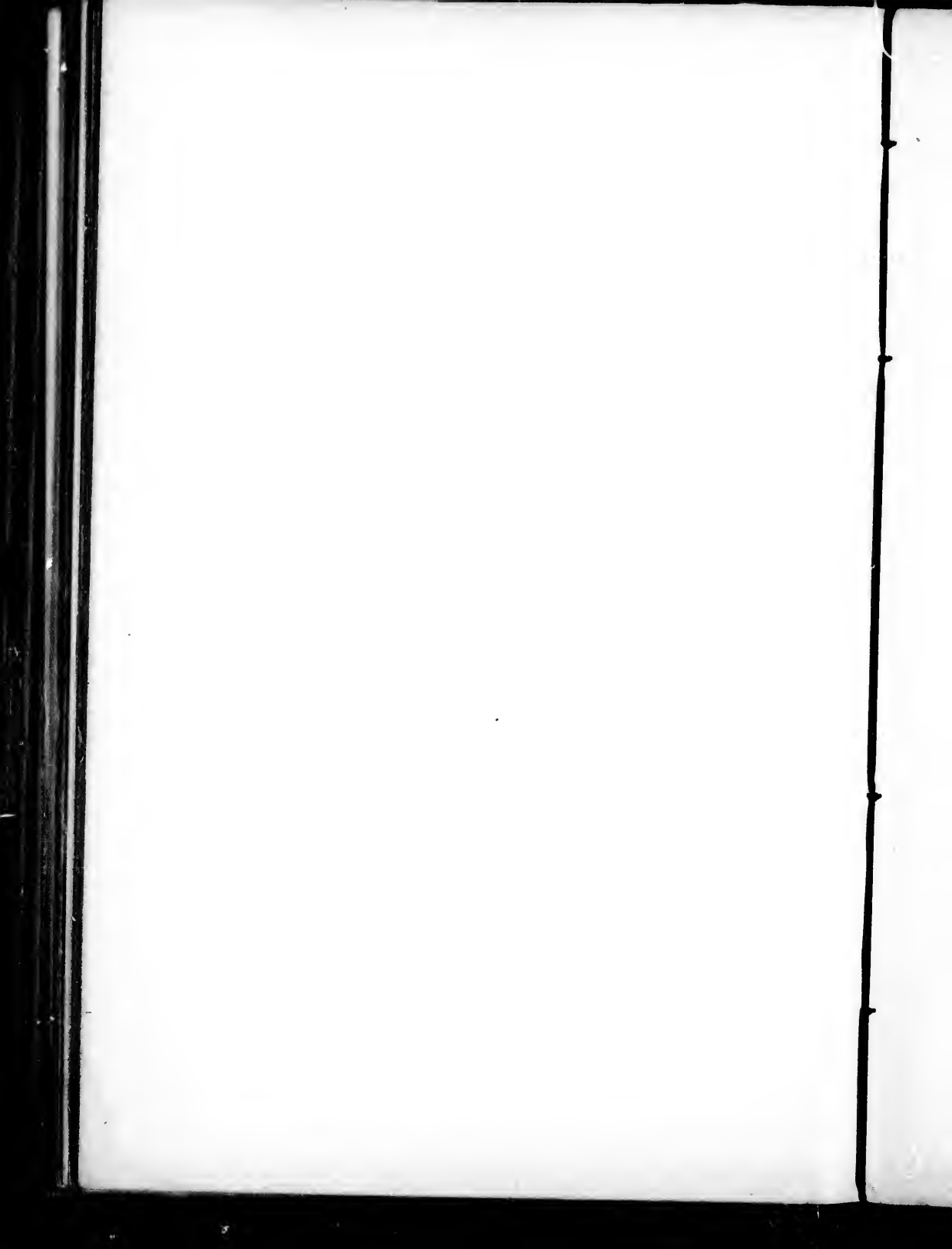
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2. Acute Diffuse Periostitis.—Infective periostitis. Necrosis extensive, a serious condition.

Causes:—Injury, generally such as occur without a wound, or Idiopathic. Etiology is doubtful. In certain subjects, especially delicate boys 8-18, of an ill-nourished, and possibly strumous tendency.

Pathology:—Long bones of the extremities are the most frequent sites, more common in the lower. Usually begins in the epiphyseal line, by inflammation and effusion beneath the periosteum; pus quickly forms and spreads rapidly; it may reach from one epiphysis to the other. In injury the trouble begins at the point of injury. Pus goes through the periosteum at several points, but seldom invades the epiphysis. In severe forms the joint may become involved, and may get suppurative arthritis. Many think it begins in the medullary canal, but text books vary. If not relieved, Septicaemia or Pyaemia result.

Symptoms:—Rigor early, Temp. 102-104, headache, malaise, vomiting, diarrhoea, patient thought to be sickening for specific fever; on the 2nd or 3rd day a tender spot, and if in the neighbourhood of a joint may be mistaken for acute rheumatism. In the latter the swelling is always in the middle of the joint, and in a short time more than one joint affected, while in periostitis the swelling is always above or below the joint in the shaft itself.

Cellulitis is excluded by the deep-seatedness of the trouble.

Treatment:—As soon as recognized, make early and free incision to the bone, examine the condition of the bone at same time, thorough flushing of the cavity, free drainage, more dependent opening if necessary, general condition of the patient should be watched; generous diet; stimulants, quinine, and probably salicylates of soda and morphine.

Where the condition has gone on for some time may have whole bone involved, and osteitis as well, then it may be imperative to do a sub-periosteal resection. Make incision in the middle, saw through the bone, and twist off from epiphysis; this resection especially justified where there is a companion bone. After resection dependent drainage, flush-

ing cut, stuffing with Iodoform, put up in splints. In well selected cases new bone is formed. If medulla and joint involved, amputation is called for.

3. Chronic Periostitis:—Simple and uncomplicated form is rare except in Syphilis; this common in association with Osteitis. It is sometimes rheumatic, or gouty; may follow trauma and fevers; the process is slow; slight constitutional and local symptoms, large amount of new bone formed with nodes.

Symptoms:—Little local disturbance.

Treatment:—K. I. in all forms. Iodine locally or I. and Pb. Ung. Syr. Fer. Iod. in children. Blistering and Poulticing. K. I. Ung., with or without Belladonnae.

If node not absorbed do a linear Osteotomy with Hey's saw, encourage bleeding, dress antiseptically. Others recommend trephine.

## II. OSTEITIS.

A process of Inflammation the same as in all other tissues; resolution may follow; may break down into pus, ulcerate, or gangrene, or fatty degeneration.

Most frequently in the cancellous ends of long bones, irregular bones, tarsus and carpus, and bodies of the vertebrae; occasionally found in the shafts as secondary to myelitis or periostitis. Seldom acute, seldom septic. May follow injuries, contusions, fractures, gunshot wounds, amputations Tubercle, Syphilis; also fevers and Rheumatism.

Symptoms:—Signs in the shaft the same as in periostitis; at first, however, no swelling,—appears later. Pain more deeply seated, and increased by percussion, not pressure.

In cancellous bone soon get symptoms of abscess, pain localized, and transmitted to the joint, the pain changes from a boring to a lancinating or aching pain, and may abate for a few days; finally have a localized pain, swelling, redness, glazed skin thickening, pain now becomes more throbbing, pus is frequently formed, may perforate joint and destroy it.

Treatment:—K. I. grs. XV-XX twice a day. Syphilitic patients, a course of mercury, morphia, parts at rest, elevated,

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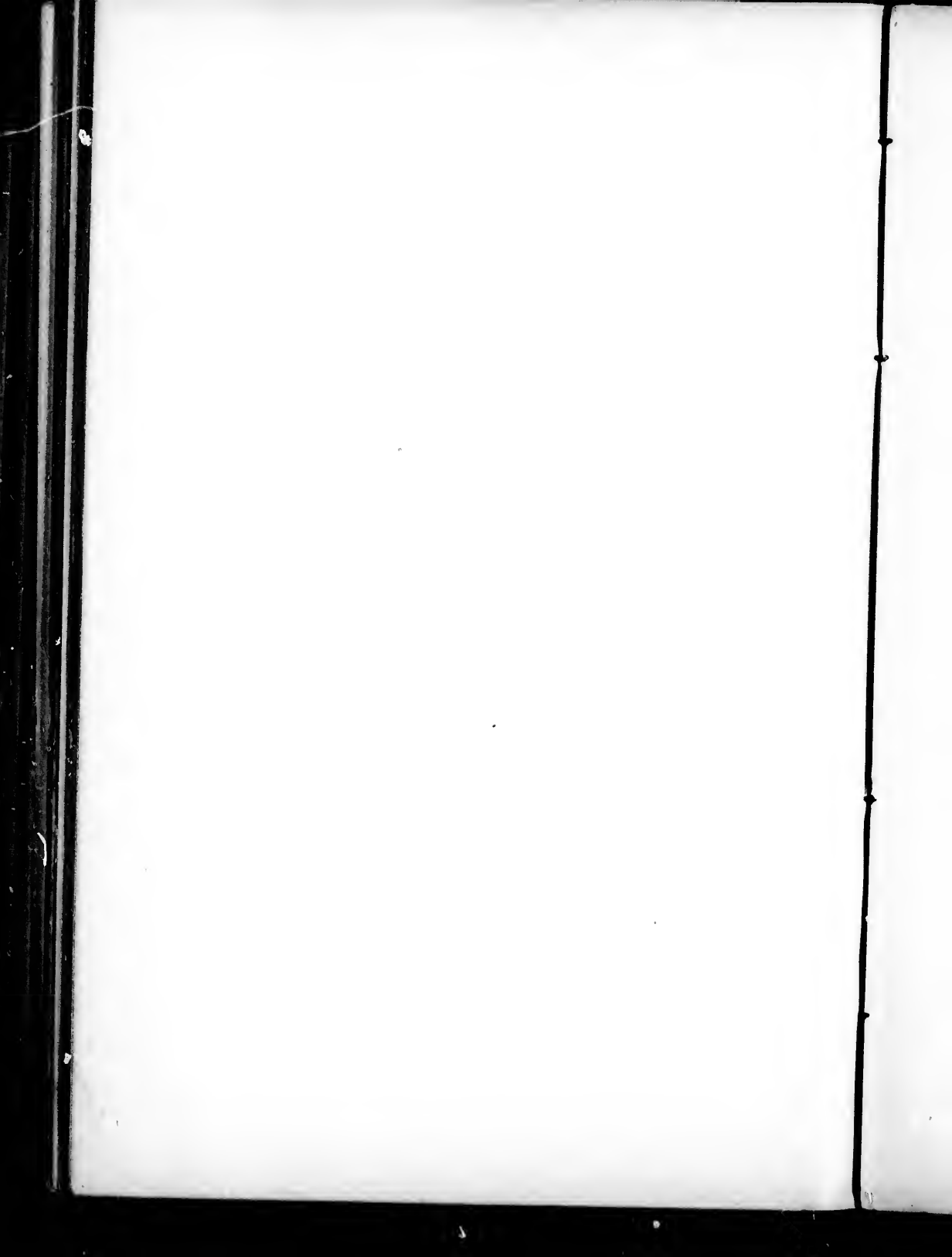
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poultices, soothing ointment, when abscess threatened incision, exploration with drill, or osteotome—this will relieve tension, and cause bleeding; where pus use trephine; pack with Iodoform and heal from the bottom.

Where there is only a thickening, do a linear osteotomy, with a Hey's saw, or osteotome, or may trephine.

### III. OSTEO-MYELITIS.

Inflammation of the Medullary canal, and the tissues lining the cancellous parts of bone:—1. Simple Acute. 2. Acute Infective or Diffuse. 3. Chronic.

1. Simple Acute may follow injury, simple or Compound Fracture, may follow amputation, may be part of a general osteitis.

The inflammation is local, does not spread, and is not due to micro-organisms, hence in many fractures, or amputations, where bone injured, a threatening of death of the bone takes place, though resolution may follow. When resolution fails, we have small central necrosis.

*Treatment*:—Really nothing, except the removal of any spicule of bone which may have been separated. This bone often is absorbed.

2. Acute Diffuse and Infective:—More serious, may accompany periostitis, or may originate from constitutional conditions, as well as local. Compound fissured fractures, and Amputations, where decomposition of the discharges takes place, are the chief causes, especially where the discharge has been pent up.

Owing to antiseptic surgery, this is now seldom seen. In civil practice it is rare. In military practice it may occur.

Tubercle may cause it; when Idiopathic it is due to a secondary effect, from absorption from a fatal wound.

If we have an acute Infective Periostitis present at the same time, the destruction of bone cannot be estimated; may destroy a whole bone, and acute Septicaemia result. The least that can be expected is an extensive central necrosis, and extensive thickening of the bone itself.

Local Symptoms:—Deep-seated swelling of the soft parts; severe dull aching pain, much tenderness on pressure. Skin normal. In case of a wound, here an increased discharge is noticed, and odor may be foul. Periosteum thickened, and loose, bone is dry and dead looking; marrow sloughy looking, will not bleed when probed.

Constitutional Symptoms:—These are the most important, they are those of severe septic fever. Temp. 103. Rigors are frequent. If not relieved acute Pyaemia results. If not relieved will die in a few days from exhaustion, pyaemic deposits, septic poisoning.

*Treatment:*—In the milder forms of this disease cleanse the wound as soon as possible; free drainage, and remove the sequestra as they loosen. In severe forms, the commonest, remove the bone by incision and excision of the whole diaphysis, or, better still, by amputation.

The question always arises, shall we amputate in the line of the bone or the joint above? Is any part good enough? It is quite possible to reach good bone by amputating at the seat of election; i. e., just below the tubercle of the tibia, rather than at the knee joint. If see a suspicious spot scrape it.

In Femur it is most dangerous to amputate at the hip-joint, better amputate at the upper third. In companion bones remove at the Epiphysis. Pack the cavity with Iodoform gauze. If general septic infection, question operation. Constitutional treatment:—Quinine, strong and nourishing food, stimulants.

CHRONIC OSTEO-MYELITIS:—Can hardly be described apart from osteitis. This leads to gradual narrowing of the Medullary Canal. Condensed condition of the bone results. It is hard and dense as Ivory.

### CARIES.

No definite pathological meaning may be applied to any slowly progressing ulceration of bone, except that in which we have sequestrum separating from living bone; characterized by molecular death; process of rarefaction. There is a



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decided loss of substance of bone tissue; tendency to ulceration and caseation, especially in irregular bones; it frequently follows osteitis, and may follow specific inflammation of cancellous bone.

Three forms :—(1) Simple. (2) Syphilitic. (3) Tubercular.

Simple caries :—This occurs in connection with wounds of joints, where destruction of cartilage has occurred, exposing cancellous bone; this tends to ulcerate and produce caries.

It is possible that it occurs from injury to the vertebrae. In these cases a cure results, and it is explained that a simple process of caries results in deformity and gets better. So in joint cases, where we suspect tuberculosis, joint cure follows, resolution takes place, and no doubt in these instances we are dealing with simple caries.

Treat :—Perfect rest, joint splint. For the back a jacket. Mild counter irritation. *It is rare.*

Syphilitic caries :—Usually due to softening of periosteal gumma; may be due to syphilitic ulcers penetrating to the bone, especially where the skin is close to the bone as in Skull, Tibia, and Sternum. In syphilitic Caries, usually get necrosis as well; zone of ulceration surrounds a sequestrum; Syphilitic caries does not go deep; it leaves the bone soft and porous; soft parts are thickened and raised. May be acquired or hereditary.

Hereditary:—Chiefly the articular ends of the fingers and toes. Syphilitic dactylitis. Also on the face, especially the nose.

Is usually Acquired, and seen most frequently in adults.

Treat :—Not operative; remove sequestra; plenty of KI; dust Iodoform and Calomel on ulcerated spots. Black wash.

(3) Tuberculous Caries :—Tubercle in localized form has long been known to attack certain bones; the ends of long bones, carpus, tarsus, phalanges; often seen on either side of the epiphyseal line of growing bones, joints are also often affected; hip-joint disease. While the process in cancellous bone usually invades the joints, it may pass up in the opposite direction, and, reaching the medulla, set up an osteo-myelitis.

Forms :—1. Fungating caries, perforating into joint. 2. Caries sicca; no pus. 3. Caries necrotica. 4. Bone abscess

Symptoms:—Dull aching pain is first noticed, associated with definite tenderness; probably associated with a periostitis over it.

As it suppurates it extends to the surface, red and oedematous; abscess forms and bursts; bone rough and bare—soft and yields to probe; sinus, skin dusky around sinus, watery discharge, with gritty matter; sinus is often very tortuous.

Constitutional symptoms:—Very slight at first, may be led to suspect it by nocturnal elevations of temp.; the process may be advanced before symptoms are pronounced.

Treat :—Change of air; good food; sea-bathing, chemical food; cream; Cod Liver Oil; Syr. Fer. Iodidi.

Local Treat :—Rest and extension, plaster of P. supports.

Other methods :—1. Parenchymatous injection with hypodermic after drilling into bone and cavities of 10 per cent. Iodoform and Glycerine, or 10 per cent. Iodine or 10 per cent. Balsam of Peru and Glycerine; repeat injection 2 to 3 times a week.

2. Acu-puncture—finest point of thermo-cautery. Penetrate the diseased area in several places; pack with Iodoform gauze. This diminishes the pain, destroys part of the products; stimulates the tissue proliferation, and produces plastic osteitis. Application of the cautery outside at the same time. Where operative measures are not justifiable, apply carbolic and water each over the bone if superficial, until the diseased parts are eaten away (aa).

In deeper parts, cavities, introduce weaker solutions; e. g., 1-5-6 on lint, leaving for 3-4 days and removing; after sloughs have been taken away, repeat.

Best:—Incision and scraping. Apply Esmarch, open up sinus, and expose the diseased bone. Volkman's spoon is the best. Chisel may be used. Surgeon with gouge or spoon can tell the difference between diseased and healthy bone; the former is soft and gritty and yields to the instrument; the latter is hard and resistant. In young children, remember that all bone is soft, therefore be careful. To tell if carious, the bone dust in water will turn white or black, whereas the healthy remains red. Cleanse the cavity thoroughly with antiseptic Zn. Chlor., 40 grs. to oz., or liq. Carbolic.





Use Iodoform freely in the cavity, and allow it to fill with granulations. If you think it aseptic, allow it to fill with blood clot or bone dust. Put up in splint or plaster of paris.

### NECROSIS.

Death or mortification of the bone, found as a rule in compact bone, especially the shafts; some are more liable to necrosis as Tibia, Humerus, Lower Jaw, lower end of Femur, Clavicle, Phalanges. Blood supply cut off from a given area causes necrosis in that area. Injury is an important factor. Osteitis and Myelitis lead to Necrosis. Exposure to the fumes of P. will cause it in the lower jaw. Mercury may also cause it.

Senile Necrosis in Tibia and Femur same as senile gangrene of the soft parts.

It may affect the laminae of the bone only—"Peripheral Necrosis;" when the innermost layers, it is called "Central Necrosis; all the layers Total Necrosis."

When we have death of the bone from any cause nature begins to throw it off; groove develops around dead bone; gradually widening, separating the living from the dead; at the same time granulations spring up, and lift the sequestrum away from the healthy bone. The periosteum thickens and ossifies, and forms a roof over the sequestrum. If the periosteum is dead, the sequestrum lies uncovered. Gradually new bone grows up around the sequestrum, and it becomes invaginated. At points where pus originally escaped, we find cloacae. From these, foul pus exudes, and on passing in probe feel dead bone. The ultimate expulsion of the sequestrum is caused by the gradual growth of granulations pushing it up and through the cloacae. When invagination has taken place, the process is slow, and may be impossible.

Treat:—When it can be got at the sequestrum should be removed as early as possible. The sequestrum is bloodless, dirty white or yellow, with probe, has hard ringing sonorous feel; on the free surface smooth; under surface is rough and worm-eaten appearance.

When invaginated thoroughly, don't attempt to remove

early, give it time to separate, and for granulations to spring up about it; make incision over it free, make use of sinuse and cloacae; if these are not enough use gouge, saw, gnawing forceps, etc.

Should the sequestrum be long, and extend across the opening, break it up, and remove piece-meal. Thoroughly cleanse cavity. In early cases may leave the granulations, but when old and stinking scrape them away. Zn. Chlor. 40 grs to the oz., or Carbolic may be used. Dust with Iodoform, and allow it to fill up.

If perfectly sure it is clean, may fill it up by blood clot; rare. Decalcified bones are sometimes used as a framework. Keep the opening in the soft parts patent by means of Iodoform gauze.

#### INFLAMMATORY DISEASES OF THE JOINTS.

Synovitis:—May be 1. Acute. 2. Sub-Acute. 3. Chronic.

Simple Acute :—Causes:—Blows, bruises, sprains, injuries in the neighborhood, rheumatism and gout, gonorrhoea, acute specific diseases, early stages of syphilis (secondary), tabetic.

Pathology:—Synovial membrane red and congested, lost its lustre, synovia increased in amount, thin, serous in quality; mixed with inflammatory exudation; some cases go on past this and get turgid; blood red and a condition resembling chemosis. Should resolution ensue all will disappear; if not, it may go on to an arthritis; suppuration may ensue; rare to get a primary suppurative synovitis.

Symptoms:—Heat, swelling, pain, distension of joint, fluctuation, pain worse at night, sharp usually; in gouty and rheumatic subjects it is gnawing. Heat diffuse, difference in temp. of the two joints. Knee is flexed on account of the relaxation of all the ligaments; all hollows are obliterated, the patella riding.

Constitutional symptoms:—Fever always. Should resolution ensue, the constitutional symptoms disappear rapidly; occasionally get suppuration.

*Treat:*—Absolute rest, confinement to bed; some kind of







splint. Ice always indicated, except in rheumatism or gout, where we use hot fomentations. Leiter's tubes, soothing liniment; opium, and belladonna later.

Internally:—In simple form Pot. Bicarb, dose or two of Quinine, nothing is really necessary.

Rheumatism Sodii Salicyl. Gout, Colchicum, Gonorrhoea, 10 grs. Sod. Sal. with a drachm Tr. Cubebs. Syphilis, Hg. Dover's for pain.

Aspiration, if distention very great, and unresolved.

Sub-Acute Synovitis:—Similar to the above.

Chronic Synovitis:—Should be limited to cases where effusion remains serous, and usually where acute symptoms have subsided.

Symptoms:—Little pain, no heat. Tenderness and swelling, weakness in the joint.

There is here the danger that in strumous patients it may become tubercular. The great trouble is effusion, which continues; we get a regular dropsy of the joint; Hydrops articuli; Hydrarthrosis. This condition may be due to rupture of the synovial membrane.

Termination:—May be complete resolution after weeks or even months. Vegetations often result; the fingers may become thickened; flail sort of joint may result from over-distension.

*Treatment*:—Perfect rest, not necessary to go to bed, but immobilization should be secured by means of leather, paste-board, or Thomas' splints. Uniform pressure assists in absorption. Pot. Iod. Ung. Fly-blisters (small ones) followed by poultices, or Biniodide Ung. 3 grs. to the oz. Strapping, Scott's dressing, Caution, later massage, Friction, passive motion, internally K. I.

In Hydroarthrosis try the above treatment, and if failure it is justifiable to aspirate and apply pressure by means of rubber bandage or cotton wool. Change of air and scene should dropsy return. Inject K. I. 1 to 2 or 3 of water into the joint. Manipulate the joint to rub it over the surface internally, then let fluid run out by means of a canula; this results in acute synovitis; be careful not to let any air into the joint.

If all fail, open the joint, drain, keep in 10 days, dress antiseptic, after dropsy joint will be weak, and needs a brace for a long time, salt-bathing and massage.

### INJURIES AND INFLAMMATIONS OF THE MALE URETHRA.

Rupture:—Any part; most frequently the bulbous or membranous. The Spongy Urethra; 5-6 inches long. Membranous three-quarters of an inch longer above than below. Prostatic one and a half inches long.

1. The Spongy part may be ruptured by a kick on the flaccid penis. Violent connection in erection. In attempt to straighten chordee.

Symptoms:—Intense pain at the seat. Hemorrhage. Ring-like thickening at the point of rupture, with depression in front. Urethra drawn back, causing thickening; passage of urine may be obstructed. Infiltration of the tissues with urine, if urine passed shortly afterwards.

2. Membranous:—Kick while legs wide apart. Falling astride some object. Complication of fracture of the pelvis.

Symptoms:—In a few cases there is only a little hem'r'g.; as a rule it is great, continuous, and recurring; early trouble in micturition; partial or complete retention. Rule:—Soon get evidences of swelling of the perinaeum, indicating infiltration, which as a rule extends. Part also ecchymosed.

Treat:—If catheter passed, do so carefully; rule is to pass the catheter cautiously under anaesthetic. This to drain bladder and prevent infiltration, and by pressure to arrest hemorrhage.

In the penile portion, can bandage around the penis. In the bulbous portion a compress and a T bandage. If hemorrhage continues, use injections of cold water, flakes of ice; styptics as tannic. If fail pass catheter, watch for infiltration, and do an early perineal section.

If seen 24 hours after the accident, find the rupture if possible, bring the ends together and suture over the catheter, which is now in place. Leave the catheter in 5-8 days. Leave





the perineal wound open; pack and let heal from the bottom, as the infiltrating urine will lead to abscess. If not seen until after the expiration of 2-3 days, and there is much maceration, then the urethra cannot be repaired. We can repair the urethra if get within 24 hours; sometimes in 48 hours we are able to repair.

Foreign bodies in the urethra:—Pencils, grain, calculi, etc., may be impacted into the wall; dislodged by flow of urine, or may pass back into the bladder, forming nuclei for stone. In the spongy prostatic portion, foreign bodies may be lodged for a long time. Phosphatic calculi may form in the Urethra.

Treat:—If body smooth and in the penile portion, it may be flushed out by holding and letting go the urethra. Tell patient to hold urine until you come. Be sure meatus is large enough; if necessary, slit. If near the meatus may extract with sinus forceps, where difficulty use urethral forceps, manipulate. Sometimes have to open the urethra; small incision and press out; suture the urethra, and skin over catheter, and leave catheter in 5-6 days.

Where body impacted far back:—(1) Displace backwards into the bladder. (2) Make perineal section. The latter is the best. Can close up, as no infiltration; leave catheter as before.

#### INFLAMMATIONS OF THE URETHRA.

(1) Specific, Gonorrhoea. (2) Non-specific.

The latter may arise from any cause; foreign bodies; excess of lithic acid; over-dose of drugs; excessive sexual habit; contact with leucorrhoeal discharge. Inflammations spreading from stone in the bladder. Sometimes tubercular.

Symptoms:—Absence of itching; pain and gaping of urethra; no chordee in non-specific form. Removal of cause cures; no gleet follows. Microscope does not show gonococci.

Treat:—Bland injection of Boracic. Tonics. Removal of cause; Lithic form more troublesome; cutting pain at the Meatus.

Tubercular follows tubercle in the bladder; discharge sometimes purulent, sometimes blood; more pain.

Stricture:—(A narrowing).

Three (3) forms:—1. Spasmodic. 2. Congestive. 3. Organic (few cases congenital).

1. Spasmodic contraction of the Urethral muscle; this frequently occurs when passing an instrument. Cause:—Sensitive condition; nervous patient, commonly disturbed mental condition, also in the gouty and debilitated.

Local Hyperaemia may light up a spasm. Drugs:—Cantharides, Turpentine.

Rectal conditions:—Inflamed hemorrhoids, fissure. In alcoholics it is common. Any part of the Urethra is affected, especially the membranous portion. In passing a catheter, gently press against the stricture, and, if spasmodic, relaxation soon follows.

Spasmodic stricture has been taken for Organic and cut. Under anaesthetic always try to pass sound as a test. A small catheter causes a spasmodic stricture quicker than a large one; hence the rule to use large sound.

*Treatment*:—Hot bath; opiate; fill with olive oil and try and pass catheter; if not successful give anaesthetic.

Congestive stricture:—Some obstruction from inflammatory swelling; often accompanied by spasm; small stream. In gout this condition is common, and occasionally also get a urethritis.

*Treatment*:—That of Urethritis. Bland drink, linseed, Hyoscyamus, Pot. Cit. injections of linseed tea.

Organic stricture:—Cicatrical narrowing:—(1) Idiopathic. (2) Traumatic.

(1) Idiopathic:—Causes: Gonorrhoea 75 per cent., or any urethritis; more prolonged gonorrhoea, greater danger. Repeated "claps" are almost sure to result in stricture. Intra-urethral chancre; within 1 inch of the opening. Masturbation.

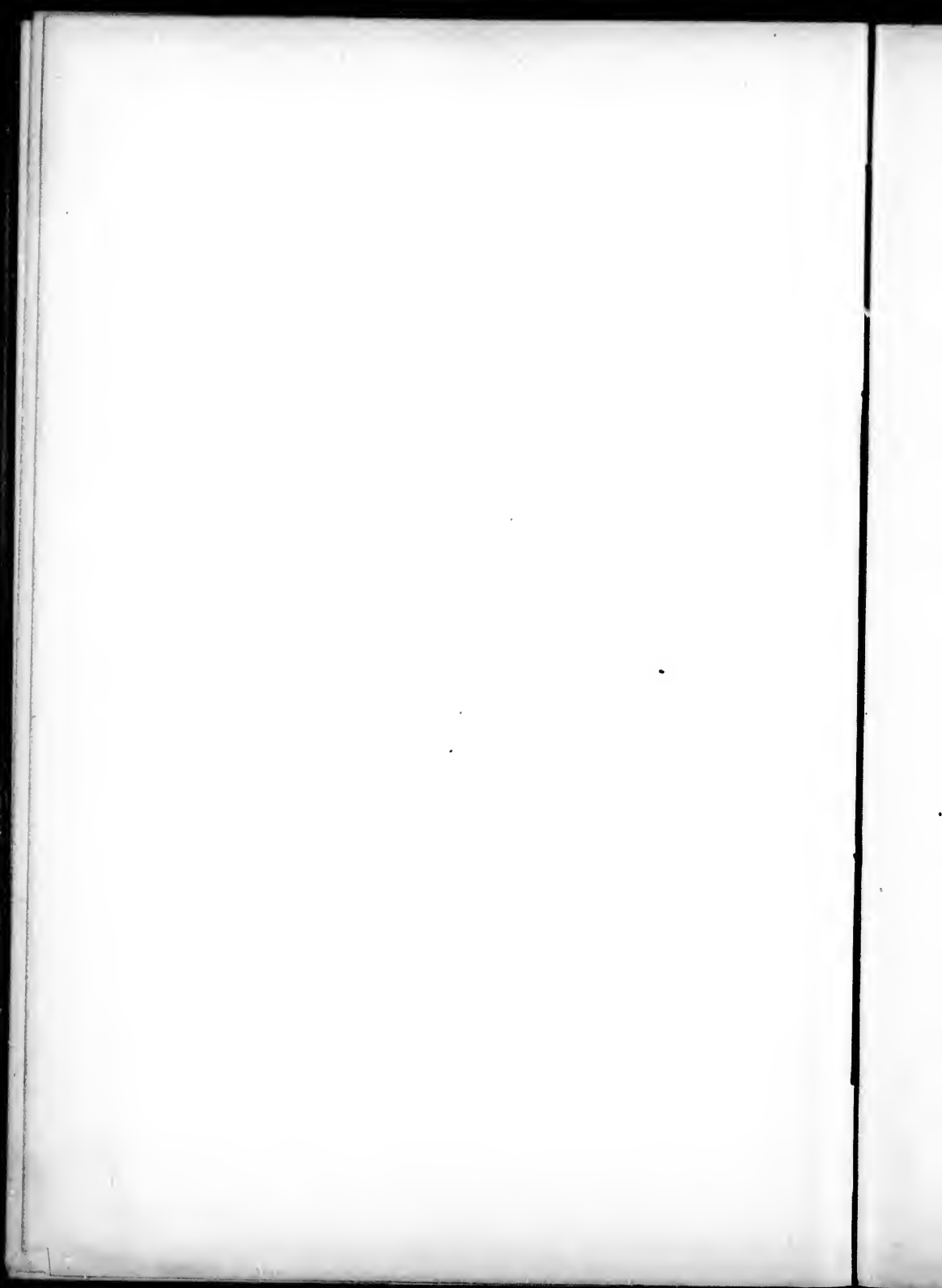
(2) Traumatic:—From laceration of the Urethra. Kicks or blows on the Perinaeum. Correction of Chordee. Injuries from various causes, as already reviewed.

The causes modify the character and extent of the stricture. Gonorrhoea; softer, don't contract so viciously.

Individual peculiarities influence strictures.







In syphilitic and tuberculous subjects, strictures are more extensive.

The extent and shape of the stricture depends upon the mode of deposit of the cicatricial tissue.

1. Linear or Ribbon. 2. Annular. 3. Band crossing canal, or bridle stricture, cohesion of two opposite ulcers. 4. Tunneling.

Consistency:—1. Soft and yielding. 2. Elastic or Resilient. 3. Hard and indurated. Cartilaginous or the whole Urethra may become blocked, which known as 4. Impermeable stricture.

Sensation:—(1) Irritable stricture.

Calibre:—According to the amount of deposit. 1. Small calibre, big deposit. 2. Large calibre, small deposit.

Seat:—Commonest. Bulbo-membranous portion, involving all the membranous, and the posterior one (1) inch of the bulbous.

Next in frequency:—The Ant'r. two and a half inch of the Urethra.

Results:—Changes in the Urethra, Bladder, Ureters, Kidneys. The part in front is normal.

Behind the walls are thin. Canal relaxed and pouched, usually evidences of ulceration by dammed up urine. Ulceration goes on the perforation into the periurethral tissues, resulting in abscess; usually posterior; perineal abscess. Bladder hypertrophied, sacculated. Urine accumulates in pouches; Cystitis; Calculi; Ureters undergo dilatation. In old cases the kidneys suffer, first get catarrhal pyelitis, hydro, pyonephrosis, multiple abscess.

Symptoms:—Constitutional disturbances are usually slight; sometimes get rigors, or chilliness, due to ulcerations behind the stricture. Frequent micturition in the day-time. Stream small, force reduced, twisting and forking (especially in ant'r. stricture, and may occur without stricture). If at the bulbo-membranous portion, there may be no change in form of stream. Dribbling of urine. Incontinence sometimes from constant straining. Retention from the slightest provocation, an excess of alcoholic stimulants, driving, cold, wet seat, etc.,

where congestion induced. Vesical tenesmus. Gleety discharge from ulceration. Pain and weight after connection, from damming of seminal fluid. Cystitis common. Hemorrhoids from straining, sometimes prolapse.

Diagnosis:—By urethral examination; see patient pass water; presence of residual urine.

Begin with soft French Bougie No. 10, or better testers with olivary ends; these, after passing, the shoulder catches, and demonstrates best the location of the stricture.

If experienced use solid instrument; best forms. Lister with olivary bulb; Van Buren American, and best German.

Use a large instrument, No. 10 anyway. This prevents spasm; does not catch.

Treat:—Look into the general condition, especially the urine, cut off all alcohol. If very acid Pot. Bicarb, and Tr. Hyoseyamus, and if putrid Boracic acid, 10 grs. t.-i. d. in solution alone, or with tonic, gentian, etc., as routine.

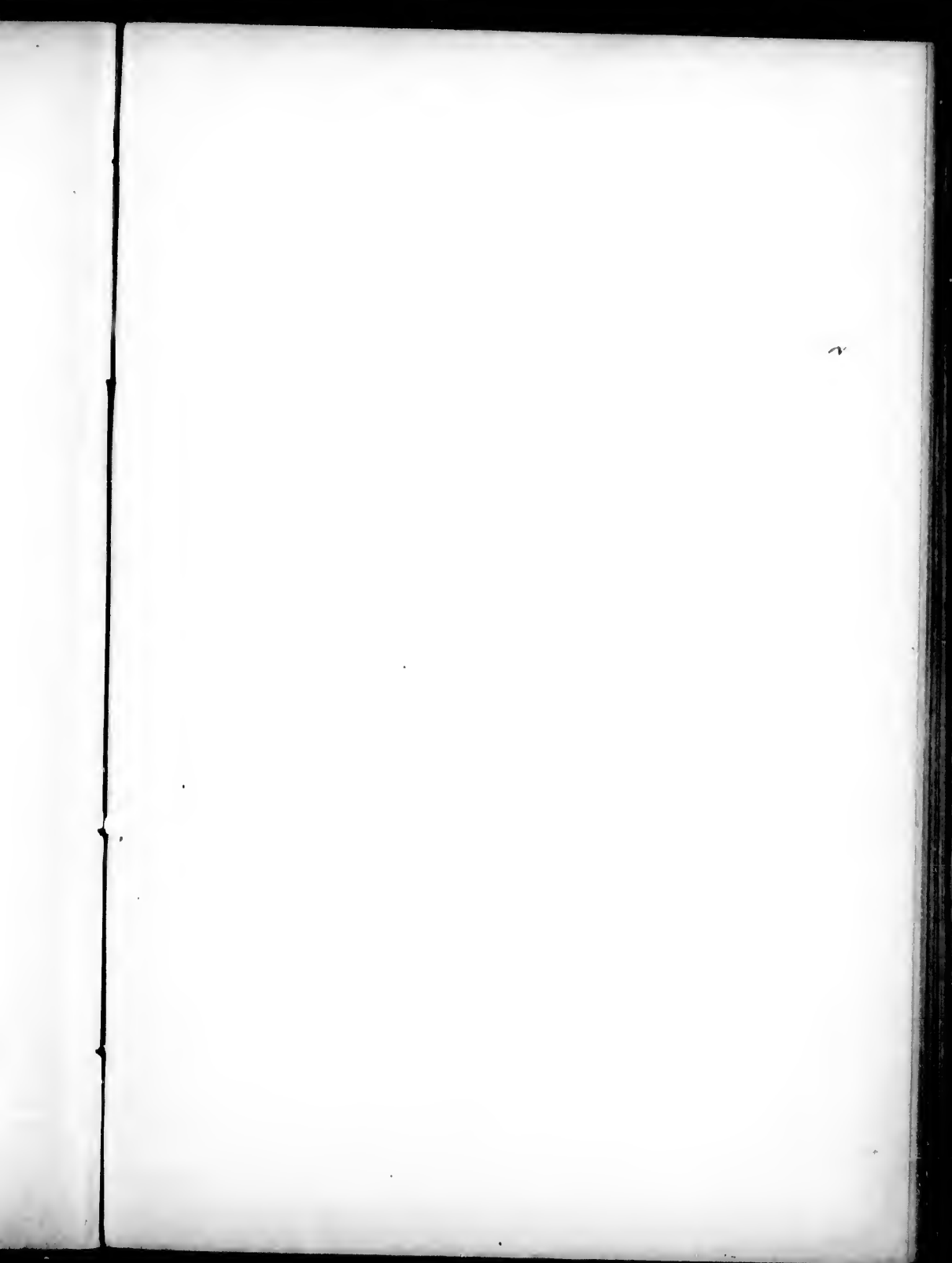
The treatment depends upon the kind and calibre of the stricture, and the patient:—1. Gradual dilatation. 2. Continuous dilatation. 3. Forcible expansion, or rupture. 4. Internal Urethrotomy. 5. External Urethrotomy, or Perineal Section. Three Operations:—(1. Symes. 2. Wheelhouse. 3. Cocks.) 6. Electrolysis. 7. Treatment by caustics. 8. By excision.

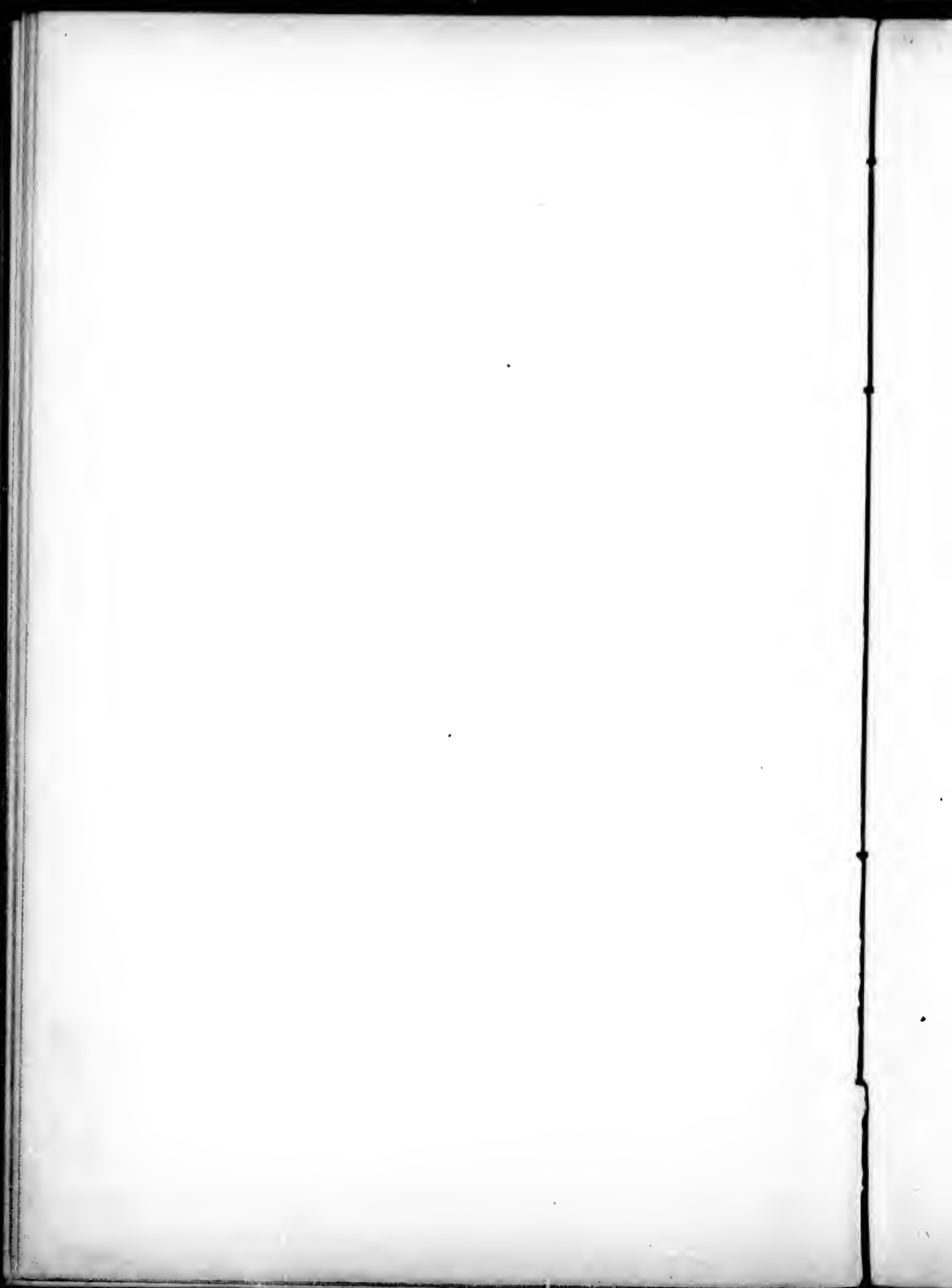
1. Gradual:—Stricture through which a 2-3-5 can be admitted, patient cannot lie up; comes every two to three days, and at each sitting you increase the size of the instrument. This is safe and satisfactory. In passing the sound, the bowels should be empty.

Take every precaution with instrument, warmed except in gleet, lubricated with Olive oil. Keep well covered.

If difficult, inject Olive oil. If chilly after, introduce antiseptics into the bladder, and leave a little in. Thiersch's, or Boracic.

2. Continuous dilatation:—Start with 3-5; tie in a gum elastic catheter; inject antiseptics; change the catheter every two days for a larger one. May have some septic absorption, and point of instrument presses upon collapsed bladder wall, sometimes causing serious ulceration.





3. Forcible Dilatation:—Able to pass instrument at least a No. 4. Holt's operation. Holt's dilator, also a Thompson's dilator; rupture the mucous membrane in two or three places, and get a good deal of scar tissue.

4. Internal Urethrotomy:—Done in strictures of small calibre, cases relapsing after other methods of treatment, and where all other modes of getting dilatation fail. Best results are in cartilaginous; irritable and resilient forms, and where there is a tendency to rigors or chills. Either cut as instrument goes in or comes out. Going in, in only bad cases where filiform guide only can be passed.

Instruments:—Which cut going in. In England Teevan's Urethratome, blade sheathed. Here, Maisonneuve's modified Guyon, button on the tip. Cutting in the opposite direction. Use where No. 4-5 can be passed. Civials. Otis; this being dilatation, with section.

5. External Urethrotomy:—Middle line, with or without staff. Where can pass a 3 or 4 do a Symes, with a Symes' staff. Where no opening through use a Wheelhouse staff, cut down on the groove at the button, divide the urethra for one-quarter of an inch, turn around and hook up the urethra, pass a director through the stricture, next a blunt bistuary; then a large instrument from the penis. "Cocks" go in the middle line of the perineum for the point of the prostate; fingers in the rectum; only do in emergencies.

(6) Electrolysis:—On trial.

(7) Caustic:—Solid grain of Silver Nitrate.

(8) Near Meatus only can we do an "Excision." Always pass the largest instrument the urethra will carry.

Combined External and Internal Urethrotomy:—Do a Guyon's and then turn up, and do an External, and get a good drainage (Reginald Harrison).

Complications:—Retention of Urine; tight strictures, following excessive drinking, cold and wet, may become complete; bladder full and rests above the Pubes. Constitutional disturbances arise; if not relieved, Urethra gives away behind stricture.

Try and pass catheter, if fail put in hot bath, and try and

pass in bath. Give morphia or laudanum, and starch per rectum. If fail, give anaesthetic; inject Olive oil; pass filiform bougie; these will relieve distension. Then can cut with Guyon or Teevan. These measures failing, must operate.

Operative measures :—I. Aspiration. This may be repeated two or three times. After each aspiration, try and pass catheter.

II. Puncture of Bladder above Pubes :—This done in emergencies.

III. Puncture through the rectum, with long trochar.

IV. Perineal Section:—Wheelhouse or Cocks.

Extravasation of Urine :—A distended bladder; person strains; sudden sensation of relief; at the same time a sensation of burning and heat in the perineum. Generally the memb. urethra is the part that gives away.

One layer of the triangular ligament gives away, usually the Anterior.

Infiltration first in the perineum, then in the scrotum, penis, then up over the abdomen, the deep layer of superficial fascia preventing the involvement of the thigh.

The scrotum is red, hot, and oedematous, extravasation may reach as high as the umbilicus.

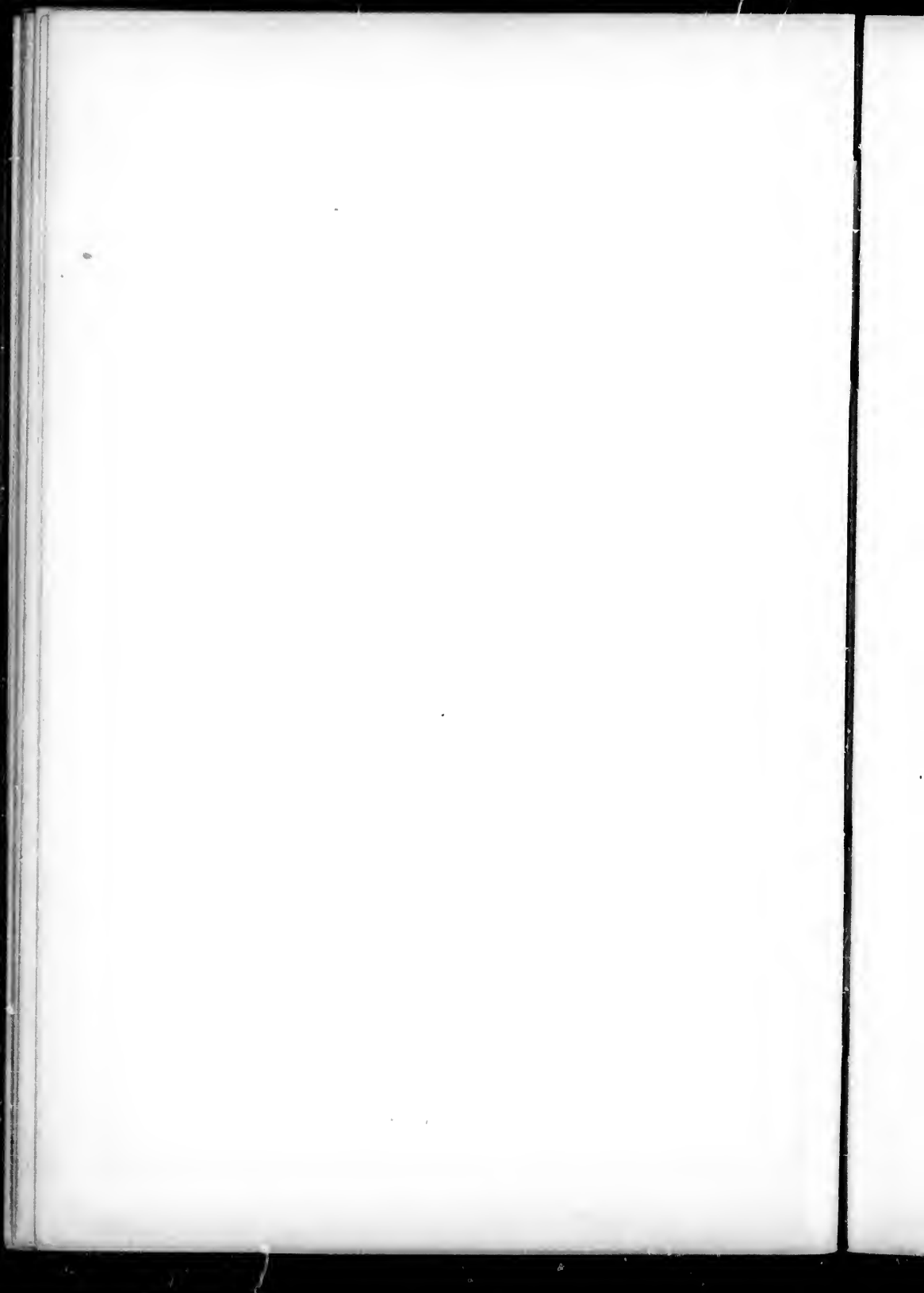
At first there is only oedema; but in 24-48 hours get a crackling due to decomposition; gangrene may be noticed in places, especially gangrenous spots on the scrotum. Gangrene of the penis is very rare, and, as Benj. Brodie said, if extravasation is sufficient to cause gangrene of the penis, it will prove fatal. Chills, high fever, a small rapid pulse, typhoid condition, delirium.

Delay is fatal :—Perineal section, slash the perineum and scrotum, as in erysipelas; the scrotal incision parallel with raphe, the penis longitudinally, into and through the cellular tissue, without passing into the fascia.

In the abdomen incisions should be oblique towards the centre of extravasation; tie bleeding points; dress large wounds; irrigate the whole with 1-5000. If sloughing a hip bath of carbolic. When getting better 2-3 day, try and pass catheter and tie in. General supporting treatment.



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Urinary abscess:—From trickling of urine. Don't open. Try and dilate stricture, and in this way may cut off connection between the abscess cavity and the urethra; then may open abscess. If abscess opened hastily, or bursts, the abscess cavity contracts until we get a fistula resulting.

Urinary fistula may occur in any part of the urinary tract, from the kidney down. In the urethra, it is called urethral fistula.

Fistula may be straight or irregular, tortuous and long. In these infiltration more common. Diagnosed by the presence of urine, previous history, and probe.

Treat: Urinary Fistula:—Simple recent case; straight fistula; treat stricture by dilatation, and inject Zn. Sulph. Sol. Nit., or armed probe. Hot wire. Galvanic current; care being always taken to pass catheter before micturition.

In more troublesome cases must cut stricture, and do a perineal section, at the same time opening up the stricture, or rather fistulae, scraping or excising. Subsequently pack and treat antiseptically. Tie catheter in the bladder.

Where in the penile portion, close by urethro-plastic operation.

Urethral Fever:—Passage of instrument, or any operation on the urethra, may produce a peculiar febrile condition, catheter fever, uraemic fever, etc.

Common for rigor to follow the first introduction of an instrument, even where no abrasion; due to nervous or urethral shock.

In other cases symptoms may not occur until several hours after the operation, or upon the first micturition afterwards, when patient has chills, Temp., vomiting, thirst, anxious look, pains in the back and head; may last only a few hours, may last all night, accompanied by weakness, and sometimes suppression of urine.

In fulminating type, may be fatal in from 6-24 hours. Temp. 106, suppression of urine and distinct chill.

Another class including prostatic cases, slight rigor, from which appears to recover, feels poorly for a few days, chilliness, loses appetite, thirst, tongue dry and brown, Urine

mucopus, may go on for weeks, patient suffering from a low form of septicaemia; develops pyelo-nephritis, dies at the end of two (2) months of surgical kidney. Pathology unexplored.

Some cases may be of nervous origin. Majority due to toxic products. Sternburg found the *Bac. Coli-Communis* in some cases. Whether the micro-organism breeds in the tissues, or in the Urine, is not known, probably both.

Treat:—Prevention; do as little violence as possible to the muc. memb. Thorough asepsis and antisepsis. Carefully examine the 24 hours urine before any operation.

See the catheters are boiled with soda, and bladder washed out with antiseptic fluid. Borac acid for a week before grs. X t. i. d., or every six (6) hours. Aconite min. 3-5 with Boracic. Quinine 10 grs. on the morning of the operation; hot bath previously.

Where mischief done; hot fomentations to the kidneys to prevent retention; dry cupping; hot enemata. Purge with 6-10 grains of Calomel. Fulminating form; Aconite min. V q. h. Repeat the quinine. Pilocarpine a-tenth to a-quarter of a grain hypodermically.

False Passages :—Most common in brittle stricture. If far forward the risk is not great; if in the usual district may wound the prostate, may run between the urethra and the rectum. Notice by turning of handle and sudden start; the instrument comes near the outside finger. Withdraw the instrument, inject antiseptic fluid, or enter Iodoform bougie. Look out for fever:—may try gum elastic catheter.

DISEASES OF PROSTATE:—Three (3) Lobes, wounds rare:—Rough catheterization, especially liable to acute and chronic inflammation; Atrophy; Hypertrophy; Malign. disease; Tubercle and Calculi.

Acute inflammation of the Prostate:—Cause, Gonorrhoea, and Gleet, about the end of the second week of gonorrhoea, following injury by catheter, internal administration of Cantharides, and from irritation of old stricture. Cold and wet. Periprostatitis may be superadded, especially the tissue between the rectum and the prostate.

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Symptoms:—Deeply seated dull pain in the perineum, frequent desire to make water; pain in defecation. Fever, occasional chill.

Examination:—Find enlarged; tender; greyish glairy discharge; prostaticorrhoea; patient very despondent; it ends in:—(1) Resolution. (2) Abscess. (3) Chronic inflammation.

Treat:—Bringing about resolution; pay no further attention to the gonorrhoea. Calomel purge; diet seen to. Inject with deep syringe silver nit 2-5 grs. to oz. Aq. Hot hip baths. Fomentations to perineum with opium. Ice in rectum; early cases; ice bag to perineum. Suppositories of Belladonna and Iodoform.

Abscess:—Pus suspected by increased pain; throbbing character, chilliness or rigor, rectum hot and full, excessively tender, may require an anaesthetic to make examination. Abscess marked in the bowel. Detect fluctuation, one finger in the rectum, and the other in the perineum, pains in the groins, painful erections, constitutional symptoms.

50 p.c. ....	{	burst into the urethra spontaneously,
		" " " " on pas'g of instruments.
		" " " rectum.

Where a good deal of peri-prostatitis, the pus may burrow forward to the base of scrotum, or into the ischio-rectal region.

Treat:—Try and find pus through the perineal incision, which is modified "Cocks;" (one-half an inch between wind and water.) Avoid the urethra, and guide with finger in rectum. Go in half an inch, then pass the director, and, if find the pus, pass the forceps along the director, open and drain. Where pointing into rectum, open there; use a duckbill speculum, puncture with bistoury; drain and inject with curved syringe, pack Iodoform. Keep bowel clean with injections. Starve the patient.

If it bursts into urethra, keep aseptic with Thiersch or Boracic.

Chronic inflammation:—Prostate.—Enlargement remains, flakes and shreds in the urine, some pain, frequent micturition; gets up at night.

Examination :—May find one lobe resolved; may have with this a chronic abscess formation : suspect, tubercle in phthisical subjects. Build up, Claret, Cod Liver oil, sea voyage, sea bathing; perineal douche, rectal injections of cold water. Blistering of the perineum: blister 8 hours; poultice 24 hours; then biniodide of Hg. Ung., half strength to keep open. Suppositories of Belladonna and Pb. Iodide into rectum at night, and perhaps ichthyol. Silver nitrate into urethra, grs. II. to the oz.

Atrophy of prostate :—Atrophy rare; gives no symptoms.

Hypertrophy of the prostate:—Advanced life, rare under 55. may begin before this. Only recognized when symptoms appear.

Causes:—Syphilis, gout, stricture, sexual excesses, by determining blood to the part act as a predisposing cause, but the etiology is very obscure, and proof that anything outside of old age can cause it is wanting.

It is due to hypertrophy of normal structures. All structures are more or less affected. (Early stages, glandular tissue chiefly involved, later the fibrous tissue growth is out of proportion to the glandular and muscular.

Distinct fibrous growths may occur in gland, size of a pea to a walnut; imbedded in gland with a distinct capsule, resembling uterine fibroids; may be pedunculated. Enlargement and tumor may both obtain at the same time.

Enlargement is usually general; sometimes asymmetrical, or middle lobe most decidedly increased, assuming pyriform shape, sometimes pedunculated.

With asymmetrical enlargement, urethra becomes tortuous.

When both enlarged, the urethra is elongated and compressed, slit like opening for urethra.

Symptoms:—All due to urinary obstruction. Sometimes symptoms are present without the knowledge of the patient. First notices loss of force of stream. Stream falling directly from the penis; later he has to strain considerably; may seek treatment for piles, due to straining. Prolapsus ani may occur. Inguinal hernia also common. Straining. Frequency (nocturnal). Act not followed by relief; constant feeling of



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weight and fullness in the perineum. Actual pain is rare. Urine altered. Does not look healthy. First turbid; then alkaline, finally ammoniacal. Always residual urine; bladder less and less able to empty. Dribbling; due to atony of the bladder; later some pain with sub-acute cystitis. Bladder becomes hypertrophied, dilated and sacculated. Sometimes get dilatation without hypertrophy; calculi and incrustations form; dilatation of ureters and renal pelvis.

Diagnosis:—Exclude especially:—1. Stricture, 2. Calculus, 3. Vesical tumor, 4. Paralysis and atony of the bladder, 5. Sub-acute and chronic cystitis.

See patient pass water; watch the character of the stream; give patient every chance to empty the bladder; pass soft catheter; get residual urine:—2-4-10-20-40 oz. The next step is to examine the prostate per rectum. Finger is obstructed by a broad hard mass. Knee and chest position.

Diag. from stricture by age, passage of catheter to prostate, character of the stream; history.

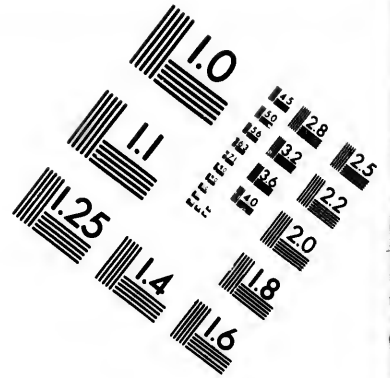
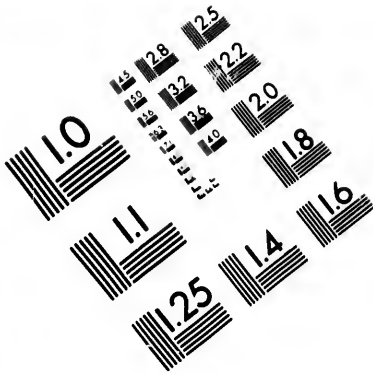
Diagnose from calculus. In stone frequent micturition is greater by day, pain distinct at the end of penis. This only occurs in the end of penis, where ulceration or injury to the neck of the bladder with instrument, and even here, usually a little further back; at corona passage of sound clears up the diagnosis.

Vesical tumor:—Here there would be blood in the urine, absence of prostatic enlargement, more common in the young, pedunculated, middle lobe may simulate tumor.

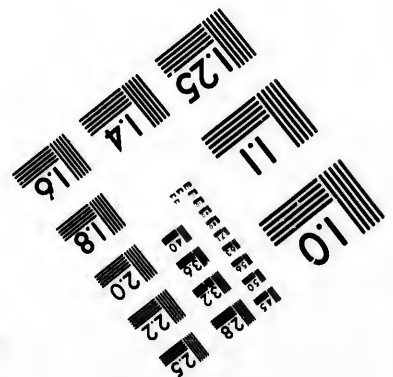
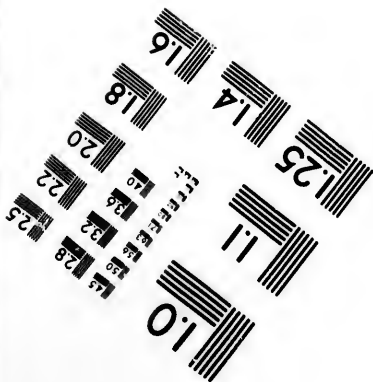
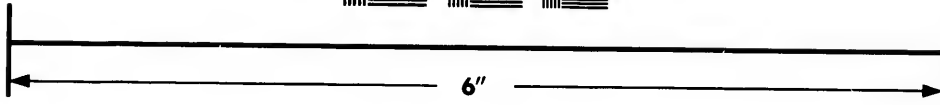
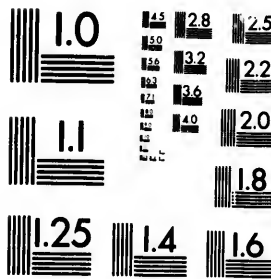
*Treatment:*—Little can be done; bowels kept free and open; woolen clothing.

Improve the urine with Hyoseyamus; where acute exacerbations Ergot combined with Alkalies or Boric acid; alcohol in moderation. Avoid beer and champagne. Regular use of catheter. Instruct patient in the use of a soft rubber catheter; may use the catheter two or three times a week, drawing off the residual urine, say 2-3 oz., or every day even drawing off 4-6 oz. In some cases the catheter is used every time the water is passed. This the "catheter life" of Benj. Brodie. Inject the bladder two or three times a week with boracic, or a





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drachm to the pint of Tr. of Iodine. Where soft rubber will not pass Coude and Becoude, the next best are the gum elastic, with stilette, finally the prostatic silver catheter may pass where everything else fails. No. 12.

Operative measures :—Where in severe cystitis catheter causes ulceration of the neck; great pain, where the bladder has been punctured, where prostatic calculus, where from a number of circumstances life becomes intolerable, then operate. In emergencies, aspiration may be performed. Best method, perineal section; incision 1 inch in front of anus, three-quarters of an inch long, and make way towards the membranous urethra, using where possible a grooved staff. Make an incision in the membranous urethra large enough to admit finger, then dilate prostatic urethra with finger if possible, if too hard use Hilton's method, and pass in forceps, and dilate them. Go into bladder, remove stone, if any present, and pass in a large tube for drainage, examine if part of prostate within reach cannot be enucleated through this opening.

Introduce a large round tube, leading to bed pan, or carry through mattresses, stitch tube to the edge of wound.

This gives great relief; retained 10 days, may be changed after the 5th day; may be left in three weeks; the presence of tube displaces, and causes absorption of the prostate; three weeks more rest in healing external wound; catheter can readily be passed.

Harrison's method—tunnel with trochar and canula, thrust through the prostatic tissues, then the rubber tube is passed through the canula; method causes shrinkage; not to be recommended; may miss the prostate, and transfix the bladder, etc.

Supra-Pubic Puncture:—As before, where no assistance.

Supra-Pubic Incision:—Incision, introduce drainage tube, without attempting to remove any part of the prostate.

Supra-Pubic Incision with Prostatectomy:—Bladder opened, projecting portion enucleated, only slightly adherent, incise muc. memb., reflect with finger, and enucleate.

Pedunculated masses with small neck, remove with scis-

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sors, first throwing a noose around the pedicle to prevent hemorrhage. Hemorrhage is sometimes alarming, needs very hot water 120-130. The mortality is very high, and found that patients are not benefited very much. Chronic form of retention due to atony of the bladder. Perineal section is most simple; drainage dependent, can sometimes remove part of the mass. Can always do a supra-pubic operation later, and here get better results; a week to 10 days should be allowed between operations.

Castration for Prostatic Hypertrophy:—Ramus, of Christiana, proposed the operation in '93, as removal of the ovaries produced atrophic changes in fibroids. Where castration in the young, prostate does not develop. White, of Philadelphia, & Millen & Fenwick, in Europe, followed; removal of one testis; is no good.

In a percentage of the cases reported, voluntary micturition has been obtained.

Marked shrinkage in many cases undoubted. Some cases where no fibroids in the prostatic mass, castration probably does little good.

Atony of the bladder is not improved by operation, many mistakes have been made; calculus, tumor, etc., so conservative surgeons recommend perineal section first.

Ligature of the vas deferens:—As an alternative recommended by Harrison. Two ligatures over the cord after incision made, and then incise between. In some cases it is an improvement. Testicles are retained, and this overcomes strong objection.

Malignant disease of prostate:—(1) Carcinoma, and (2) Sarcoma. Sarcoma is seen in children, but is rare. Carcinoma in men over 50; diagnosis between the two is clinically impossible.

Cancer may be:—1. Primary. 2. By extension. 3. By metastasis.

Symptoms:—Haematuria, pain, obstinate cystitis; bleeding extensive, pain in the perineum, in the rectum, and down the thighs.

Diagnosis:—Per rectum, a hard, rapidly growing mass; not

like hypertrophy, irregular and nodular, later the glands become enlarged. Cachexia, pallor and emaciation. Usually fatal in one year. Sarcoma in children fatal in a few months.

Treat:—Palliative, morphine freely, soft catheter; when too painful, do a supra-pubic cystotomy. For hemorrhage, injections of tannic acid.

Tuberculosis of the prostate:—1. Primary. 2. Secondary; between 15 and 35 years, subjects may be at times otherwise robust and healthy.

Symptoms:—History of acute prostatitis, frequency and pain in micturition; pus in the urine, and sometimes blood. Slight elevation of temperature; generally secondary to tuberculosis of the testicle, etc.

Treat:—Improve the hygiene, change of air. Guaiacol, with glycerine and almond oil. Remove tuberculous testicle. Attempts at radical cure are futile. Germs in the pus found in urine.

#### DISEASES OF THE BLADDER.

Absence of the bladder has been seen; ureter or rather ureters, generally opened directly into the urethra, vagina or rectum, or end in little sacs which contained considerable fluid.

Multiple bladders known; some cases only sacculations. Hernia, or cystocele, as inguinal hernia, where the tumor is gradually returned without gurgling, and without other signs of intestinal hernia, especially where after return there is a desire to urinate immediately, then suspect a cystocele.

Inversion of bladder, very rare—really occur only in women with short and relaxed urethra. In male some cases of inversion as far as the membranous portion.

In women the treatment consists in returning the mass; introducing the catheter, recumbent position, hips raised, cauterizing urethra. A long course of treatment is required.

Exstrophy or Ectropion Vesicae:—Failure of development in anterior wall of bladder and abdominal wall in front; bladder projecting from the abdominal walls; the posterior wall

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of bladder is continuous with the ant'r. abdominal wall. Most frequent congenital malformation, in the proportion of boys 9 to girls 1. Symphysis is absent; complete epispadias; prostate ill developed; vesiculae seminales absent. Testicles absent, sometimes present; often retained in inguinal canal; sacrum projects forward.

Female:—Vagina converted into a slit. Clitoris labiae separated, vagina is patent, and uterus present, although undeveloped.

Tumor itself is irregular in shape, irregular, triangular, oval or circular, absence of umbilicus; leading up from mass a depression indicating the linea alba. Mass florid, injected, secretion below; projects forward from the pressure of the intestines behind, like half an orange skin. Sometimes like hernia, the surface bleeds readily, tender; orifices of the ureters seen as small round projections, and urine trickles, patients wet; troubled with excoriations, collections of phosphates; erythema in the neighborhood; liable to erysipelas; conception may occur.

*Treatment*:—Appliances no good.

Wood's operation:—Go deep enough and do not excoriate the lateral flaps to cover the raw surface of middle flap.

This modified by Ager. Modification in the male; turn scrotum up Morley's operation; defective; hairs cause collection of phosphates.

Thiersch:—He suggests lateral flaps, planting end in a gutter on the opposite side. In a few weeks take another flap over on opposite side from above. Edges of flaps joined by scoring.

Trendelenberg:—Only under five years; brings side walls together.

Wounds:—Bladder; inflicted within or without. Within, surgical, foreign bodies:—(1) Penetrating. (2) Non-penetrating, as when separating the bladder from other structures, also internally, such as are made with sounds or lithotrite.

1. Penetrating:—(a) Ex-peritoneal; sometimes a complication of a fracture; stabs, and gunshot wounds with distended bladder; falls from a height. (b) Intracapsular; commoner,

the greater part covered with peritoneum, and besides this thinnest part. (c) Subperitoneal; vesical wall alone ruptured; very rare.

Symptoms:—History of injury, sometimes the bladder is distended; after accident cannot pass urine, or if it comes it is blood stained, trickles; collapse early. Sharp pain in the region of the bladder. Catheter shows bladder contracted and empty; sometimes an amount of urine comes, intermittent stream, with rise and fall of the abdominal parietes. If abdominal wound diagnose easily.

If extraperitoneal, signs of extravasation early appear; may extend up to thorax; into thighs, etc.

If intraperitoneal; no signs of extravasation, the urine gravitates to the pelvis, and the small intestine floated up; intermittent stream due to catheter passing up into abdominal cavity through the rent in the bladder; sometimes the rent is closed by a knuckle. Urine may be drawn from the bladder. Strangulation may occur.

Treatment and Diagnosis:—Inject a measured quantity of boracic or weak Thiersch; if not ruptured, the bladder fills up and rises, withdraw, and should get all back if no rent. Filtered air and Hydrogen have been introduced, get a tympanitic note.

Ex-Peritoneal cases:—Introduce drainage into bladder.

Where wound either Ex or Intraperitoneal, cut down; repair the rent; Lembert sutures. If rent cannot be found, open the bladder, and search from within. Where rupture intraperitoneal always perform laparotomy; early as possible; mop and flush out.

### CYSTITIS.

(1) Acute. (2) Chronic.

Causes:—Acute:—Almost invariably bacterial infection. Ordinary pyogenic micro-organism the most frequent, the Colon Bacillus; also specific forms; tubercle and gonococci. Pyogenic bacteria are incapable of infecting the normal bladder, but if nutrition impaired, or injury, large prostate, stone, stricture, etc., find pyogenic organisms which induce inflammation.

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In ischio-rectal abscess may get Bacteria penetrating the bladder wall, or may reach the bladder through the circulation (Idiopathic). Typhoid germ sometimes causes infection. Paralysis promptly followed by cystitis.

Also where distension with little ruptures, etc., giving entrance to germs, here cystitis is common. Cystitis common in women, by extension of micro-organisms from vagina, in decomposition of menstrual discharges. Bursting of pelvic abscess into the bladder, as in pyosalpinx.

Symptoms:—Frequency of micturition. Painful micturition. Pus in the urine. No urine will be retained by the bladder. Urine of high color, and containing pus at first, later blood, or mucus, and loaded with lithates. Temp. sometimes rigor; rapid pulse. It may be localized at the neck "prostatico-cystitis." "Urethro-cystitis" usually confined to the mucous mem.

Terminations:—1. Resolution. 2. Chronic Cystitis. 3. Ulceration. 4. Abscess formation.

*Treatment*:—Remove the cause; recognize the variety of Bacterial infection; dilute urine by the administration of bland liquids; barley, rice and gum water; liq. Pot., or Pot. Bicarb., and Hyoseyamus; put to bed; hot poultices over the bladder, and perineum 3-4 Hot Sitz baths; morphine; no instrumentation until urine becomes foul, then use a rubber catheter, and Boracic, Salol. or Salicylic acid. Diet milk and soda water.

Early stages, where suspect that it is going to be bad; may shorten by an injection of silver nit., a quarter of a grain to the oz.; increase daily if aggravation continues.

In very severe cases may be justified in doing a perineal section one inch in front of anus into memb. part.

*Chronic Cystitis*:—Resulting from acute cystitis, more frequent a foreign body, stone, tubercle.

Symptoms:—Insidious and slow. The three cardinal symptoms of the acute variety:—1. Frequency. 2. Pain. 3. Pus.

The frequency of micturition is not so marked; more urine is tolerated by the bladder; pain is less. Pus differs; not so mixed up in the urine; most abundant at the beginning and the end of micturition. Largely mixed with mucus; tenacious,

glairy and stringy. "Catarrh" of the bladder is the old name. Muco-purulent discharge may interfere with micturition. Urine alkaline, ammoniacal, offensive.

Shreds of mucous memb. due to desquamative processes; large portions of the mucous membranes may come away; croupous cystitis.

Pathological changes. Mucous mem. ecchymosed, mottled, slate coloured, covered with muco-pus. At the trigone and the opening of the ureters find the greatest changes; multiple abscesses in the bladder walls. Gangrene in some cases, hypertrophy, and sacculation.

Diagnosis:—(1) Pyelo-nephritis. (2) Tuberculosis. To find if pus from pelvis or ureter, wash the bladder, leave catheter in situ, then if pus in 1st urine it comes from kidney.

Treatment:—Prophylaxis, remove any cause, catheter daily from the first; use a No. 8. Solution hotter than the body.

Use Thiersch's solution or Boracic acid, or Thompson's bladder solution:—Glyc. Ozij.; water ozij.; sod. bihor. dri to ox. IV of warm water, add a tablespoon of the above. Silver nit. gri. to the oz., or nitric acid minims. one to the oz.) Sublimate 1-10000 or 15000. Quinine 1 or 2 grs. to the oz., with minims. 1-2 of acetic to dissolve. Iodoform grs. 2 to 3 in gum water oz. i. Zn. Sulp. Pot. Permang., copper sulph. Never inject more than 3-4 oz. at a time. Continue until we get a clear fluid.

If injections not well borne, then try suppositories of iodoform and gelatine.

Internal treatment:—Diet; alcohol prohibited; drugs as specifics. Drugs:—Buchu, Uva ursi, trit repens, as infusions, pint in 24 hours, besides potash mixture. Liq. not so good as other potash salts. Where gonococcus infection give copaiba. Hyoscyanus and morphine for tenesmus. Tuberculosis comes next of diseases of bladder.

Tuberculosis; Tubercular Cystitis:—Proportion: Men 3; women 1. Primary form is rare. Usually secondary from extension from the pulmonary regions, or effusion from the kidney. Tubercle extends most commonly from the prostate, seminal vesicles, testicle, kidney.

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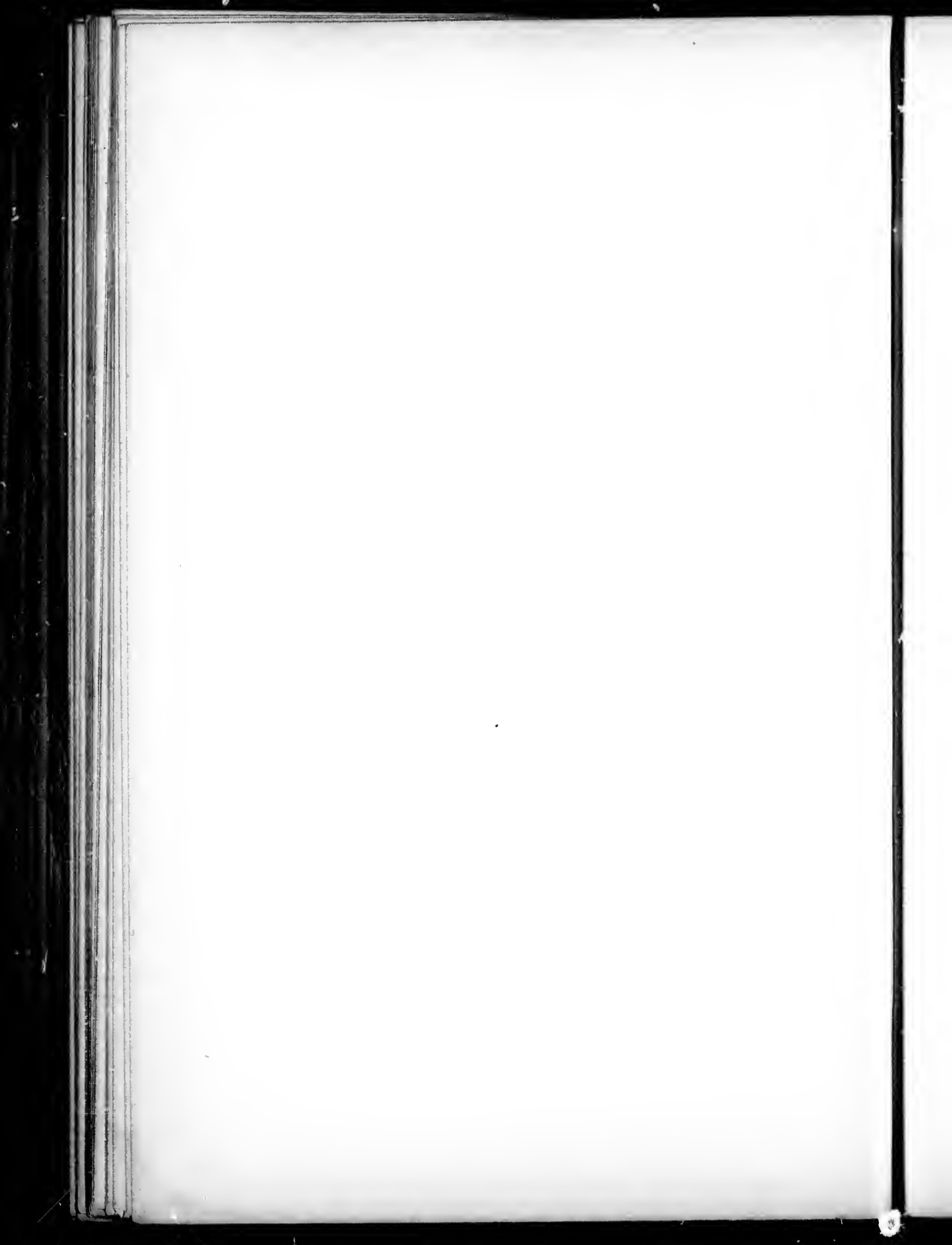
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The exciting cause is invasion by the tub. bac., but usually find evidences of predisposing causes, damaged walls gonococcus predisposing.

Seat is trigon, and openings of the ureters, first red then puffy, swollen, fungus looking. Then get an ulceration tending usually to spread superficially, or rarely to perforate, resulting in fistulae.

Symptoms:—Frequent micturition, most common after meals and at night. The urine is tinged with blood and later pus. Pain does not come on early, but late, and is then intermittent, finally with ulceration intense and continuous. Later in the disease get infection of the blood by pyogenic germs. Constitutional symptoms are not marked at first, but later are distinct from loss of sleep and pain.

Prognosis:—More rapid when secondary. Death from Tub. Peritonitis, spreading to the kidney, miliary tuberculosis, etc.

*Treatment:*—That for Tuberculosis. Irrigation is harmful. Instillations of Sublimate 1-500; 10 mins. to 40 mins. injected every 2-3 days. (Guyon's method), also Iodoform 2, Glycerine 2, Mucilage 4. Water 20 parts, inject two drachms once or twice a day. If late give opium. Perineal, or Suprapubic operations.

Perineal is not recommended as likely to ulcerate; cannot examine the bladder well. Cannot examine locally or scrape, or apply Iodoform directly, as in Suprapubic operations, which is the operation to be recommended. In the female, no operation, dilatation of the urethra.

#### FOREIGN BODIES.

Foreign bodies:—Pieces of instruments, spent bullet, piece of bone from a fractured bone in the neighborhood, buttons, clothes, ulceration of outside bodies into the bladder; other bodies forming a nucleus for a stone.

Symptoms:—Pain; frequent micturition; blood stained micturition. Pain is greater when body is first introduced, as incrustations of the angles and sharp corners reduces the irritability.

Treat :—Elec. cystoscope; lithotrite; body must be caught end on, unless filiform guide, or gum elastic catheter; distend the urethra rather than operate.

Operation:—Perineal section. If body recently introduced, and no cystitis, close.

### TUMORS OF BLADDER.

(1) Benign. Papilloma, Myxoma, Fibroma, Myoma; Dermoid, Hydatids, Angioma, rare. (2) Malignant. Sarcoma, Carcinoma.

Hydatids involve the bladder secondarily. Papillomata most common; frequently occur; sessile or pedunculated; may have pedicle; cauliflower growth. The pedunculated are the most common.

Sarcoma:—Round and spindle celled. Few cases of lympho-sarcoma and sessile papilloma. Difficulty in making diagnosis, especially if lasted some time, and ulcerated. Sarcoma grows more rapidly.

Carcinoma:—Epithelioma, Glandular; hard and soft; primary are rare.

Symptoms:—All varieties; all ages; myxomata. Sarcomata most frequent in children. Papilloma most frequent during adult life. Carcinoma 40 to 60. Haematuria is most common and constant; bleeding without any apparent cause; occurs spontaneously; increased with catheterization, occurs at end of micturition; not always present; sometimes the difficulty in making water is due to clot. Bleeding may take place at the end of micturition, and cause large clot, due to bladder contracting down on tumor.

Bleeding is due:—1. Squeezing by bladder. 2. Ulceration; hence in malignant tumor bleeding is more constant. Fragments of tumor may be passed. Pain not constant. Villous tuft may get caught in urethro-vesical orifice. Frequent micturition is not always an early symptom.

Procs:—Fragments in the urine. Cystoscope. These with presence of tumor. Bi-manual examination of rectum and abdomen is a valuable method. Tumors of the bladder grow at all points; most frequently the neck. By rectal examination may conclude whether they are sessile or pedunculated.

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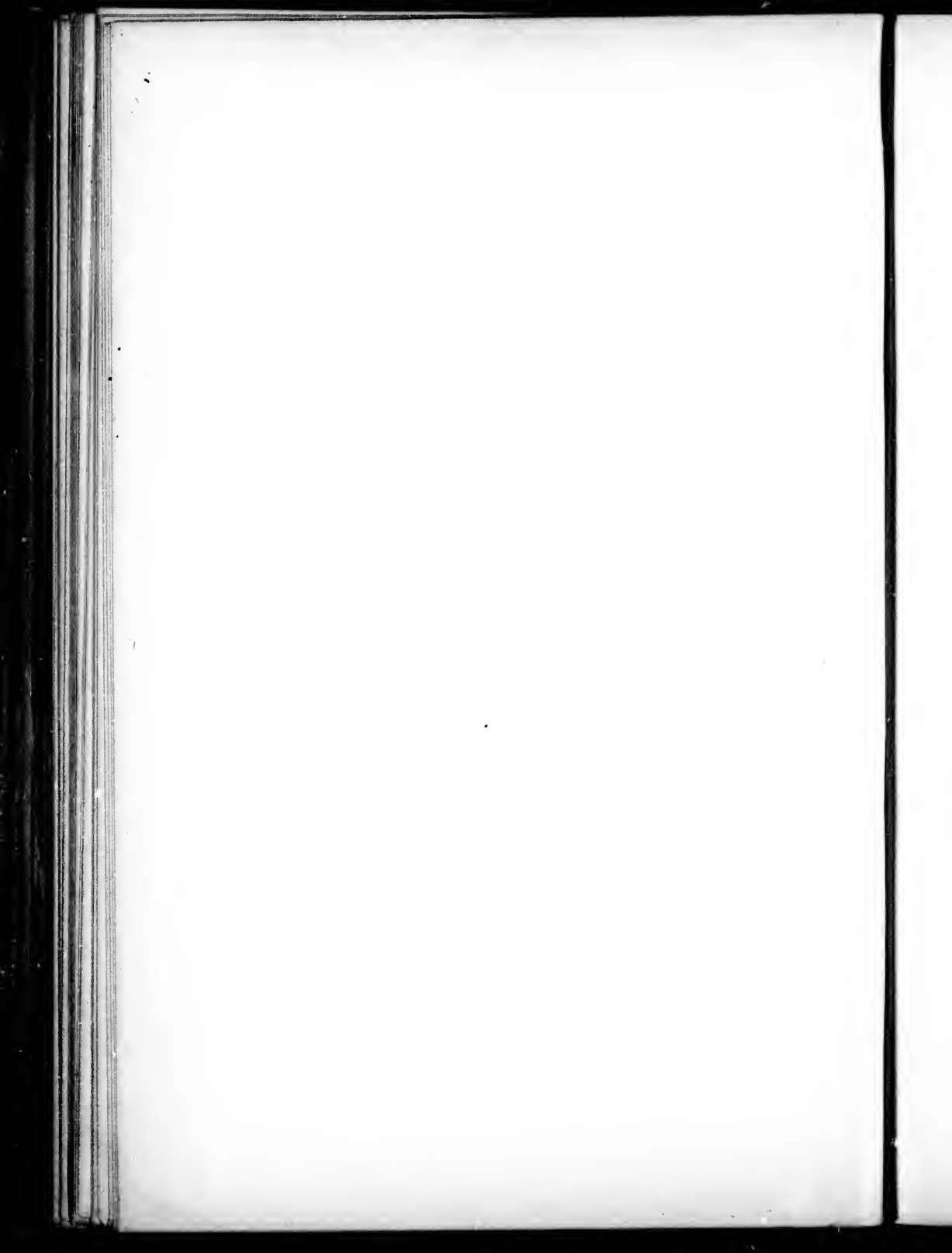
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Prognosis:—Is always serious. Benign return sometimes. Hemorrhage may be serious; die from a suppurative cystitis extending up. Malignant tumors extend. Transformation from benign to malignant.

Treat :—Palliative; Turpentine 3-4, increasing to mins. ten (10) on sugar t. i. d. Hemorrhage. Injections of hot water. Ice. Tannic 20 grains to the ounce. Rectal suppositories of opium.

Curative treatment:—Not attempted, if bladder walls infiltrated. As a rule, where the base is normal can remove with a fair prospect of recovery:—1. Through the urethra. 2. Perineal lith. 3. Sub-pubic cystotomy.

1. Through the urethra:—Only in the female; dilate thoroughly. In young persons where the bladder can be readily felt and explored by the finger perineal operation is very good, but should never be attempted where enlarged prostate; such a condition would not give a chance to explore.

Suprapubic is the accepted operation; growth torn or twisted off, where pedunculated; large peduncle; wire.

## STONE.

Sediment, Gravel, Calculus, or stone.

Calculus originates in the bladder, or was primarily formed in the kidney; passed into the bladder when small. Has stone formed in the bladder or in the kidney?

Two classes:—1. Those formed out of the constituents of the urine, owing to diathesis, or constitutional conditions. Uric acid and salts, oxalate of lime, cystine.

2. Local Origin; from precipitation of phosphates, formed in the bladder, ammonium magnesium phosphate.

3. Mixed; starting in one kind, and covered with phosphates.

4. Foreign bodies covered with phosphates.

Various substances may form a nucleus.

In a few cases no nucleus, e. g.:—Generally phosphatic. May have vesicle or oil globule.

Cause:—Remote. Water is a slight cause. More important is eating Albuminous food in excess, creating a gouty

diathesis; insufficient exercise. Hereditary predisposition. Poor living; bad hygiene. Malt liquor.

Local Predisposing Cause:—Phosphatic stones in stagnation of urine in bladder in cystitis.

Found in any period of life, most frequently in youth; males rather than females, owing to the length and narrowness of the urethra; children of the poor; rare in laboring men; men of the higher classes. The number of calculi in the bladder varies a good deal.

#### URINARY CALCULI.

Uric acid, reddish, layers, slightly rough, fairly firm; pretty heavy.

Oxalate of Lime:—Darker; sometimes black; nodulated mulberry; sharp processes.

Phosphatic; white; slightly rough, or perfectly smooth.

Stones:—Single or multiple. In children usually only one. Phosphatic are inclined to be multiple. Uric are very small; when multiple, tendency for them to become faceted. Facetting is not always present in multiple stone, where there is residual urine, or atony of the bladder, liable to be absent. It is rather found where the tone is good, and the stones are ground together until the bladder is distended. A number of stones may be ground together and become united; irregularities in shape may be due to partial sacculation.

Cystine and Xanthine:—Cystine is very rare; contains 26 per cent. of sulphur; composed of hexagonal plates; peculiar yellow colour becoming green, waxy, may be hereditary.

Xanthine is very rare; grey, or brownish; greasy.

Carbonate of calcium is very rare; hour-glass form; fusion of two; sometimes growing out of a saccule. Sometimes one appears, sometimes two; may get uric acid nucleus in saccule, and phosphatic portion outside.

Symptoms:—(1) Pain. (2) Freq. micturition. (3) Hemr'g. (4) Sudden stopping, stoppage of the stream; this may be worse with a small calculi, as constantly rolling around, more marked when empty. Oxalate of lime the most irritating.

Pain is sharp, or dull, increased by jolting; shaking; dis-

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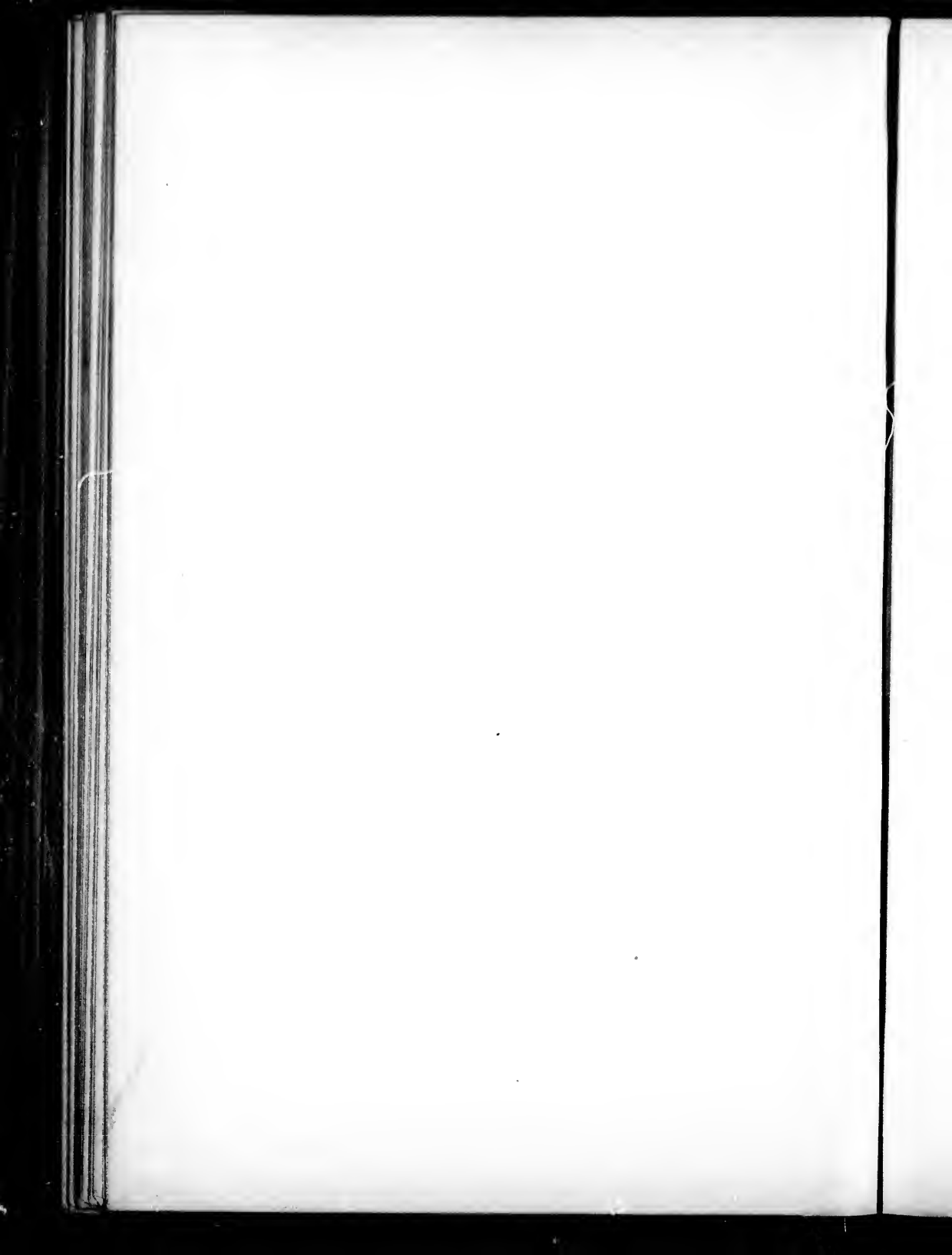
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appears in the recumbent position; worse after micturition, referred to the region of the bladder, or forward to the end of the penis, and under surface of the penis; more severe in children, viscus more tender. In the old, enlarged prostate protects the neck of the bladder. As time goes on pain may diminish, owing to rounding up with phosphates, and irritation may cause fibrinous exudate, with imprisonment of the stone. It may become sacculated.

Sometimes sole of the foot is visited by pain, pain in the loins, etc. In children the pain is relieved by pulling on the prepuce. The frequency of micturition is due to cystitis and mechanical irritation; it is more marked by day. Urine passes in small quantities, and frequency increased very much by moving.

Hemorrhage is often an early sign, common in children, and should lead to a suspicion of stone. Hem'g. may be large after exertion or micturition; it may also disappear suddenly, owing to the rounding off of the stone, or its being covered with mucus, after which toleration occurs.

Stoppage of the stream; mechanical; more in children; lie on back or side to keep stone from urethral orifice.

Other signs:—Tenesmus of the bladder; priapism, especially in children; prolapse of the rectum. In old men the symptoms are masked, and may suddenly disappear owing to stone getting into a sacculus. Besides the conditions already given, suspect a child when it is in an irritable condition, screams after micturition; wets clothes and bed; pulling at penis.

Examination:—Boys possible to examine per rectum, women per vagina; this can't be done in adults except the stone is very large; in these cases usually use sounds and cystoscope.

Sound, short, deep instrument. Thompson's short beak turn up or down; with hollow, can inject at the same time; the click is not so distinct, therefore the solid are safer. Best sounds are with round handle so that can turn easily.

Prepare the patient carefully; empty the bladder; put in 4-6 oz. of Antiseptic fluid, pass sound. Examine the distal portion, then the near, above the pubes, and below; draw off some of the fluid, change the position of the patient.

Errors are likely to occur, owing to a thick mucous coating on stone; pouching; behind middle lobe of prostate; if behind or covered by a fold of mucous membrane which is inflamed; or above the pubes; may imagine have stone when none, may feel in children the promontory of the sacrum, or may find an incrustation of phosphates on the wall of the bladder.

In doubtful cases examine a second time; give an anaesthetic; forcibly distend the bladder; throw in with force to distend the bladder; with sound judge the quality, and by drawing across the surface gauge the size. If want to be accurate pass the lithotrite, throw out and try and catch in the smallest diameter, and then in largest.

Removal, Operating:—Prophylaxis is efficient in those where uric acid, or a gouty history; diet; exercise; general mode of life; drink large quantities of water; Pollinaris useful in uric acid diathesis. Richelieu and Radnor, the idea being to dilute the urine.

Abundance of vegetables, fruit and fish; no alcohol, sugar and fats. Saline purgatives; Freidrichshal, Hunyadi, Apenta, Medicinally:—Lithia, Carbonate and Phosphate of Sodium, Boro-citrate of Magnesium, Piperazine; Salicylates of Lithia in rheumatic diathesis. Oxalates of Lime. Mineral acids.

When stone is formed and soft, something in the way of a solvent may be used, but generally not satisfactory. 2 per cent. Piperazine has been used, but not thought satisfactory.

Operations :—Two. 1. Lithotomy, Perineal. a. Median. b. Lateral. 2. Lithotriety Suprapubic; Litholapaxy (Bigelow's operation).

*Median Perineal* in cases where stricture, as can at the same time divide the stricture and remove the stone. Also in cases of small stone, and where have prostatic calculus, and where from condition of the patient you want very little hemorrhage.

*Lateral Perineal*:—Cases of moderate size hard stone, which could not be crushed; as small oxalate of lime stone, or have atony of the bladder present in a marked degree, where suprapubic drainage not good, and litholapaxy not desirable.

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This is the best and safest in children up to 12.

*Suprapubic*:—Where stone unusually large and hard; in cases of encysted stone; sacculated bladder; in cases of enlarged prostate, where other operations are out of the question; this the safest operation in kidney disease.

*Lithotrity*:—Soft or moderately hard stones; urethra healthy; bladder in good condition, and will retain 6-8 oz. of solution. Kidneys o. k.; general health fair.

Crush the stone, expel or extract the fragments through the urethra; first performed by Civiale in 1818, Amussat & Leroy, also Brodie did it.

Bigelow in '78 improved the instrument serrated blade, suggested the evacuator; large catheter.

Prepare the patient, see that kidneys are working all right, see to the bladder. Inject 1-20 of solution. Thiersch or Boracic to improve the bladder walls, give Boracic ac. or Salol.; put bed; milk diet. Prepare the field; withdraw the urine; inject 4-6-8 oz. of Boric solution. Rectum empty; anaesthetic; instrument warmed and lubricated; allowed to go in by its own weight; grope for the stone; grasp and draw forward; bringing it towards the pubis; turn in all directions to see that no mucous membrane entangled. Having crushed the stone in several places, take out the heavy instrument, and introduce lighter one (Thompson's). Then employ Bigelow's evacuator. Repeat until nothing further comes; if little blood following may introduce lithotrity again. Finish at one sitting.

Afterwards put to bed; milk diet; quinine 10 grs., followed by Boracic acid; keep 10 days. If cystitis introduce boracic.

Contra-indication of this Operation :—Fibrous stricture in the deep urethra; great enlargement of the prostate; severe chronic cystitis. Stone of great size and hardness, or where there is a suspicion that the nucleus is a foreign body and cannot be crushed.

There is great danger in this operation of injury to the bladder walls, and for this reason some prefer Harrison's modified operation; which is to make a median incision, as in the "Median Operation," and crush the stone through the wound; we can afterwards examine the bladder with the

finger; also does it in the pouch of the bladder should stone be in a pouch. This operation gives complete rest to the bladder, and perfect drainage.

Lateral Lithotomy:—In B. C. 400 Hippocrates advised his followers not to perform it. Early operations done without a staff. In earliest days performed by itinerant operators called "cutting on the gripe." Some pushed into the perineum. Towards the end of the 17th century, Frere Jacques did 500 cases successfully before knowing the anatomy. Operation was subsequently relinquished. Chelseden perfected it; he had 213 cases all ages, and only 10 deaths. Later a blunt knife was used.

#### KIDNEY DISEASES.

K. normally cannot be palpated.

Anomalies:—of size, shape, position and attachment. Floating; congenital with mesonephron; these exceedingly rare; operations are intraperitoneal. Movable; retro-peritoneal; due to stretching of normal attachments, never congenital.

Causes of this latter:—Pregnancy; injuries to lumbar region; lax abdominal wall; disease causing absorption of perirenal fat (women more than men; Rt. side the most common).

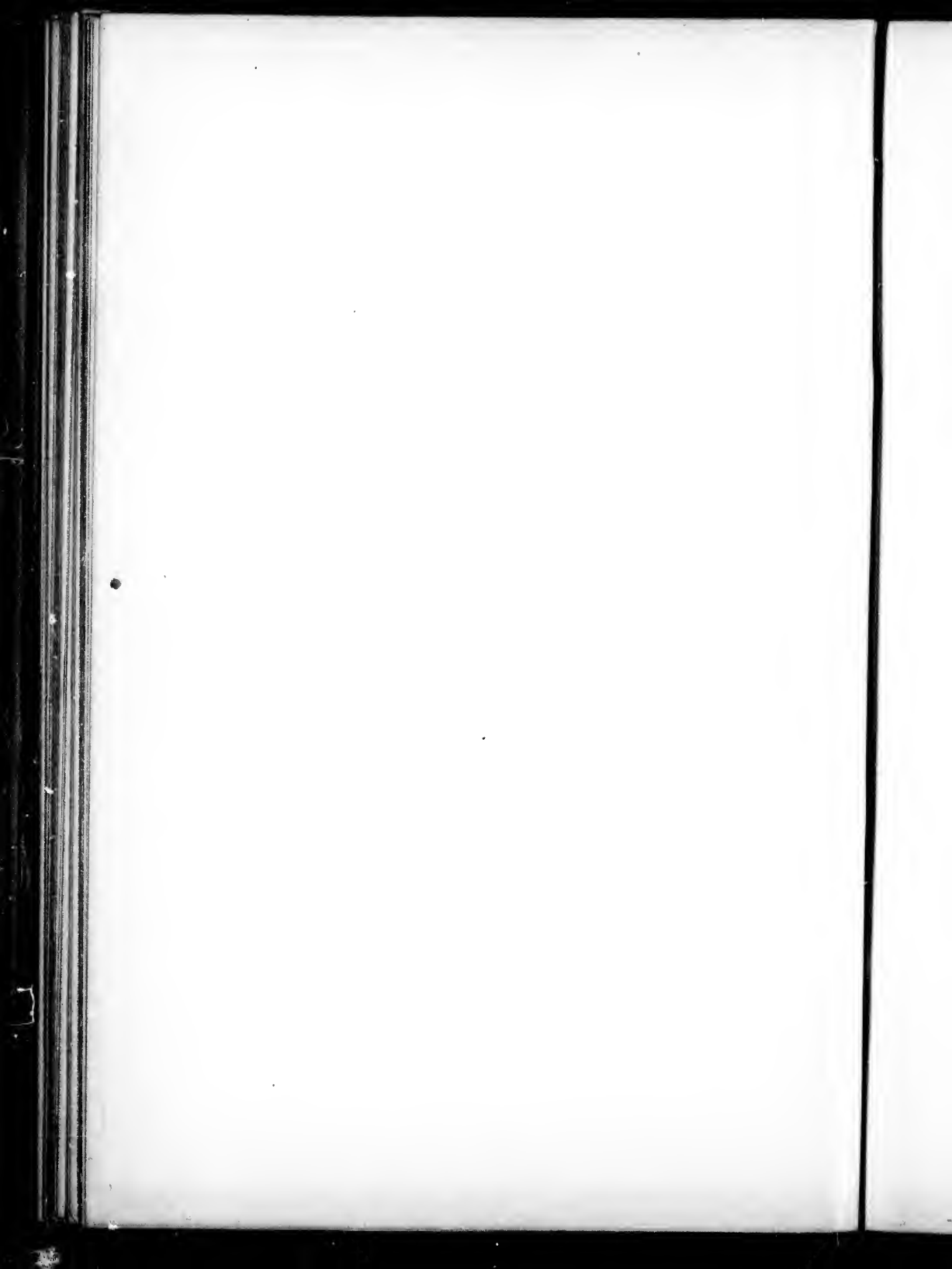
Sometimes no pain.—Sometimes pain in the lumbar region. Colic or paroxysmal due to twist in ureters or deranged blood supply, causing painful contraction of the muscles, sometimes vomiting, may simulate renal colic; called acute renal dislocation. Urine may become scanty, high coloured. After attack it is of low s. g., large quantity of urine passed.

Penetrating wounds of kidney:—Symptoms:—Blood in the urine; urine in the wound, other symptoms about the same as in subparietal injuries; gunshot wounds are more serious, owing to infiltration of retro-peritoneal tissue by urine.

Treatment of all Injuries:—Good drainage; complete hæmorrhage; perfect rest; care of the kidneys, that is, care of the sound kidney, by looking after the bladder.

Perinephritic Abscesses:—Cause:—Cold, extension from renal injuries, appendicitis, petulent cystitis, cancer of the colon, extension from the gall bladder, general pyæmia, operations on the testicle, urethra, bladder and rectum.





Such conditions are frequently taken for lumbago. Abscess may open in the thigh, loin, buttock, inguinal, or pleural cavity, producing pyothorax. History of pain in side or back, and flexion of the thigh preceding pyothorax, should point to the kidney. From appendicitis it may be differentiated, by the pain being rather more in the loin than inguinal; radiates to the testicle; history of renal calculus; attitude and gait, leaning to one side. Spinal caries, rigid muscles, etc., may have pain in the hip, and knee in nephritic abscess. No wasting of the gluteal muscles.

*Treatment*:—Relieve pain by hot fomentations, cupping, leeches; empty colon to relieve the pressure on the kidney. On exploration and evacuation of pus, always examine for stone. Drainage of incised kidney with tube, and pack the incised K. with gauze.

In trans-peritoneal operations keep outside the colon to avoid injury to blood supply.

Suppurations:—(1) Pyelitis. (2) Suppurative nephritis. (3) Pyelonephritis. (4) Pyonephrosis, due to retention of pus in the pelvis; all may be induced from nephritic stone.

1. Catarrhal Pyelitis; obstruction below; concentrated urine. In exanthemata from Toxines, Turpentine, Cubeb, and Copoiba, blow in the lumbar region.

2. Purulent Pyelitis; organisms present; entrance by propagation along mucous membrane from e.g., urethra to bladder and from here up ureter. Passive congestion of mucous membrane from gonorrhoea, etc., instrumentation, bursting of abscess of contiguous organs, as in sarcoma of the colon; through the blood.

Symptoms:—Pain in the loin, anterior and posterior, increased by pressure, frequent micturition; excess of mucus, acid urine depositing pus rapidly, pain slight or intense. Epithelial cells, sometimes haematuria simulating calculus. Fever, rapid onset, and severe.

*Treatment*:—Remove the exciting cause, stone, stricture, large prostate, antiseptics, diuretics, render urine alkaline, reduce the frequency of micturition. Dry cupping.

3. Pyonephrosis.—(1) Damming of pus in the pelvis. (2) Infection of Hydro-nephrosis. Cause, obstruction in the ureters,

cysts, pressure of tumors. Produces a most rapid destruction of the kidney substance. Liquids may be absorbed, and inspissated pus may be found as a chalky mass p.m. Spontaneous evacuation may take place through the loin. If obstruction is a stone, we may get occasional draining, with disappearance of tumor.

Symptoms:—Pus may or may not be present in the urine. Pain in the lumbar region increased by pressure in front.

Sometimes relieved by pressure behind, development of tumor in the loin; elastic and fluctuating, or hard and doughy. If tumor is not surrounded by inflammatory adhesions, it is movable, it descends with inspiration. In perinephritic inflammations the kidney is fixed. Evidences of deep-seated suppuration:—Toxic effects chill, sweating, remittent fever, loss of appetite, headaches, frequently rapid emaciation and pinched features of chronic septic poisoning.

In Hydro-nephrosis:—Get same cause, same tumor, obstruction is misleading, so that diagnosis must chiefly be made by constitutional symptoms; slow, absence of pyelitis preceding. In Hydronephrosis, don't get oedema and waxy swelling in the loin.

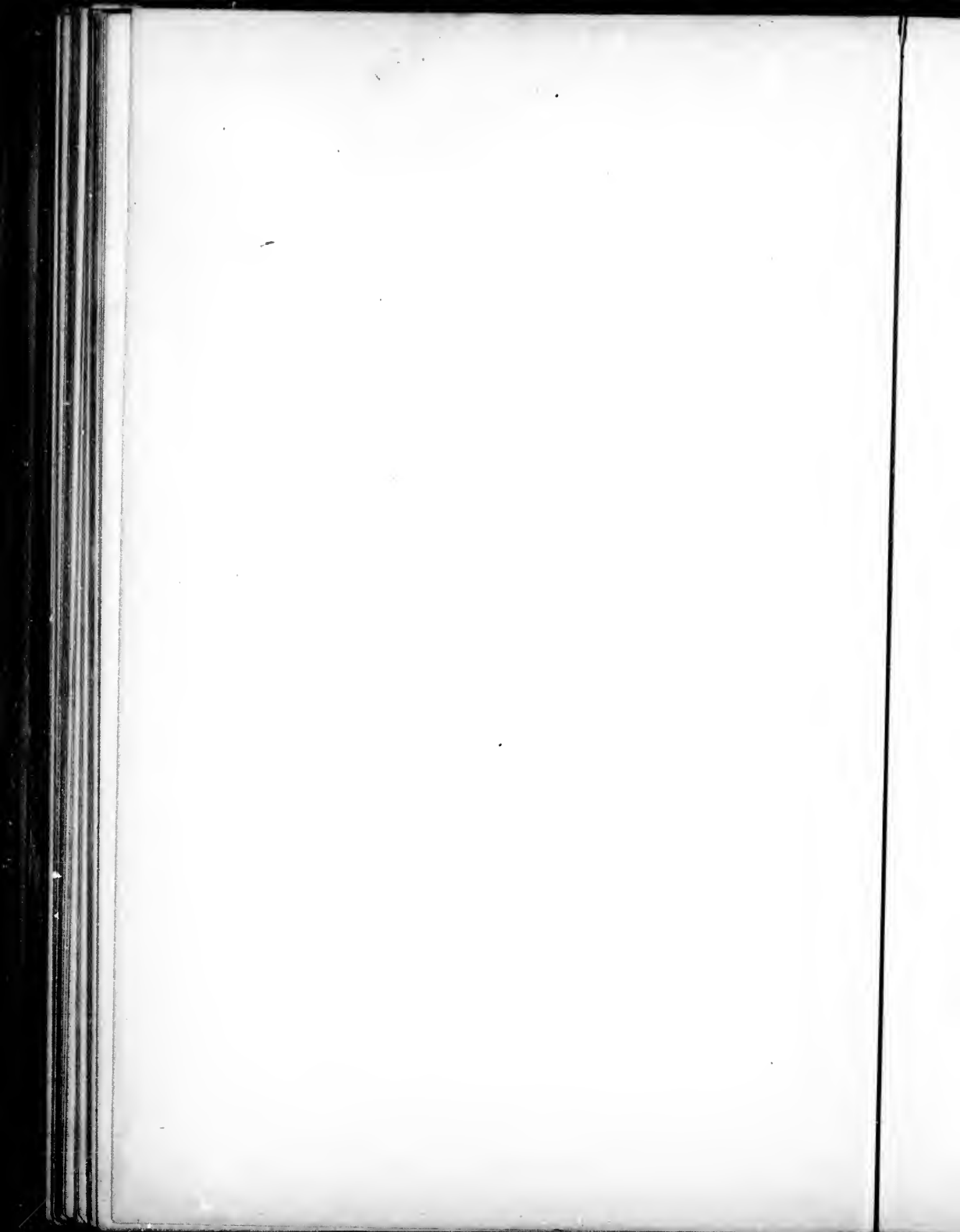
Treatment:—Hydro-pyonephrosis and Perinephritic Abscess the same. Diagnosis from aneurism, enlarged spleen or liver, sarcoma of the kidney, tumor of the suprarenal. The treatment depends upon the cause. Morris recommends massage; hot water; jolting exercise. Bed, light diet, hot fomentations in any serious cases or in intermittent type.

Operation is the proper remedy. Spontaneous evacuation through the walls, perforating the diaphragm, and through the lung may occur. Aspiration not to be recommended. Free incision through the lumbar route, and thorough drainage; exploration for calculi. Drainage tube into pelvis, packing of cellular tissue forming base of wound. Don't do nephrectomy at this stage; wait.

Pyelonephritis:—Surgical kidney. Following a pyelitis, especially if damaged prostate, ureter or bladder, especially if any surgical interference. May begin as a suppurative nephritis, with pelvis involved secondarily; this most common in Tuberculosis.

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Exciting causes:—Those of Pyelitis, or Pyo-nephrosis. Pyelo-nephrosis associated with single or multiple abscess. The whole kidney substance destroyed.

Symptoms:—Pain in the loin. Marked diminution in the quantity of the urine; sometimes sudden suppression, usually acid. If acute, blood appears as well as pus from pyelitis.

If cystitis, the urine is alkaline, and have all the symptoms of suppurative cystitis.

Repeated chills, high fever, sweating, typhoid state; muttering delirium; general prostration; sinks in bed, finally coma, and death 12th to 14th day. The treatment is a supporting one, that of pyemia. Prophylaxis, important in the proper preparation of patient for all urethral and bladder examinations.

Treves says the following diseases follow path. conditions of lower urinary passages:—Pyelitis. Pyelo-nephritis. Hydro-nephrosis. Suppurative kidney, where suppuration primarily in the kidney.

Forms of urinary fever:—Congestive. Inflammatory. Suppurative.

Hydro-nephrosis:—This condition may be congenital or acquired; permanent or transitory (temporary). Remittent or recurring. Unilateral or bilateral. Ureter above the obstruction is dilated, below it is contracted. Where rapid obstruction, may get atrophy. Where slow, we get the greatest degree of Hydro-nephrosis. Where complete obstruction, the fluid may be cystic. Where chronic obstruction, and some of parenchyma left, fluid may resemble closely normal urine. Mild degrees of Hydro-nephrosis may give rise to no symptoms. Where congenital and bilateral, death may occur early from uraemia. Unilateral congenital hydro-nephrosis probably accounts for cases of large hypertrophied single kidneys.

Causes of Congen. Hyd., Nep.:—1. Imperforate ureter, double. 2. Imperforate ureter, unilateral. 3. Angle of junction of ureter with kidney forming a kink. 4. Anomalous folds of mucous membrane. 5. Congenital tumors of the bladder pressing upon the entrance of the ureters. 6. Pressure of tumors. 7. Floating kidney. Complete congenital is

liable to cause a larger hydronep. Kidney than acquired complete obstruction.

Causes of acquired :—(1) Stricture of the urethra. Enlarged prostate, especially the middle lobe. Tumors of organs; movable kidney. Pressure of displaced organs; renal calculi. Tuberculosis of the bladder and ureter. Irritable bladder with frequent micturition. Injuries to the lumbar region; subsequent cicatricial contraction of ureters. Obstruction of ureter by blood clot. Hydatid cysts; papylomatous growths; enlarged lymphatic glands. Age has no influences; both sexes equally liable, as also are both kidneys.

Symptoms:—Unless large, palpation is impossible, or too painful, unless anaesthetic is given. If large bulging of the loin; nodular; tense; dullness in the loin.

Double and complemental anuria, with uraemic symptoms. Where one kidney completely obstructed some time before from stone, then get compensation, finally obstruction of the second by stone. Pain and swelling in the loin. Urine is frequently subnormal in quantity. An intermittent, suddenly appearing tumor, fluctuating reduced quantity of urine, followed by increase, at the same time being albuminous, alkaline, with disappearance of tumor, more frequently due to movable kidney, ureter becomes twisted, then relaxes.

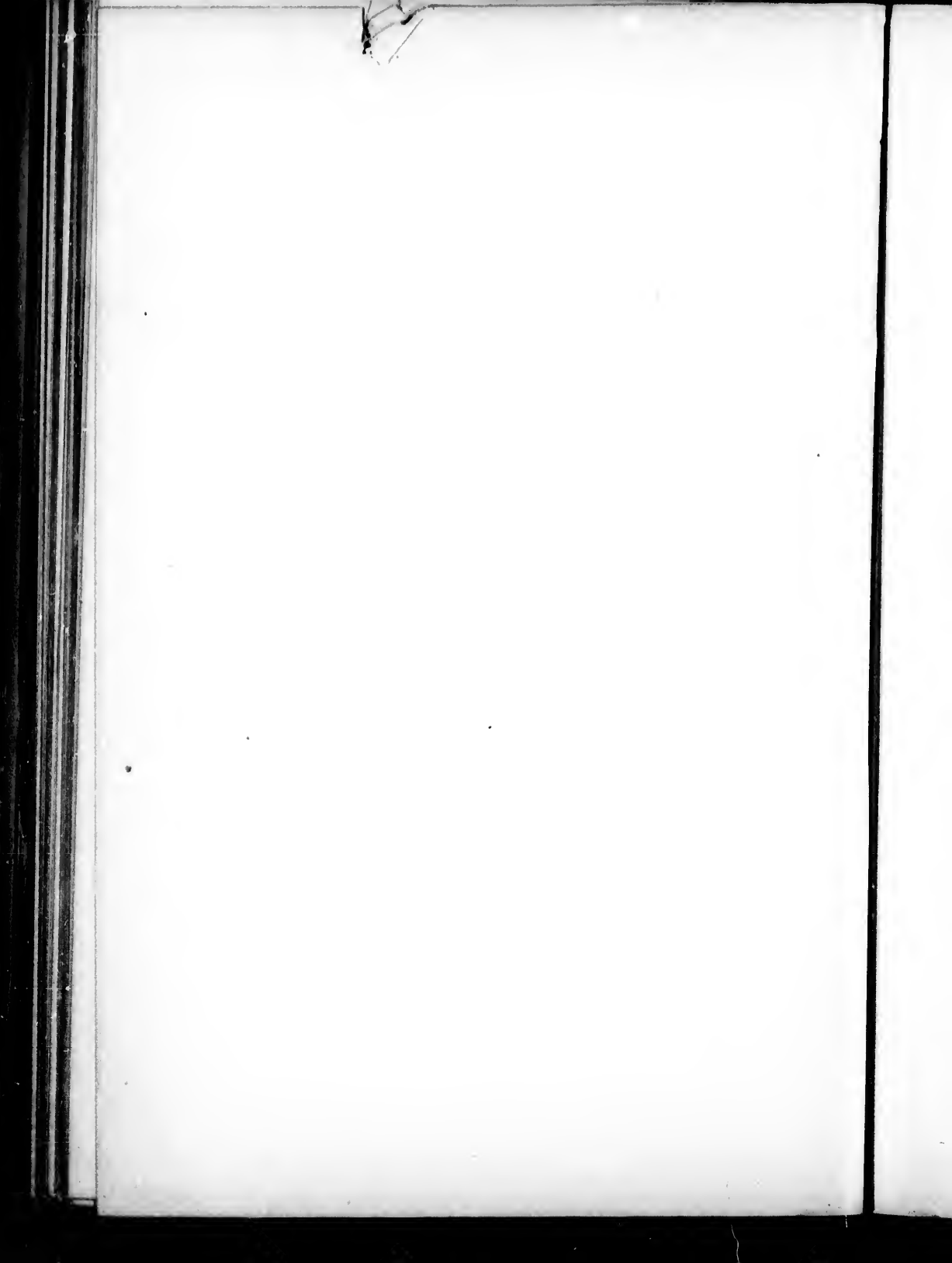
*Treatment*:—Massage and manipulation dangerous. Danger of rupture and producing peritonitis. Tapping sometimes followed by good results. Nephrotomy, the operation, opening and draining the sac. Nephrectomy may be necessary if renal fistulae or suppuration.

Aspiration is justified in urgent cases, but if repeated liable to get fistulae. Nephrotomy is followed by fistula, where any kidney substance remaining.

Tuberculosis:—(1) Acute or (2) Chronic.

Miliary tuberculosis—there are no symptoms pointing to this especially. Scrofulous kidney; strumous pyelitis; scrofulous; pyelonephritis. Tuberculosis may be primary in the kidney, but nearly always associated with tubercle in other portions of the genito-urinary tract. Adolescence and old age; attacks papillae; ulcerates; disease spreads; new deposits; ulceration, etc.





**Tuberculous Pyelitis:**—Originates in the calices of the papillae.

**Symptoms:**—Pain in the lumbar region, aching or paroxysmal, radiating to the point of the penis, thighs said never to produce contraction of the testicle. Symptoms otherwise exactly resemble those of calculus. Tumor may develop; nodular. Family history of value. Polyuria of a murky type; frequent micturition. Sudden chills and severe pains, unassociated with colic. Frequent micturition may be due to acid urine in early stage, also to polyuria. Colic is not so severe; more apt to be preceded by passing blood, ulceration and breaking down of tubercular masses; may have passage of a calculus followed by blood.

Urine is cloudy from a mixture of pus; it is acid, and of low Sp. G. Light coloured, depositing a thin layer of pus, with signs of blood, a continuous haematuria; not marked. Sometimes small lumps of caseous material. It is of great importance to demonstrate the presence of the. (frequently exam. for T. B. C.).

Urine in the later stages shows albuminuria. Frequent micturition is due to Polyuria; irritation of the bladder by septic infection of the muc. mem. Tubercle extending to the bladder, the most frequent site being the trigone.

Where case advanced, caseation and pus thrown off by the kidneys. Get constitutional symptoms, hectic, etc., no tumor in the loin, and absence of tubercular material.

May suspect this condition, but absolutely to diagnose is impossible.

**Fenwick:**—1. Family history of tubercle. 2. Age 20 to 40. 3. Personal history of tuber. lesion. 4. Polyuria. 5. Vague lumbar pain. 6. Sudden chills. 7. Frequent micturition at night in early stages. 8. Where colic appears, it is later, preceded by a flow of blood. 9. Said no retraction of the testicle. 10. Haematuria slight. 11. Uninfluenced by rest or motion. General condition; ailing, anaemic, easily fatigued, early anorexia.

**2nd group of Symptoms:**—1. Family history negative. 2. Age 40. 3. Personal history negative, or complains of

gravel or red deposit. 4. Weakness in the loin; subjects of lithaemia. 5. Testicular neuralgia. 6. Vague lumbar pain. 7. Marked colic. 8. Frequency of micturition due to irritation; more frequent by day and after exercise, or manipulation of the loin. 9. Colic followed by blood. 10. Haematuria; not persistent, and associated with exercise (look up lithaemia, oxaluria). Where the cortex first affected, polyuria may be the only symptom for some time; process more rapid, where pelvis first involved. Toxines with acid urine first cause catarrh of the bladder, especially the trigone.

Treat:—Codeia best relieves pain and irritability of the bladder. Cod liver oil, hypophosphates, diet, climate, supporting treatment

Colic:—Anodynes, opium, hot baths, anaesthetics.

Renal Calculus:—Etiology obscure. Whether a constitutional disturbance or primarily a disorder of the kidney is not definitely known.

Predisposing causes:—Sedentary habits; high living, poor feeding. Absence of milk from the diet of children.

Calculi originate in calices, then drop into the pelvis and either pass with colic or remain within the pelvis: may become encysted; giving rise to no symptoms. Renal stones are irregular; seldom faceted; absence of attrition.

Symptoms:—Pain, blood, pus, calculous fragments, renal colic, frequency micturition, nausea, and vomiting, suppression or diminution of urine. Pain in the lumbar region, and nearly always on the same side, increased by pressure and exercise. Pain is constant in typical cases; dull and aching, frequent sudden exacerbations at night, apart from the colic due to the passage of flatus in the colon (Jacobson). Morris thinks due to fresh deposit. Pain radiates to the testicle, loin and groin, calf, sometimes the sole. All the symptoms may be referred to the intestines, or all to the bladder. Sharp stabbing pain due on deep palpation to pressure of the renal substance against sharp stone.

Renal colic due to passage of stone or fragment of gravel along ureter. Typical attacks, apart from renal, are sometimes met with. Haematuria may or may not be marked; not as

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marked is in malignant disease, and unaccompanied by such marked anaemia; may only occur after an attack of colic, or after violent exercise, blood intimately mixed with urine. Blood clots from ureter may be passed before stone.

Pyuria may or may not be a prominent feature.

To determine whether pus is from kidney or bladder, determine the quantity after standing in the bladder 4 or 5 hours; then carefully wash out, draw off urine in half an hour; if from the kidney get the same amount of pus; if from bladder much less. Equal frequency of micturition by day as well as by night, as well as other symptoms pointing to renal calculus, also are indications of renal tbc. Where suppression resulting from obstruction, urine pale, low Sp. G. Distinguish from movable kidney, malignant growths, Pyelitis, Tuberculosis, Renal and Peri-renal abscess.

*Treatment*:—Prophylactic; Palliative and Radical. (1) Simple diet; out-door exercise; avoidance of alcohol, free use of water, especially Lithia, Potash, Freidrichshall, for uric acid diathesis; Oxaluria, nitro-muriatic in full doses with some vegetables bitters; solvents are uncertain, by rendering the urine alkaline we may increase the size of the calculus.

Colic:—Morphia hypodermically; sometimes anaesthetic, hot applications, hot baths.

Radical treatment:—Nephrolithotomy; extraction of stone from a kidney otherwise healthy. Nephrotomy when associated with other degenerative conditions in the kidney.

Operation:—Semi-prone, hard pillow under the lower loin to increase the distance between the last rib and the crest of the ileum. Surgeon at the back, the assistant in front to push up the kidney from the front. Define the 12th rib, to avoid the pleura; parallel to and half an inch below the 12th, commencing just outside the erector spinae; long incision as necessary; thin patient three and a half in. Stout 4-5 or 6. Each tissue cut the full extent of the wound.

If the quadratus projects beyond the erector spinae, cut if necessary, then through the fascia lumborum down on the tunica adiposa of the kidney; avoid large veins, and separate the fatty capsule, carefully palpate the kidney, and when hard

mass made out incise the kidney through the cortex; it may be necessary to crush stone before removal. If palpation fails, put needle in kidney, and probe for calculus.

### THE OPERATIONS IN URINARY CALCULI.

Lateral Lithotomy:—Patient prepared; dose of oil; enema morning; table low and narrow; face of operator on a level with the buttocks. Scalpel; straight backed kept more easily in the groove of staff; straight blunt pointed bistoury, hemm'g forceps, director, lateral grooved staff; couple of pairs of straight and curved lithotomy forceps; cover the blades with *oil* if operating in children, as liable to injure the walls. *Ke* r catheter; drainage tube. Again satisfy yourself that stone still there. If cannot find, send patient back, and examine again. Empty the bladder, and inject 6 ozs. of solution.

Lithotomy position; hands bandaged to feet; draw to the edge of the table; pass staff, held by some assistant "the place of honor." Penis drawn up, and sound felt tight against the pubis. Introduce finger into rectum, note if empty, well contracted, condition of the prostate.

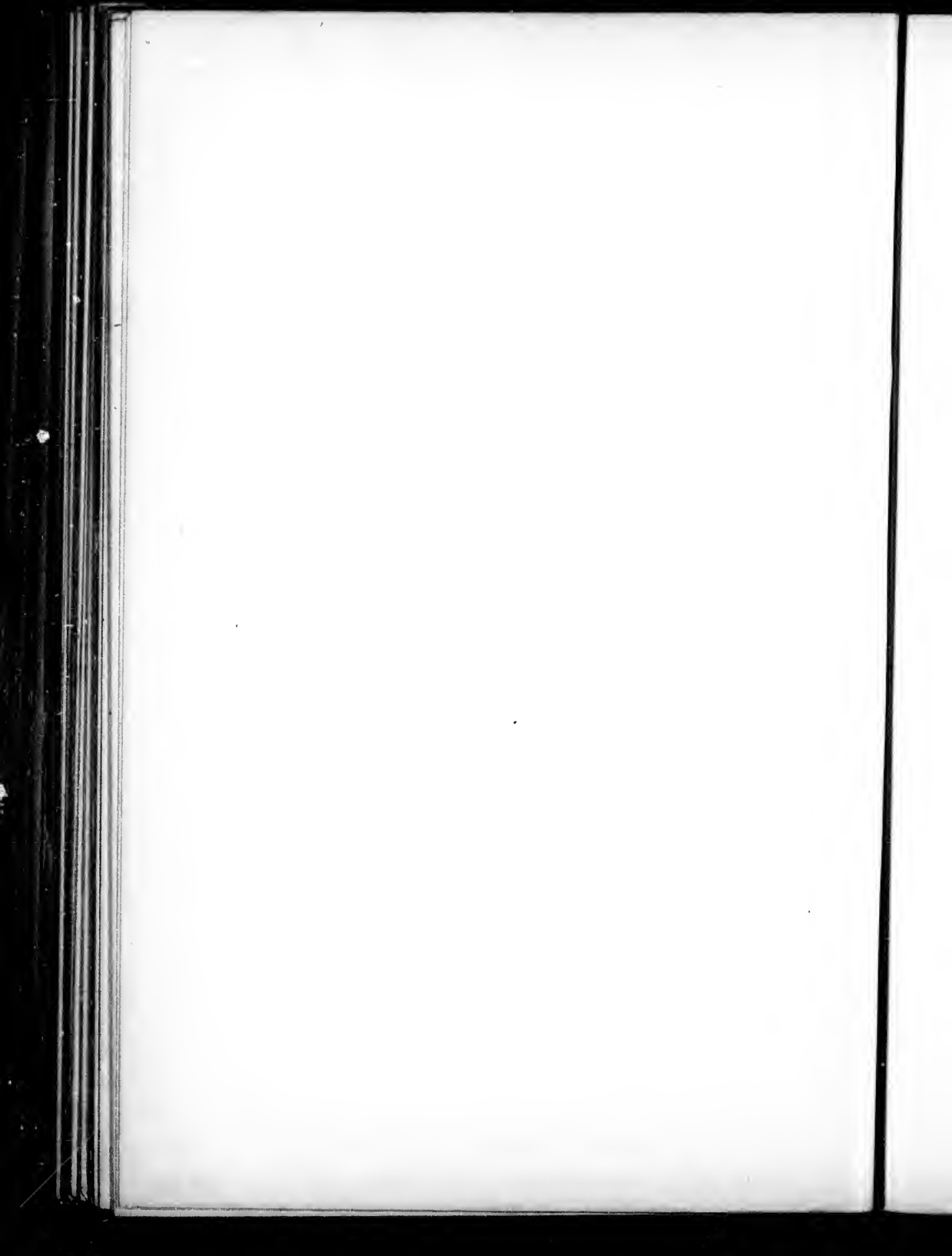
Incision one and a quarter to one and a half inches above the margins of the anus in adult (child three-quarters of an inch), a little to the left of the raphe, down and outwards, between the tub. of isch. and the anus; a little nearer to the tuberosity than the margin of anus.; upper part deep; should be able to feel the groove in the membranous portion of the ureth. Guide is the left finger, press the knife into the membranous portion of the urethra, and be careful to lateralize the knife, severing the prostate up to the bladder, the point of knife free in bladder. Divide the skin, sup. and deep fascia, transverse perineal muscles, vessels and nerves (Ex-Hemorrhoidal). Perineal vessels and nerves, accelerator urinae, and levator ani, then compressor urethra, membranous urethra and prostate. Pass in the forefinger, dilating as you go, un-

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tl can distinguish the cavity of the bladder with the same left forefinger. If the incision is not sufficient or satisfactory, enlarge it with a blunt bistoury, pointed along the finger or director.

Examine for stone; a small stone may pass with gush from the wound. Keep left forefinger in the wound, grope, if feel stone, pass the forceps, coax stone into the jaws, and, if large or rough, extract by rotatory motion to prevent dilatation. Accidents of operation; operation wound, by getting too far in, or due to gas. May wound artery of the bulb if carried too high. Internal pudic artery if too far out. In wounds of the rectum do nothing; keep empty and aseptic; 9 out of 10 per cent. good healing. If artery to the bulb wounded, catch, and leave forceps on; don't tie. Internal pudic artery serious; digital pressure by relays; forceps, if lucky.

If hem'r'g. or oozing from prostatic plexus, then use Dupuytren's chemise. Take a large rubber or silver instrument, tie a piece of antiseptic gauze around it, and pack with antiseptic gauze.

May miss the groove, and divide the tissues outside the urethra, or make the wound too wide, and get outside the prostate. In children may tear the urethra across with finger, and push the whole back into the pelvis.

May wound the posterior wall of the bladder. In tearing the urethra, or where cannot find bladder, open above pubis, extract stone and provide careful drainage. A serious accident, and usually fatal. Phosphatic stone may break, when they do use either the scoop or finger.

Large stone, enlarge the incision, or cut the other side of the prostate where the limit is reached on the one side; use a blunt pointed bistoury; failing in this crush the stone, or do a suprapubic operation.

After consequences :—May die of shock; intense exhaustion from hemorrhage; blundering operation; urinary infiltration, cellulitis, septicaemia, sapsraemia. Diffuse inflammation of the cellular tissue of the pelvis; urethral fever; extensive sloughing in debilitated subjects, erysipelas and phlebitis. Drain by rubber catheter 24-48 hours; gives time for the tissues of the

wound to become glazed over, and less liability to absorption.

Put to bed; hot water bottles; liquid diet; pack with iodoform; morphia; barley and rice water; milk and soda. Four days on light food, sometimes stimulants. Whether tube be in or not the urine dribbles out of wound at first for 3 or 4 days; then in 24 hours passes by the urethra, then again by the wound until the 17th or 18th day. Where there is a tendency to a phosphatic deposit, the wound delays in healing; troublesome. Min. 1 of nitric to the oz. aids this condition; or stimulate the wound by Ag. No. 3, Cu So 4, iodoform. On the 18th to 19th day, pass sound. This prevents the membranous portion from becoming contracted with stricture.

Median Lithotomy :—A great favorite, but dangerous in a large stone; seldom performed, never in children; small stones in adults; in bladders where suspect prostatic calculi. Prepare in the same way. Incision 1-1-2 inches above the anus, down to the margin of the anus; staff grooved on posterior border; feel staff in memb. urethra; divide compressor. Urethra, memb. urethra, and on into bladder; no hem'g.; artery to the bulb may be wounded if go too far forward; follow knife with finger, rotate and gradually dilate wound, or open the blades of stone forceps. Introduce drainage tube. Less risk of hemorrhage; no danger abnormal arteries; prostate not seriously impaired; prostatic plexus not opened; less danger of phlebitis and inflammation, heals rapidly, 3-4 days in the healthy bladder.

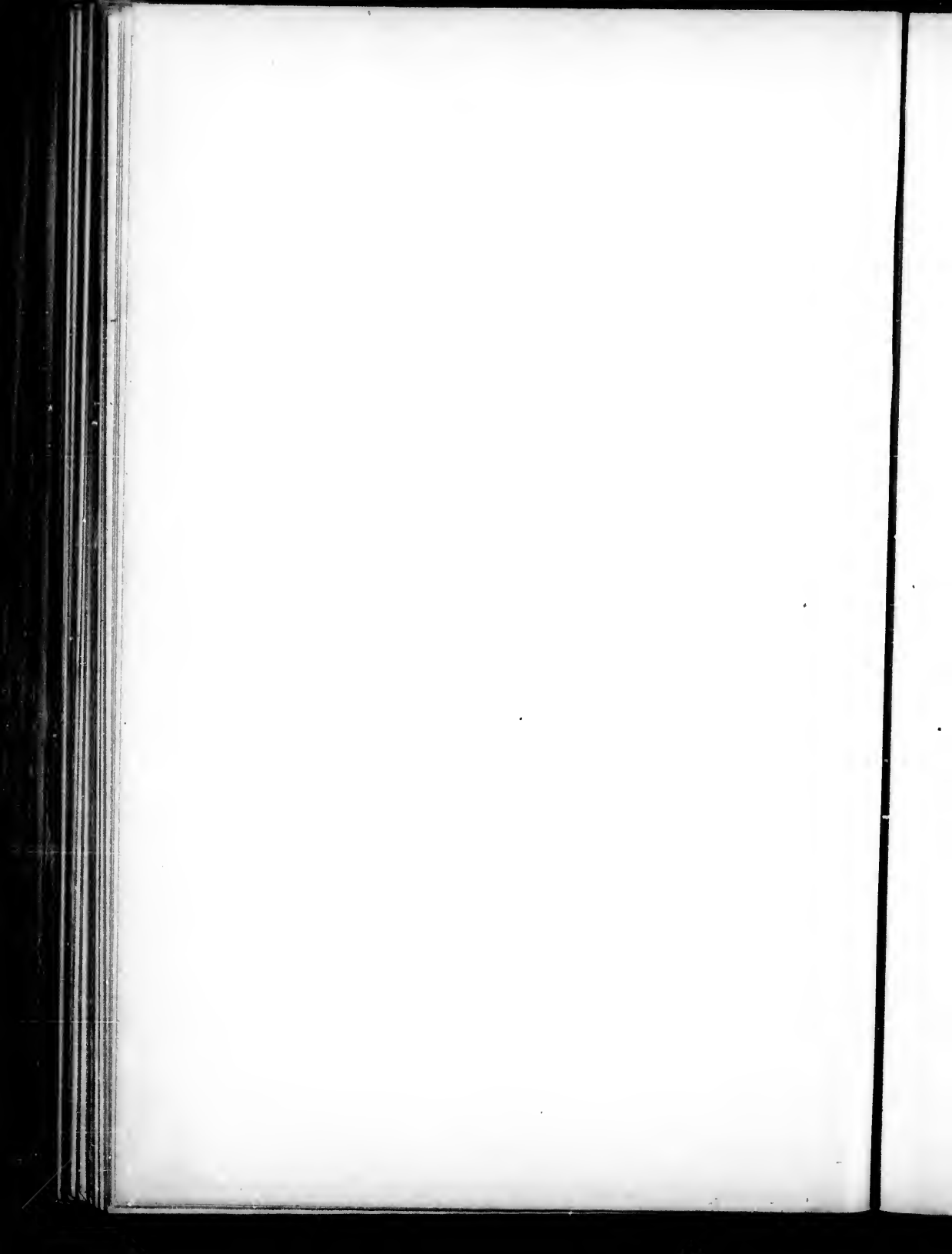
Disadvantage:—Little room, cannot be performed in children.

Supra-Pubic Lithotomy:—Prepare the patient, shave the mons., give oil, and an enemeta. Peterson's bag, properly shaped, like kidney (of Kiel), placed in the rectum, distended with 8-10 oz. of water or air. Wash bladder with boracic; inject 10-12 oz. of boracic or Thiersch. This rolls the peritoneum well up. Table; Trendelenberg; raise pelvis, so that intestines roll away.

Incision begun over the pubic bone, and half an inch of the bone may be exposed, extending up 3 inches; nothing injured; medium line; through linea alba, come down on the fat and

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veins, bleed freely; separate the fat rather than cut; then come on dark blue bladder walls coursed with large veins. Catch up with silk sutures or forceps; this gives the assistant something to hold up the wall with. Make incision in the middle line towards the pubes three-quarters of an inch to introduce the finger with little force. Allow fluid to flow off gradually. If need more room, then increase the incision downwards, or enlarge with forceps. Remove stone with forceps or with finger and scoop. Forceps on the whole are the most handy; explore the bladder.

Subsequent treatment:—The best is simple drainage; 2 tubes, and bring the rest of the wound together; patient on side. End of 3 weeks wound all healed; infiltration rare; drainage better than perineal or urethral.

#### GASTRIC SURGERY.

Dysphagia due:—1. Malformations, stricture, fistulae and diverticulae. 2. Pouches. 3. Foreign bodies impacted. 4. Ruptures. 5. Wounds and injuries. 6. Acute inflammations. 7. Tumors, and strictures, benign and malignant. 8. Aneurism. 9. Pott's disease. 10. Hysteria in the young. 11. Paralysis; usually about the pharynx and soft palate with regurgitation through the nose.

History is important; if sure of an obstruction pass bougie, if no aneurism is suspected, gum elastic 24 inches long or olive pointed bougies; useful in testing the size and location of stricture. Before using warm to render pliable; cover with glycerine. Patient straight in chair, head a little back. Left hand forefinger to epiglottis; care don't pass into larynx. In malig. disease use great care; the tissues are soft, and there is danger of perforating; a fatal accident. Oesophagus 9 inches long, cardiac orifice 16 inches from the teeth, bear in mind the bending of the bougie. Diagnosis: aided by auscultation of oesoph. during the swallowing of soft food, the bolus is heard to be arrested at obstruction. Oesophagoscope "X" rays. Localized dilatation is usually acquired; fistulae remains; bronchial clefts; if closed at outer and inner ends get a cyst; sebaceous or mucous.

Pouches—from pressure within, or contraction, or scar tissue without, as caseous bronchial glands; may be dissected off and oesophagus sutured up.

Foreign bodies:—Usually in children. If near top, and press on the larynx epiglottis may cause suffocation; impacted bodies may cause vomiting and dislodgment, but bad practice to give emetic; three points of lodging; at either end or crossing of bronchus.

Diagnosis:—History, pain, expectoration, bloody mucus, especially if high up; passing the sound final. If high up, may be reached with forceps. If low, push down with sponge probe; if very low, and impacted, gastrotomy may be performed, and reached below, or introduce a horsehair probang. Oesophogotomy:—Through incision along the ant'r. border of the Sterno-mastoid of the left side. Start level with the Cricoid, incision 4 inches long. Where there are important structures, always make a long incision.

Oesophagus, to left of larynx, artery external, do not injure the Sup. Thyroid, or recurrent laryngeal; keep wound clean.

To secure the oesophagus pass four (4) sutures into the incision longitudinally; hemorrhage controlled forceps; pass bougie as a guide; open over the foreign body. Closure of wound may be practiced if sure of no infection, but drainage is usually practiced.

Rupture of Oesophagus; always fatal; cellulitis; vomiting after a heavy meal, drinking bout.

“Chemicals” swallowed:—Allay the pain; large doses of opium, then stimulants, food by the rectum; if patient rallies, and inflammation subsides, may feed by the mouth Cod Liver oil and lime water. Bougies later to prevent cicatricial contraction.

Inflammation:—Secondary to stomatitis or gastric trouble; may become croupous; rectal feeding; opium.

Malignant tumors are common, cause *stricture*. We may also have strictures of benign origin, as following tuberculosis, swallowing corrosive chemicals, as also congenital.

Course of malignant is rapid, ulceration early, trachea opened out, food enters the trachea, or air regurgitates. May

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have rupture of the pleura, or pericardium, which is rapidly fatal.

Treat:—In stricture dilatation with bougie through mouth, or having opened the stomach from below; silk string from mouth out through incision in the stomach, and saw through. Symond's tubes useful early in malignant cases.

Operations:—Gastrotomy.

RUPTURE OF STOMACH:—From horse kick; sometimes only partial, the serous coat escaping.

Symptoms:—Pain, and slight peritonitis, not general; cicatrix may contract, and if at pylorus, may cause stricture.

Total rupture is most common, both from within and without.

Symptoms:—Shock, sometimes instant death. Patient usually unconscious; pulse thready. Skin moist, cold and pale. Resp. shallow, if not unconscious very restless, moaning, anxious expression.

Pain, usually sudden in onset, severe and burning at the moment contents of stomach escape; this is a variable symptom, however, and may be absent; usually depends upon the amount of food in the stomach. Pain continuous; unlike colic; in upper part of abdomen at first.

Vomiting is continuous, comes on rather late; first stomach contents, then green bile. Vomiting is very easy.

Percussion. Liver dullness disappears; may get loose movement of the bowels shortly after perforating, great thirst, water being regurgitated; chilliness. The later symptoms are those of peritonitis. Temp. is first below normal; it then rises, but is on the whole very uncertain. Tenderness becomes a marked symptom; rigid abdominal walls. Distension, constipation, and finally death. The above is typical. In other cases the pain and shock may be absent. Again may have fatal peritonitis without pain, tenderness, distension or rigidity.

What viscera involved? Consider the history and site of pain.

ULCER:—In young women; rare in men, or after youth, history of indigestion, haematemesis, etc.

Pain :—Stomach, upper part abdomen. Appendix, Rt. inguinal. Typhoid, on Rt. side.

If in doubt do an exploratory incision. Perforation of the stomach calls for prompt action; abdomen opened. Perforation found and closed. If patient in a condition of shock, may have to wait a little.

Ulcer leads frequently to stenosis and dilatation. Dilatation may be due to hypertrophy, as of the muscle fibres at the pylorus.

Operations :—Loreta :—Digital operation; open the stomach and dilate with the finger. Heinecke, Mekuicz, Gastroenterostomy. (See page 216.)

Carcinoma :—Affects the deep layers of the muc. memb., spreading rapidly. 60 per cent. at the pylorus; next the lesser curve. Tendency to ulcerate and spread to the surrounding parts; perforation of the stomach is not common; may get gastro-intestinal fistula.

Symptoms :—Hemorrhage is severe; coffee ground; large vomit, Tumor epigastric usually, to the Rt. of the middle line, sometimes found on the left side. Pylorus very movable; sometimes tumors movable, but usually early fixed.

Emaciation is rapid, owing to :—1. Cachexia from growth of the cancer. 2. Actual starvation.

Diagnose :—From gastric crises of locomotor ataxia. Gastric fistula :—rare.

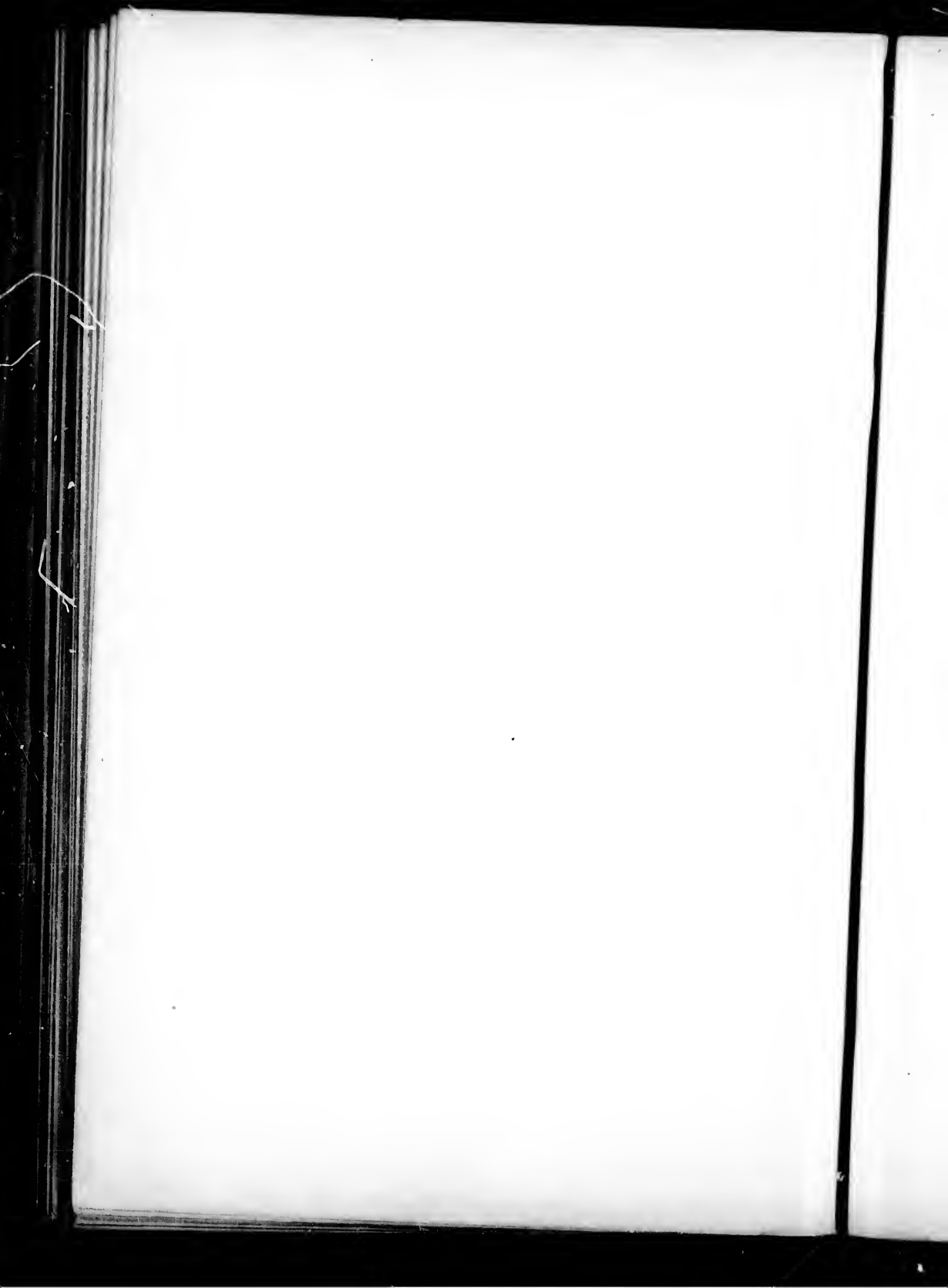
Gastric Fistula :—Three causes :—1. Gunshot wound (Martin). 2. Simple ulcer. 3. Malignant ulcer. Non-malignant condition closed by plastic operation.

Foreign Bodies :—Any body passing through the oesophagus generally finds its way out; may be 10 days to 3 weeks in passing.

Treatment :—Mashed potatoes; cathartics contra-indicated. If body remains in the stomach, may do a gastrotomy 28 cases; 24 recoveries. Br. Med. J. for Oct., a case of gastric varix of the veins of the deep layers of the mucous membrane. A vein here ruptured, and patient died of hemorrhage. This the first case. Many fatal cases reported as ulcer, may have been due to varix. Later Dr. Adami's case at R. V. H.

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Operations:—Two (2) incisions.

(1) Fenger:—Oblique incision, parallel with ribs of left side 3 inches; one a half fingers distant from the edge, through rectus muscle obliquely. This somewhat modified, because found that cutting rectus not necessary, and weakened the muscle; therefore skin incision the same fibres of rectus separated by blunt dissection in vertical way; only the fascia incised.

(2) Median:—Ensiform to umbilicus, according to thickness of abdom. wall. This latter operation is the most useful; little or no hemorrhage; in opening the peritoneum be careful not to injure the underlying or adherent organs. In closing incision, less danger of hernia than in lower abdominal region. Sew like to like; three layers of sutures the best; 1st, continuous; 2nd, interrupted (both gut); 3rd, silk worm-gut from skin.

Intestinal Suturing:—Czerney; Lembert; Czerney, through mucous and submucous layer. Lembert brings serous coats into apposition; peritoneal adhesions form in a couple of hours, needle entered half an inch from the cut surface, brought out after passing through the submucous coats near the cut surface; re-entered on the other side in the same way. In interrupted sutures, catch both layers, or, as used here, the continuous suture is found very satisfactory. Where inversion difficult, owing to inflammation and infiltration, omental grafts are used, suture the omentum over the wound. Drain where necessary, use a round cambric needle; twisted Chinese silk; where suture line long, better interrupt occasionally, as if one opens the whole line is liable to loosen if not interrupted. In operating, be careful of the packing, gauze, sponges; always count before closing.

Perforation from Gastric Ulcer:—Without operation, uniformly fatal. 1. Find ulcer. 2. Close. 3. Cleanse and drain peritoneal cavity.

Perform section as early as diagnosis of perforation made; median incision. Examine with great care, break down adhesions carefully; pack well; when peritoneum opened, may get an escape of gas and stomach contents. The more

that escapes the graver the prognosis, although the stomach contents are not so virulent as the intestinal. Ulcers most common on the posterior, but perforation most common on the anterior wall of stomach, and on the lesser rather than the greater curve; the cardiac end rather than the pyloric. The nearer to the cardiac the greater the difficulty in suturing, owing to fixity.

It is not necessary to trim edges or remove the ulcer; the rapidity of the operation is important. Lembert suture; a double row if necessary.

Where we cannot suture, pass a tube into the stomach; pack carefully, or make gastric fistula, by stitching to the abdominal incision.

Irrigate with normal saline at 115 deg. Irrigate systematically; begin by irrigating the region of disease; cleansing by dry sponging may suffice. Drainage to ulcer, and suture line, and over pelvic bone into pelvis. Danger (1) of Peritonitis. (2) shock of operation and anaesthetic. (3) secondary perforation.

Gastrotomy:—Indications; foreign bodies. If body felt, incise over it; otherwise a median incision. Make out the body; great care if sharp, cut down on the blunt end and extract. Incision; transverse of the long axis with the vessels; large enough to give room; can avoid most vessels. Extract the foreign body with forceps or with fingers. Manipulations gentle on account of inflammation. If much fluid, then swab out with gauze. Close with Czerney-Lembert, drain, 48 hours, nothing by the mouth, then a small quantity of milk or lime water, one drachm every hour, gradually increasing; if patient very debilitated, start feeding in 24 hours if no vomiting.

Start nutrient enemata immediately after operations 4 oz every three hours.

Gastrostomy:—Indications; cancer of the oesophagus, or mediastinal glands; cicatricial contraction of the oesophagus; cancer of the pharynx; must not be put off too long. Let patient bear the responsibility of operation. Surgeon may well refuse where too late. So long as semi-fluid food can

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be taken, put in Symond's tubes; passed on an applicator; may wait. Where patient restricted to fluid diet no time to lose. Where cannot swallow anything—too late. Progress of case is the index when to operate. If other organs implicated and chief cause of decline, don't operate.

Methods:—"Howse" two (2) stages:—Two days between; 1st, make a vertical incision through the rectus; blunt dissection; open into peritoneum; stomach probably up under the liver; if difficult to find, follow the peritoneum from the anterior border of the liver: stomach is thicker, and pink. Choose site near cardiac end; suture to abdominal wall. Sutures one inch back from edge of wound; put two sutures of silk into the middle of the exposed stomach walls; antisept. dressings.

2nd stage; 2, 3 or 4 days later; expose stomach covered with lymph, and only recognized by silk threads; puncture with tenotomy knife; pass catheter; inject milk; in a few days require a larger tube. First feed prepared milk, and brandy, yolk of eggs, later chicken broth, soup, and semi solid food. Hemorrhage is not usually serious. No anaesthetic for second operation. May have difficulty in finding the stomach.

Escaping gastric juice is irritating; causes dermatitis. To overcome the leakage Kader suggested bringing the stomach through the 8th intercostal space.

"Frank" makes an incision close to the border of the ribs: draws stomach well out, sutures peritoneum all round. 2nd incision above and parallel to the 1st, and a little to the left; undermines the skin, and draws stomach through, the skin being closed over the 1st incision. Very fairly successful.

"Witzel," at one sitting. Incision through the left semilunar line, or parallel to the costal border; does not matter; want to get to the stomach well outside. Take a soft rubber catheter, and lay on abdominal wall, and put cat-gut suture through the abdominal wall to hold the catheter, then by means of Lembert sutures infold the catheter 3 inches, having made a small opening; cover well by infolding; reinforce with a second row of sutures, fix to the abdominal wall and dress. Leave tube in several days, and when taking out to cleanse must be early returned.

Digital Dilatation:—"Loreta's." Pass finger into Pylorus; may pass three fingers. Suitable also for cardiac constriction. This is not a surgical procedure, and stricture liable to recur.

Loreta's is not safe; may get rupture and peritonitis.

Pyloroplasty:—Heinecke, Mikulicz. A longitudinal incision 1-2 inch long. Only applicable for cicatricial contractions; sew up transversely.

Pylorectomy:—In cancerous strictures, remove the pylorus and reunite the stomach and duodenum. "Billroth" ties off the mesentery, cuts out the cancerous area; partially sews up the opening in the stomach to fit the duodenum; sutures duodenum. "Wolffler's method":—Closes the stomach wound entirely after suturing the duodenum into the side of the stomach. "Von Haker."

Gastro-Enterostomy:—Median incision, come on the omentum; push to the right, and find Jejunum, and place on the anterior wall of the stomach, now press the contents both ways, and constrict with rubber tubing at two points, do not tie tight enough to damage the intestinal wall; attach the jejunum and stomach by Lembert sutures (4 inches); make a 3 inch incision, sew the cut surfaces through and through, then anterior row, through the peritoneum. Be sure and make opening large enough.

#### DISEASES OF THE TESTICLES.

Polyorchidism; very rare, usually an encysted hydrocele fibroid of the cord, epiplocele.

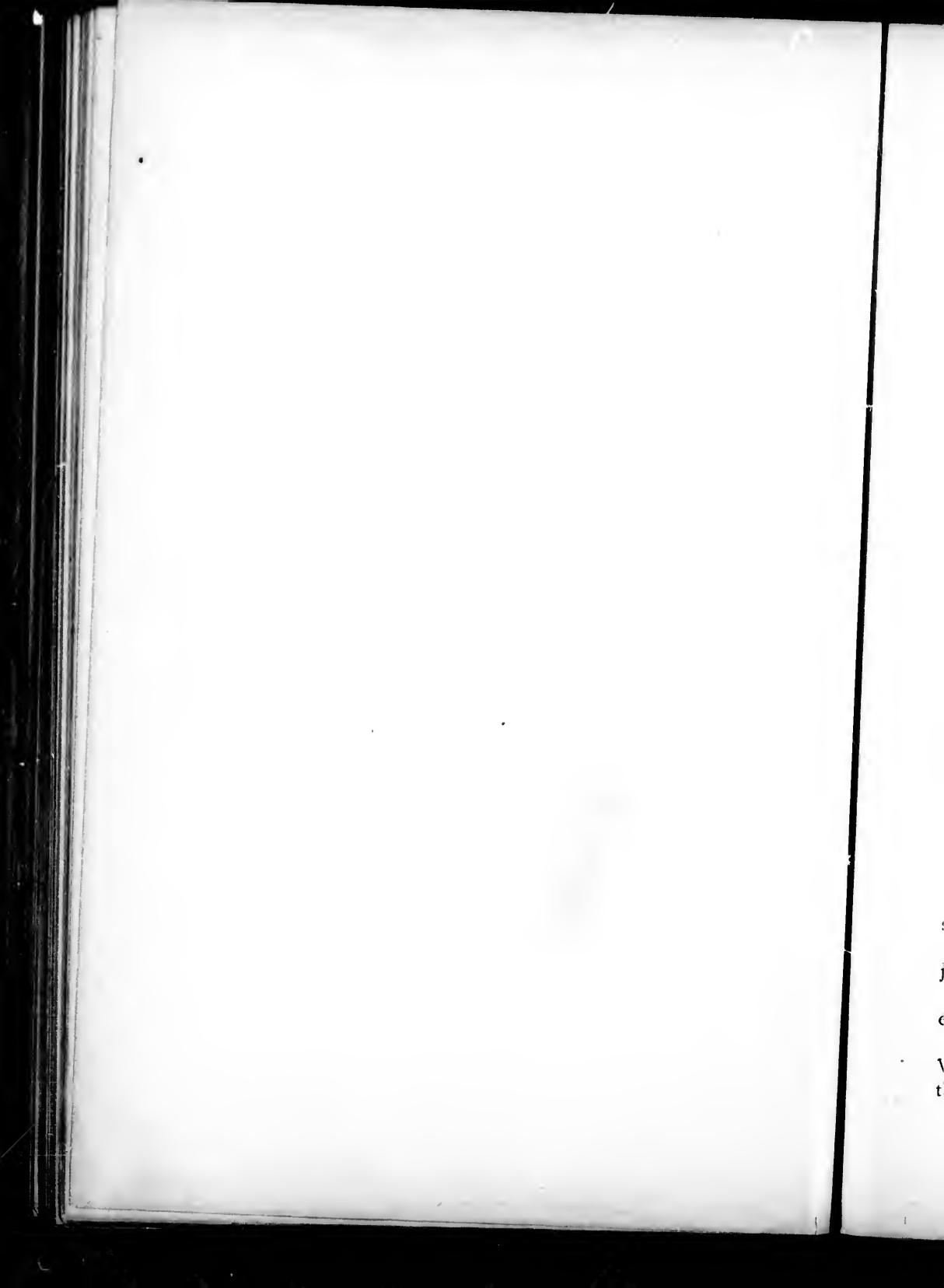
Anorchism:—Unilateral or Bimonorchid, and Cryptorchid.

Hypertrophy is sometimes congenital. Retained in the abdomen, or inguinal canal, or outside the Ext. abdominal ring, may miss the scrotum, or at the femoral ring. Causes too large to pass through the ring; becoming attached, weak gubernaculum, cord short.

In retained, testicle is generally smaller, apt to become the seat of inflammation, and functions early impaired and destroyed. Remarkably liable to malignant disease. If attacked by gonorrhoea, becomes a difficult question of diagnosis. Hernia often accompanies retained Rt. testicle.

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Intra-abdominal—don't touch. Where outside the internal ring, try to coax down by means of a horseshoe pad over the ring to prevent hernia. Stretch the cord by gradual pulling. Where hernia considerable, do a radical cure, and remove testicle.

Hydrocele:—Dropsy of the testicle. This may be:—Infantile. Congenital. Acquired.

Infantile—sustained injury, and resembles adult form.

Congenital—communication with peritoneal cavity.

Acquired—cause of adult hydrocele not easily made out, sometimes hereditary; from long continued irritation.

Symptoms:—1. Painless. 2. Translucent. 3. Peculiar shape.

Translucency not always present for three reasons:—1. Mixture of blood. 2. Sac thickened. 3. Complicated with hernia, especially omental.

*Treatment*:—1st time simply tap; may be repeated two or three times, and may cure. Very simple operation, Avoid the large scrotal veins and testicle. Site, lower and anterior portion, where no vein of any size; thrust first directly inwards and up, then up. Failing this inject cavity, after tapping; injection 2 dr. of Tr. Iodine, allowing one (1) dr. to flow back, or if pain inject a few mins. of 5 per cent. cocaine. Fl. Ext. of Ergot drs. IV., allowing 2 drs. to flow out; this lights up an acute inflammation; next day an effusion large as ever, put to bed for a week or ten days; or:—

Incision—pack with Iodoform gauze, and expose the sac; gradually withdraw gauze; this causes closure; may be sufficient. Cocaine or Ethyl Chloride.

Failing this:—Free Incision:—And dissecting away of the sac; only justifiable when other methods fail.

Infantile—diagnose carefully; when not congenital injections of one-half the strength of Iodine.

Congenital:—Close off the sac with a pad, and apply an evaporating lotion.

Haematocele:—An effusion of blood usually into the Tunica Vaginalis, sometimes into the testicle and scrotum, or all three.

Causes:—Injury, blow, straining, tapping, hydrocele. Readily made out by effusion into the scrotum; ecchymosed—rounder than hydrocele; no pain unless of great extent; only a feeling of weight.

*Treatment*:—If small rest in bed, elevation, cold ice bag; lead and spirit lotion under ice bag; frequently fails.

Determine by palpation if fluid, or clot. If fluid tap and keep up lotion. Many cases of clotting begin early, and get laminated clot; free opening; turning out clots; catch any bleeding vessels. Pack with Iodoform gauze and heal from the bottom.

Acute Orchitis:—Frequently associated with epididymitis, gonorrhoea, injury, gout, prostatitis; irritation of catheter in the urethra, prostatic calculi. Gland is painful, Epididymitis if chiefly affected behind. If both it is wedge-shaped; pain in the groin and back. History.

*Treatment*:—Depends upon the cause. If combined condition, cold, ice bag immediately.

Simple Epidid.—Heat if carefully applied. Ice is automatic; not such frequent changing. Local depletion, leeches, opening 3-4 largest scrotal veins. Foment 20 min. with hot water. Tenotomy knife preferable to leeches, which liable to inflame. For pain: lead and opium, puncturing with a narrow knife; open albuginia, allow of the escape of the effusion; also sometimes a little hydrocele, which likewise allowed to escape. As case progresses; Ung. Belladonna and Pb. Iodide; Strapping; suspensory bandage.

Neuralgia:—Frequently accompanies varicocele. Likely to occur in nervous and dyspeptic men. Patient complains of a continuous irritable condition, usually in epididymus, radiates to the groin. Only tenderness of the patient; increases nervous tendency, melancholia and suicide; nervous headache most often affected.

Tonics:—Fe, Zn, never morphia. Locally Aconite Lin.; Menthol & Belladonna Ung., susp. bandage, salt douching, sea bathing. If everything fails may excise. A very serious undertaking.

Solid Enlargement of the Testicle; Sarcocoele; Chronic Orchitis; Syphilitic Sarcocoele; Tubercular Sarcocoele.

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True Tumor:—Adenoma, Fibroma, Sarcoma and Carcinoma.

Tuberculosis:—Seldom get pure Chronic Orchitis lasting any length of time; usually associated with Tubercular or Syphilitic condition. Sometimes it is the result of an acute Orchitis, which not resolved, kicks and squeezes, in disease of the prostate, rheumatic, and gouty subjects; irritation of catheterization.

Symptoms:—Uniformly large, heavy, hard to the feel, testicular sensation remains; epididymus merged into the body of the testicle, or when testicle affected first and chiefly may get a ridge between.

In time the cord becomes thickened; skin healthy unless suppuration; only one testicle involved.

If irritation of long standing, suppuration may begin; the skin adheres at one point; softening, and pus exudes. If a large piece of skin involved; sloughing; may get "hernia testis" or protrusion; red bleeding covered with granulations. In cases of abscess a fistulous opening.

Treat:—Chronic Orchitis, where unresolved, strapping application Pb. Iod. and Belladonna (a dr. of the solid Ex. to dr. VII of Pb. Iod.) Hg. Ung. Hydrocele tapped, but not injected. Tonics K.I. Tr. Nux. Abscess opened early, scraped, packed with Iodoform. Examine pus; may have tuberculous disease. Where late; hernia, cauterize; let slough separate; dress with Iodoform; granulate. If large, shave off, freshen scrotal incision; close up. Excise in extreme cases.

Syphilitic Testicle:—This may occur at any stage; rare primary. Early secondary get epididymitis; an indurated tumor the size of a walnut. Testicle is rarely attacked. Late secondary and early tertiary get the body of the testicle involved. In late secondary stage, the most frequent involvement is a simple inflammatory condition. A uniform enlargement, painless. Testicular sensation is absent early. The gland is large, smooth and ovoid, rarely nodular, rarely any tendency to abscess. Hydrocele frequently. Now and then adhesions between the two tunics, and hydrocele in separate sacks.

Very late secondary and tertiary. Gummata; one in the

centre; or numerous over the surface, the size of a pea to a hazel nut; sometimes seen in congenital syphilis; do not tend to soften, and break down very early. Sometimes they do undergo breaking down; K.I.

**Tubercular Testicle:**—Comes on usually about puberty; may develop at any age; usually a delicate subject; may occur in the robust. Usually begins in the Epididymus in the Globus Minor, nodule hard, region of the Epididymus well defined; size of a pea to a bean; little discomfort; well defined boundary, shading off into surrounding tissue. May or may not be a history of injury; history of a number of attacks of gonorrhoea; disease usually slow; sometimes rapid; no hydrocele. A tendency to soften and break down, becomes adherent early to the scrotum. Cord not generally thickened; vas slightly thickened; sometimes a little irregular. As advances pain increases, adherent skin becomes red; gives way, discharging caseous pus, leaving a cavity with a sloughy bottom, tub. bacilli. Tendency is to become chronic, sometimes spontaneous healing; usually breaks out again; hernia follows neglected cases. Tendency to spread upwards to vesicles, which become the seat of enlargement and suppuration, subsequently involving the bladder, prostate and kidneys. General health in the early stage not affected, with suppuration, health fails; sometimes the other testicle is involved. Lungs may become involved.

**Diagnosis:**—Chronic Orchitis; course somewhat different; also from Gumma.

**Prognosis:**—Very bad; testicle itself, treatment of little avail.

**Castration:**—The best treatment; or may open the nodule freely, scrape, etc., but can promise nothing in this form of treatment.

**Tumors:**—Rarely enchondroma, dermoids and hydatid cysts.

**Adenoma:**—Usually of the cystic variety, any age, rarely before puberty, growth slow and painless. Vas and glans not affected and cysts forming on the body, and on surface of the Testicle, size of a pin's head to a walnut, slow in growth; takes a year to make a difference in the size; first notice little fluc-

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tuating points, where large might be mistaken for an encysted hydrocele. Epididymus becomes lost in the general mass. General health unimpaired.

Treat:—Excision; examine thoroughly, after made incision, exclude hydrocele before excision.

Fibroma:—Rare.

Sarcoma:—In all its forms; usually round or spindle celled, cystic or not. Indistinguishable from soft cancer before removal; usually in younger subjects; been found in early infancy.

Symptoms:—Rapid growth, everything involved; glands not early involved.

Treat:—Early castration.

Carcinoma:—Medullary or Spheroidal, and sometimes Scirrhus. Older subjects; never infants; seldom before 20. Insidious, begins in the body, large, smooth, and fairly firm; testicular sensation soon lost. Cord later becomes involved; early enlargement of the veins of the scrotum; grows rapidly. Veins more distended; skin is adherent; growth is waxy. Hernia and fungus protrusion; glands early involved; cachexia; secondary deposits. Pain tends to become lancinating and severe.

Treatment:—Early and free removal; results fairly good.

Castration:—Incision to the bottom of the scrotum. It is seldom necessary to remove much scrotal tissue. Sometimes elliptical incision, remove all adherent skin; long incision for drainage. Take care to separate the cord, and divide well above the disease. Ligature *en masse*: tie three vessels separately, and throw a cat-gut ligature around the whole mass; not tight. Tetanoid convulsions in nervous, where the whole cord tied, anchor the cord by the uppermost suture, to control subsequent hemorrhage.

#### DISEASES OF LIVER AND GALL BLADDER.

Gall Bladder.—In health oz. I. Cannot be palpated in health. If distended it is readily seen or felt. It is in contact with the hepatic flexure. Normally 4 inches long, 1 inch diam. Cystic duct 1 inch long, com'n. 3 inches. The Cystic duct is the smallest part of the biliary passages, so stone pass-

ing this usually passes the common. Lining of the ducts is convoluted like the small intestine. Cannot pass probe, and this fact therefore is no proof that the duct is occluded. In the Sub-hepatic space get other diseases; cancer of the pylorus, pancreas, tumors of the kidney and colon. Before gall bladder opened, impossible to say by palpation whether stones present or not. If distended very tense. Diverticulum of Vater; common point of lodgment of stone. Heisterian valve; folds of the Cystic duct.

Wounds of the Liver and Gall Bladder:—Slight lacerations are common and not serious. Large lacerations are accompanied by great hemorrhage. Gall bladder ruptured, and gall escapes. Normal gall does not produce peritonitis, unless an old cholecystitis. Stabs of the liver require immediate operation, open the abdomen and control the hem'g., swab out the peritoneum, control the hem'g. with a purse-string suture. In gunshot and punctured wounds always operate. Shock is due to loss of blood, and the longer you wait the deeper the coma. Suggested to make a small opening with local anaesthetic. Rupture; fatty liver may lead to fat embolism of the lungs. Expectant treatment in only very mild cases. Careful abdominal section gives the patient the best chance for recovery. Control hemorrhage; suture gall bladder.

Floating Liver:—Few cases reported; sutured up into position.

Tumors:—20 cases; 18 recoveries. Haemorrhage controlled by cautery, pack, ligature, and suture.

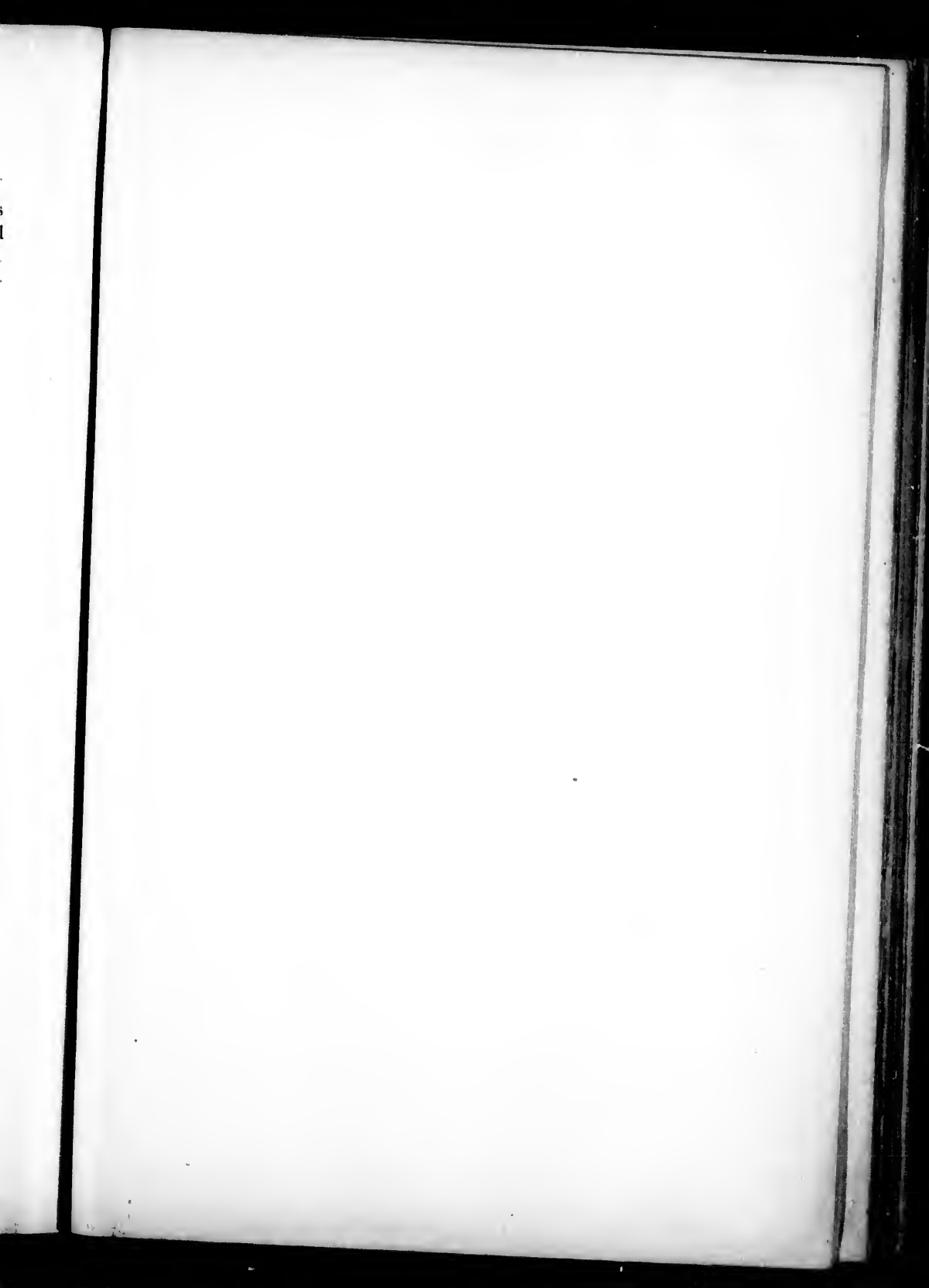
Cancer :—Most cases inoperable; primary form rare. Cancer of gall bladder due to irritation of calculi. If taken early may excise. May get fibroid thickening due to chronic inflammation.

Secondary Cancer of Liver:—Common; inoperable.

Cancer of bile duct inoperable, due to calculi; seat just at the entrance of bowel.

Syphilis of the Liver (1) Localized. (2) General infiltration and Hyperplasia.

Actinomyces, Hydatids, Tropical Abscess:—Gall Stone:—



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Temporary stagnation of the contents of the bladder; water is absorbed and solids inspissated and crystallized. Muc. memb. secretes cholesterolin. Calculi vary in color, size and number, usually 1-10, from the size of a marble to a walnut, pearly white, yellow, green or black. Soft or very hard, depending upon the amount of lime salts. Frequently present where no symptoms. More common in elderly women 5-2. Reasons; wearing corsets, want of exercise, the liver becomes sluggish.

If a number of stones they will be faceted. Pain only in passing through the cystic duct; peristalsis in the duct, bladder secretes actively, and increases the "vis a tergo." Duct may be greatly dilated by a large stone. Frequently passage of stone leads to permanent dilatation. Ulceration into the stomach, duodenum and colon.

Biliary colic, sudden, pain in the region of the liver; shooting through to the back and shoulder, faintness, nausea and vomiting, sweating, paroxysms, doubled up; no Temp. Half an hour in duration up to a couple of days, stops suddenly. If jaundice due to obstruction in the common duct, always enquire as to previous attacks of "indigestion." Small calculi are frequently the cause of symptoms in this region.

If jaundice slowly and gradually increasing, the pain is probably due to malignant disease.

In case where no operation done may get:—1. Septic fever; debilitating effects of jaundice. 2. Ulceration through of Calculi. 3. Malignant disease.

Time of Operation:—1. Patient's wishes to be consulted. 2. Don't wait until played out before operating. 3. Never certain about getting recurrence of attack; operation gives permanent relief. Single stone may cause recurrent attacks.

Some of the names of operations:—1. Cholecystostomy. 2. Cholecystectomy. 3. Choledochotomy. 4. Cholecystenterostomy. 5. Cholelithotrixy.

Cholecystostomy:—Incision vertically 3 inches from the end of the 10th rib. Viscus may be displaced downward or covered with adhesions, bring up to the incision, and pack with

gauzes (never sure sterile). Remove fluid and aspirate; enlarge the incision, pass finger—stones removed forceps, scoop or finger, then search the ducts, first Cystic, then common; stitch the edges of the Gall bladder to the peritoneum, then the rest of the abdominal incision closed; drainage tube into gall bladder.

The ideal operation is to suture the incision in the gall bladder at once, and to drop back into the abdomen, but this not safe until tube out 10 days. Firm pad to stop bile. Bile stools shows the passage o.k.

Where grey stools continue, there is a stone in the common duct, or if bile stools, and the bladder discharging stone in the cystic. Peristalsis may be reversed and stone passed through the opening.

Cholecystectomy:—Chief indication is malignant disease. Separate the peritoneum and bladder by a blunt dissection, pass ligature around the cystic duct. Cut off and cauterize.

Choledochotomy:—Same incision. Raise the shoulders and chest to allow the intestines to gravitate down, hold up the liver. Draw the colon to the median line and away, pack the field of operation. Incise the peritoneum from the cystic duct towards the duodenum, and get duct out as it goes behind the duodenum. Incise longitudinally, remove stone, and sew up.

If condition bad, it is good surgery not to close the incision, but to insert gauze, pack, and drain; gauze pressing the sides of the incision in duct together.

Cholelithotrixy:—Either finger and thumb or forceps supplements the other operations, and may use a good deal of force without injury to the duct.

Cholecystenterostomy:—Establishing a fistulous opening between the gall bladder and the colon or duodenum; latter preferred; easier with the colon. Anastomosis by simple suture or a Murphy button.

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## CHOLELITHIASIS.

Gall stones are very frequent, being present in from 5 p.c. to 12 p.c. of all autopsies. We may find a large number of small stones, from 635 up to 1,000, or a small number of large ones, from 1, 2, or 3, to 6. They are principally of two forms. I. Cholesterin, which is white, and II. Bilirubin calcium, red.

Causes favouring the formation of Gall Stones.—1. More frequent in women than men, and in a large percentage of cases in those who have borne large families.

2. Tight lacing, by diminishing the movements.

3. Laxity of abdominal walls, allowing liver to fall down so that fundus of gall bladder is considerably below level of junction of cystic and hepatic ducts, thus favouring the retention of bile. 4. Diminished movements of diaphragm. 5. Sedentary habits. 6. Influence of food. 7. Influence of disease. Heart disease. Chronic rheumatism. Diabetes. 8. Infection of bile ducts by typhoid, small-pox, typhus and puerperal fevers.

Cholesterin is formed from a solution of the epithelial lining of the biliary ducts, caused by inflammatory affections, etc.

Bilirubin calcium.—In the normal bile these two are not combined. In catarrh of gall bladder, albumen is formed from the disintegrated epithelium, and in all probability this favors the precipitation of bilirubin calcium.

Treatment in Cholelithiasis.—Partly medical and partly surgical. Empyema of gall bladder should be opened and drained, as in Empyema proper.

Ulceration of gall bladder, sometimes due to typhoid, pressure of stones, etc., giving rise to pain, temperature, sweats.

*Treatment*.—Open, wash out, drain, rest. If the ulceration is allowed to go on it may result in stricture of common duct and gall bladder, and if found when operating, may be very puzzling. It causes a so-called "hour-glass" constriction.

*Treatment*.—Suture up and remove distal portion.

Non-infective inflammation of gall bladder may be due to cancer, hydatids, etc. It is frequently associated with cancer, and it is on this account that it is advisable to remove gall

stones at an early date, because if allowed to remain, as patient grows older cancer is liable to be set up.

Gall stones throughout the liver, in the bile passages, may cause a cirrhosis.

Surgical treatment very satisfactory. Symptoms hepatic or colic. Onset sudden, pain very severe. Maximum pain in epigastrium a little to right, then radiating across to left side; then into back and up into right shoulder. Accompanying this we have nausea and vomiting.

Nephritic colic.—Begins in back, and generally shoots down course of ureters, accompanied by pain and retraction of testicles, pain in penis, frequency of micturition, and pain down thigh.

Perforation of stomach.—Occurs particularly in one group of people—anaemic dyspeptic girls. Symptoms: pain radiating around left side, and often followed by rupture of the hollow viscus; get a tympanic note.

Appendicitis.—Pain over abdomen; maximum over Macburney's point.

In gall stone due to infection, there is elevation of temp. This is important, as if it is up it indicates the formation of pus, empyaema and severe inflammation going on in ducts.

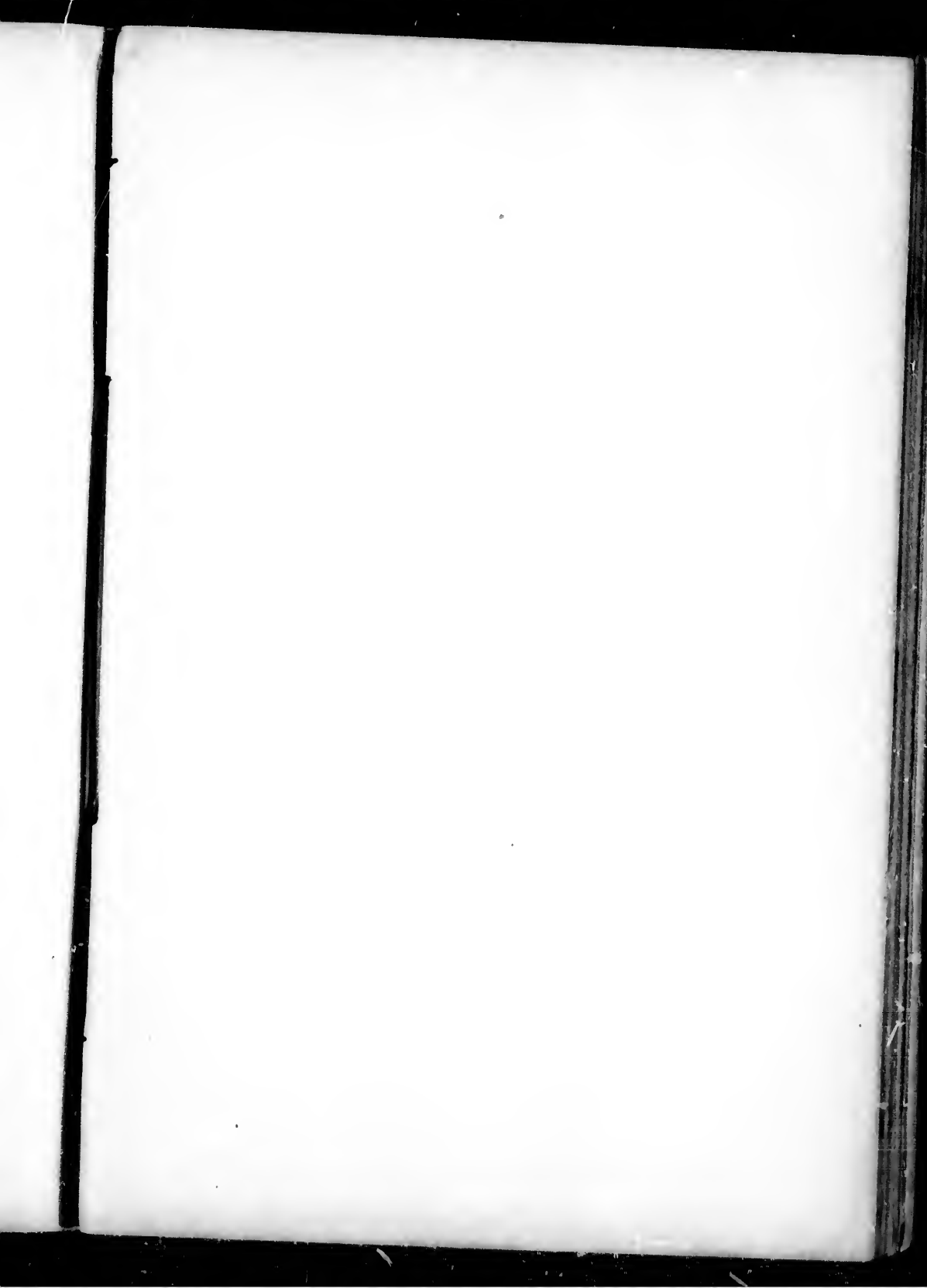
Medicinal treatment.—Spirits. Drugs, sulphate or phosphate of soda, two drachms daily. These are believed to prevent the concentration of bile and the formation of stones. The diet should be regulated, avoiding starchy and saccharine foods. Regular exercise beneficial.

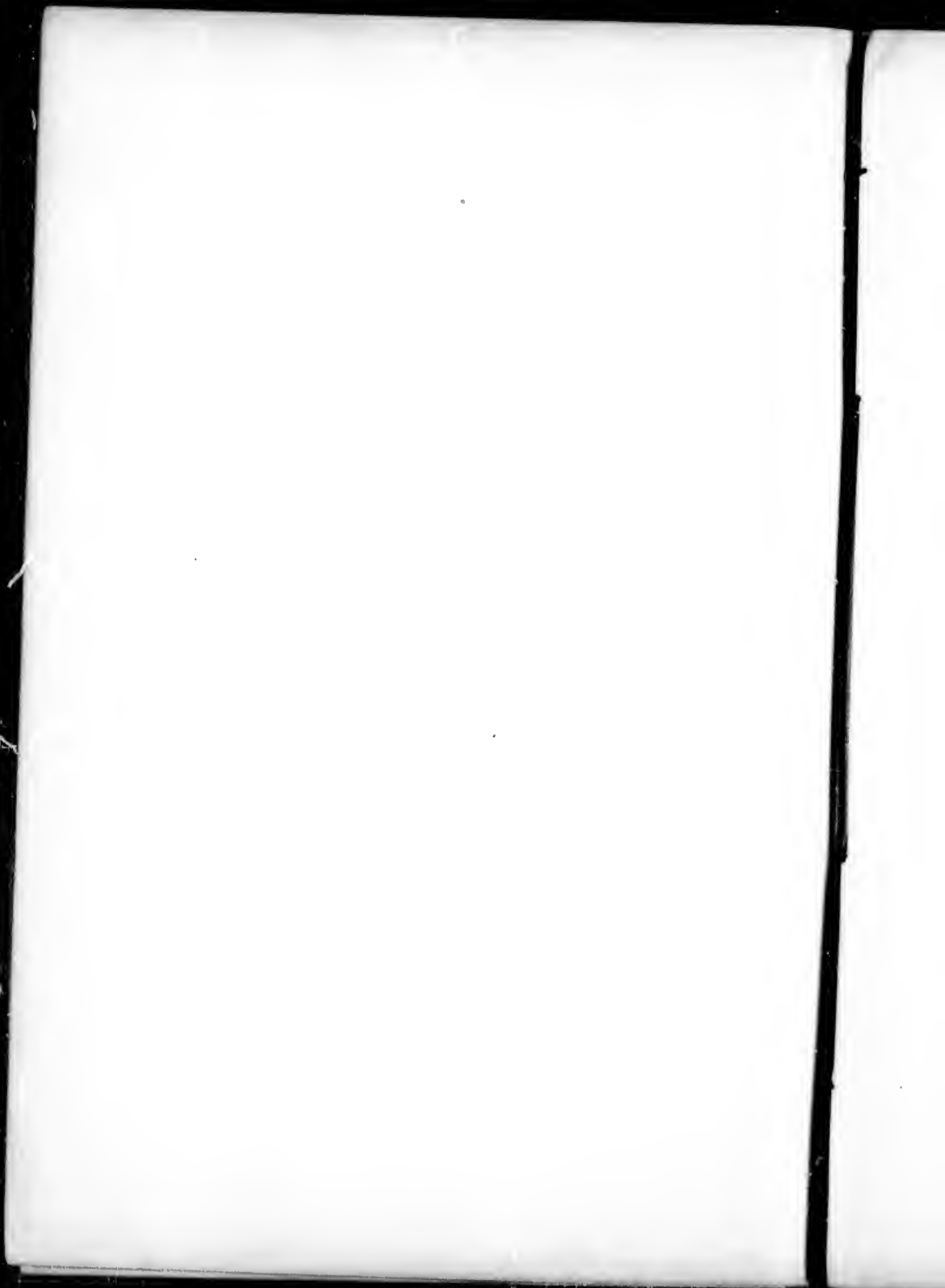
For the intense itching, powder with starch, strong alkaline baths. Hypodermically, hot pilocarpin, gr. 1-8 to 1-6, and antipyrin, grs. viij. Relief sometimes obtained by ichthyol and lanolin ointment.

If gall stone in bladder, no jaundice or malignant disease; mortality about 1 per cent.

Two complications.—I. Malignant disease; this is dangerous on account of the hemorrhage, due to alteration in the blood; death due to hemorrhage.

II. Prolonged jaundice. Wright's test. Normal blood coagulates in 5 min. Jaundiced blood takes much longer to





coagulate. This test is applied to blood to see if it is within the safety lines.

When to operate.—In a general way after several repeated attacks.

Position.—Put patient upon sound side, large sand pillow underneath, and the bladder comes up. Two incisions, vertical and lateral. Vertical.—Incise through all parts; then put in an aspirating needle and drain off bile; pack all around because the bile of cholelithiasis is infective, and we are apt to get peritonitis. Then open bladder and get out stone.

Can generally feel if there is stone in cystic duct.

If stone in common duct, syringe through into duodenum with normal saline solution. Having emptied gall bladder, bring it up to edge of incision in peritoneum, and suture it there; then abdomen closes over it. This is the safest way. May suture it up at once, but then may have to reopen it. Arrest of hemorrhage will not be difficult. Persistence of fistula, 5 or 6 days to two weeks. If it persists longer may close by pressure, and a little cotton and iodoform collodion. If gall bladder is small and retracted, then it is impossible to bring up to wound, so must put in a tube for drainage.

Recurrent jaundice due to stone in Vater's diverticulum, blocking up for a time the opening into duodenum. Then rolling back, and again blocking the opening.

Patient may discharge 1 to 2 pints a day, from side, so we do a Cholecystenterostomy, in which we cut down and join the bladder to the intestines, thus allowing bile to flow into intestines instead of outside.

*Intestinal obstruction.*—1. Setting up a local peritonitis, paralysis and obstruction. 2. Giving rise to such violent contractions that volvulus is induced. 3. A big gall stone in intestine, having ulcerated through the gall bladder and the intestine lying against it.

*Treatment.*—If soft, crush through intestine. If hard, open intestine, not at point where stone is situated, because the walls there will be ulcerated, but farther down where you will have healthy edges.

· APPENDICITIS.—Follow down longitudinal band on large bowel and you come to appendix.

Inflammations.—I. Simple catarrhal inflammation; the mildest form, within a week the patient is better. This forms the majority. 90 per cent. of cases get better for time being at all events.

II. Gangrenous; due to blocking of artery. If not operated on, it proves fatal.

III. Ulcerative appendicitis.—Secondary to catarrhal. Abbej introduced the method of distending the appendix with alcohol, and then he saw that it was, as it were, closed up just like a stricture. Probably the recurrent cases of appendicitis are due to this stricture formation. It is just a matter of time before this completely closes up, and then appendix ulcerates and bursts into abdomen.

Sometimes the appendix becomes twisted around and lies on mesentery, causing a phlebitis. Inflammation spreads through these to portal system, forming abscesses in liver. If there are septic symptoms and we can exclude Fever and Ague, then operate.

IV. Fulminating appendicitis leading to septic peritonitis; when appendix, as above, ruptures right into abdominal cavity.

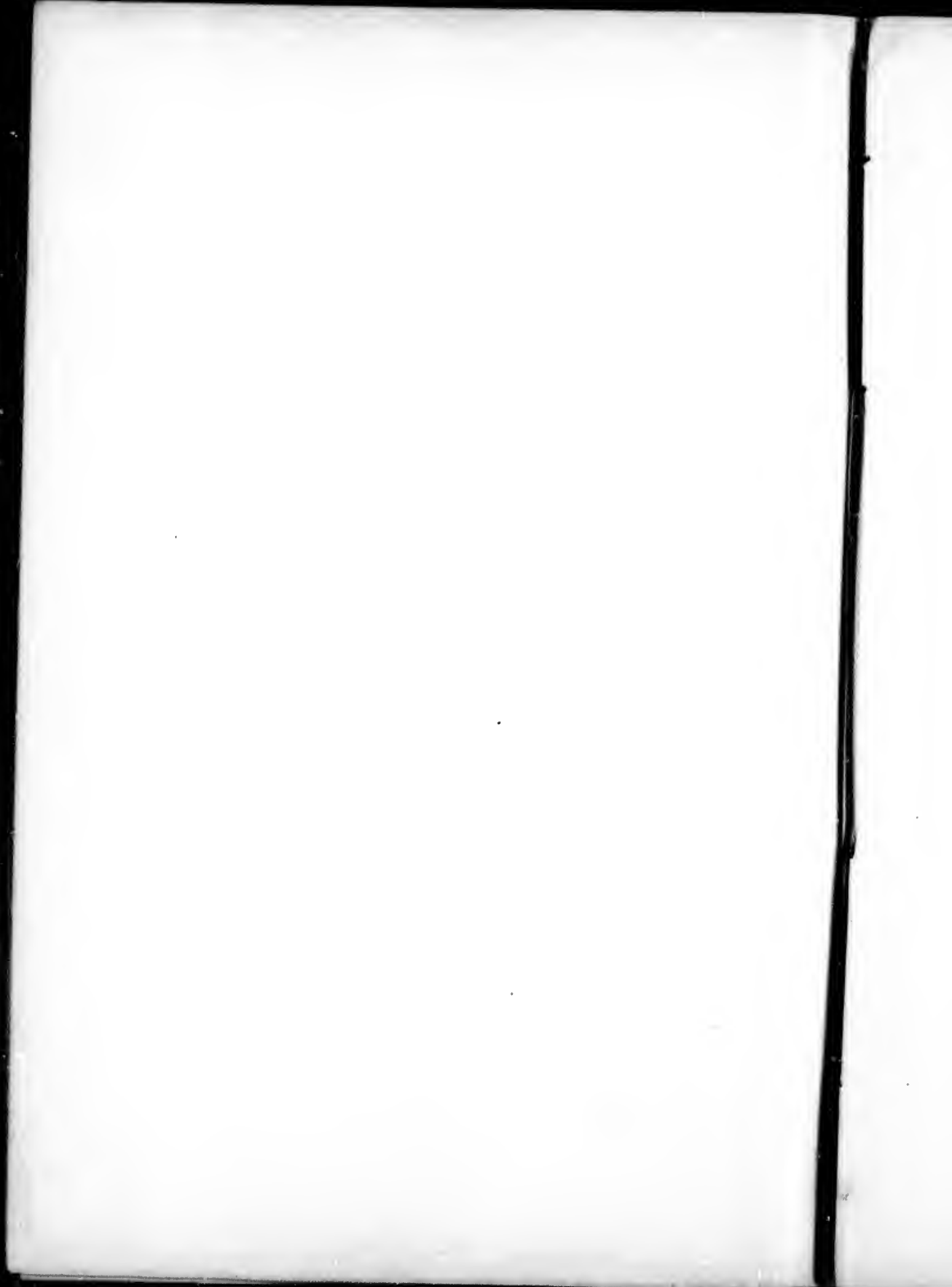
Etiology.—Causes.—1.—Rare in Europe, probably due to better living. 2. Great changes in temperature. 3. Catarrhal colitis is one of the essential predisposing causes. We get loss of epithelium of appendix; then bacteria get in and set up inflammation. 4. Changes in position of appendix as in twisting around, forming a sharp bend. 5. Foreign bodies. (Dr. Armstrong has never found any.)

Diagnosis.—Pain referred to centre of abdomen. 2. Tenderness over appendix (Machuruey's point, half way between A.S. spine of ileum and umbilicus, and a little above). Do not lay too much stress on this as we may find appendix back in loin, and the tender point there. In some cases do not get tenderness anywhere, but with finger in rectum we find appendix in ileum.

Symptoms.—Anxious expression, fever, nausea and vomiting, pain and tenderness.







Must differentiate from I. Rupture of stomach in gastric ulcer. Patient generally a pale anaemic girl, pain over stomach. II. Stone in kidney.—Hyperacidity of urine, increased frequency of micturition and ardor urinae. III. Gall stone colic.—Pain in region of liver, radiating into back and around right shoulder. IV. Obstruction of bowels.—Violent peristaltic action above seat of obstruction, patient becomes exhausted from repeated retching and vomiting. Intestine is distended above obstruction.

*Treatment.*—Condition may be improved in 24 hours. Otherwise abdomen may begin to swell, and about the third day a rounding up is noticed. Vomiting of mucus and stomach contents with a great deal of retching. Tenderness becomes greater. Temperature and pulse show gravity of disease. I. Applications of ice over appendix arrest pain and lessen inflammatory process. II. Some people object to ice, then apply heat, hot applications or fomentations. III. Restricted diet.—If we do not stop all food by mouth. IV. Never give morphia in acute form as it is uncalled for, except in *extreme* cases, because it disguises symptoms, and ulceration may be going on without any pain, and so both patient and physician are deceived. V. Purgatives, as a rule, contraindicated; if one is required, give a S. S. enema. When a purgative is given it may break down some slight adhesions, owing to great peristalsis set up. VI. Calomel, gr. 1-8 *omn. bii.* This also acts as a disinfectant. Not of much value.

*Treatment.*—Is largely operative, and question is, when and in what cases should you do so.

Dr. Armstrong's rule.—If on examination abdominal pain, vomiting, etc., is found, apply ice, rest in bed, cut off all food, give only beef tea instead of milk as it has less residue. Visit in twelve hours; find patient doing well. Visiting again in twelve hours find increase of pain and some temperature. Then, if in 24-36 hours you cannot say without doubt that patient is convalescent advise operation. Do not do this too seriously, confide in parent, explaining just how the case stands, and that everything except operation has been done. If they object then go on treating as before. The operation

in itself will kill none of them. If they die it is due to the conditions which you find.

Dr. Johnson's opinion at autopsy of a fatal case was that death was due to paralysis of bowel produced by morphia, because the field of operation was clean.

When a patient has had morphia previous to operation, it is an excellent rule to give Ext. Belladonnae, grs. 1-4 every four hours.

### DISEASES OF THE BREASTS.

**Malformations:**—Amasia, micromasia, plicomascia, supernumary breasts in the axilla, lower mammary region, front of thigh, usually not developed. Agalactia; no milk. Galactorrhoea excessive do.

**Hypertrophy:**—Steady increase for years; 1 or both; as a rule both; weight may be great, consistency uniform, no pain; glands not involved; may become anaemic.

**Pathology:**—An increase of all the constituents no cause.

**Diagnosis:**—Fr. Fatty tumors, and Cystic growth.

**Treatment:**—Equally applied pressure. K. I. Iodine and Belladonna; inconvenience extreme; incision.

**Atrophy:**—In the young; more frequent in old women.

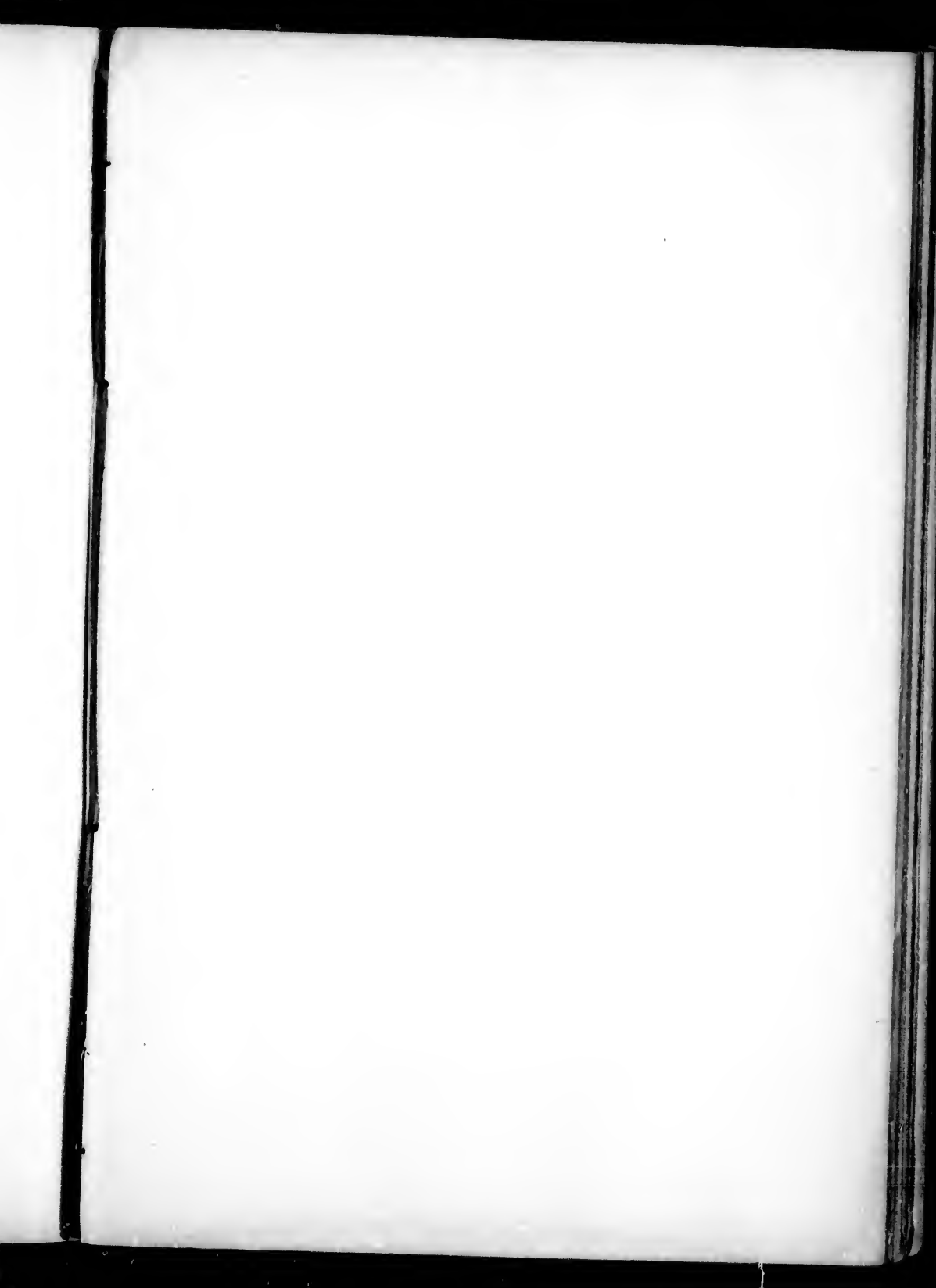
**Mastodynia:**—Neuralgia; like testicular neuralgia; paroxysmal; radiating pain; periodical at the menses may be continuous; thinks she has cancer. Examination fails to find any pathological condition.

**Treat:**—Correct any menstrual irregularity. Fe As, general management, a sea voyage. Locally Belladonna as ung. or plaster, supporting the breast with plaster.

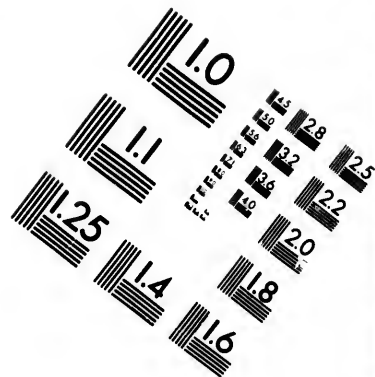
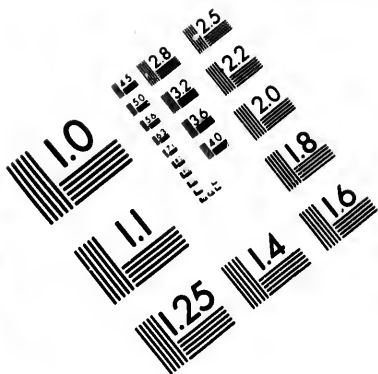
**Nipple:**—During lactation frequently sore and cracked.

**Paget's Disease:**—Now known to be an eczema, but requires attention, as is a precursor of carcinoma. Begins with a chronic eczema of the nipple and areola. The discharge is viscid or watery; clothes stick; becomes dry; scab; induration of structures. Fissures and ulcerations which may destroy the nipple.

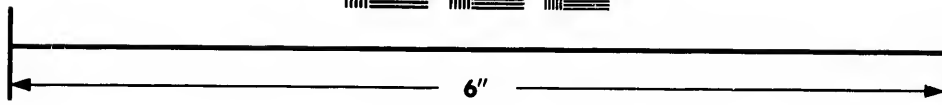
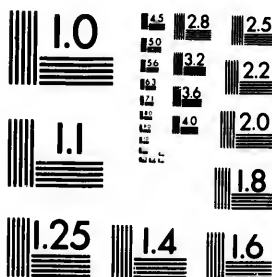
**Treat:**—Early stages Cocaine, and 20-40 gr. sol. of silver nitrate, followed up by a soothing lotion. Boro-glyc., Pb.







**IMAGE EVALUATION  
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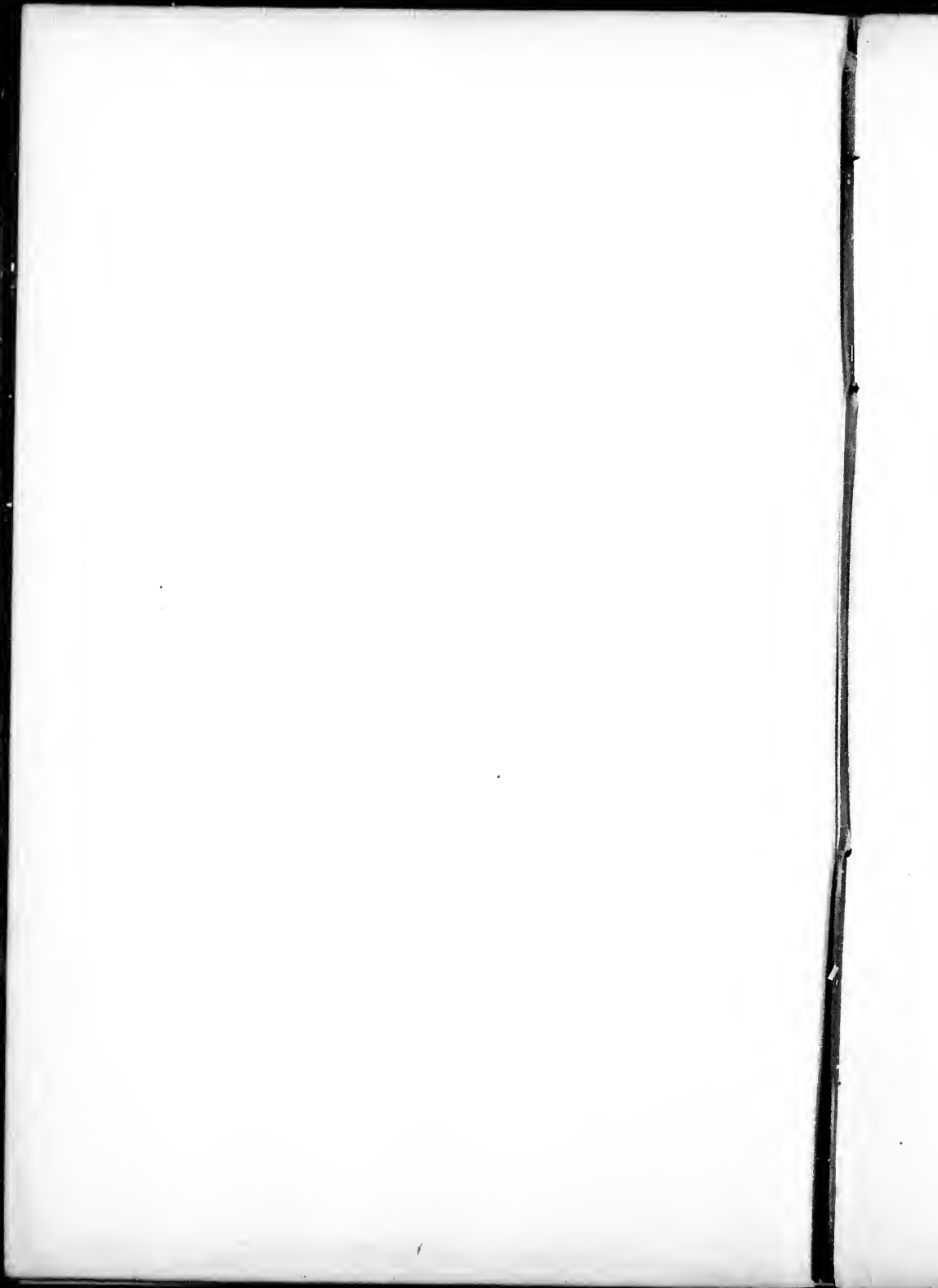


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lotion, Pb. Ung., Belladonna; before apply silver nit. may apply sublimate to kill the parasites. Ulceration destroys the nipple, then it is best to urge excision of the whole breast.

Inflammation of the Breast:—At puberty; girl from rapid development changes, get pain, swelling, and some induration, some constitutional disturbance; rarely ends in suppuration.

*Treat:*—Pb. lotion, and Belladonna plaster.

Mammary Abscess:—(1) Supramammary, frequent, any age, resulting from injury. (2) Intramammary. (3) Post or submammary. The first is readily made out; the third is the most difficult; when in doubt aspirate.

*Treat:*—In supramammary incision in any direction. In intramammary, incision radiates from nipple, so as to divide breast in the line of ducts. Submammary; at the lower margin of breast; most dependent part.

Chronic Abscess:—Chronic, lobular interstitial mastitis, following lactation and miscarriage; frequent in tuberc. patients. Onset is chronic, becomes hard and tense, pain; gradual retraction of the nipple or dimpling (may confound carcinoma). Later on get oedema.

*Treatment:*—Incision; Volkman spoon; Iodoform gauze. If tubercular, incise the cyst wall or the whole breast.

Sometimes have a series of these abscesses in women, who, after parturition, have some suppuration.

Syphilis :—1. Ex.-Genital chancre. 2. Secondary; not noted. 3. Gummata; ulcerating.

Actinomycosis:—Treat by amputation.

Tumors:—(1) Simple, and (2) Malignant.

Cysts:—2 classes:—(1) Those arising from distension of some part of the glandular apparatus. (2) Those arising independeatly of gland structure:—(a) Galactocele. (b) Duct cysts. (c) Involution cysts.

Galactocele:—Distension of duct or rupture of duct and infiltration of the surrounding tissues; grows rapidly; may empty partly when nursing; remains fluid some time, then becomes inspissated, shrinks from coagulation of milk and now and then disappears.

*Treatment*:—It is small, and so symptoms until suckling is over. If painful aspirate and apply pressure. If still persists, open, clean out and dress. Thought sometimes to become chronic abscess; may become the seat of tuberculous disease.

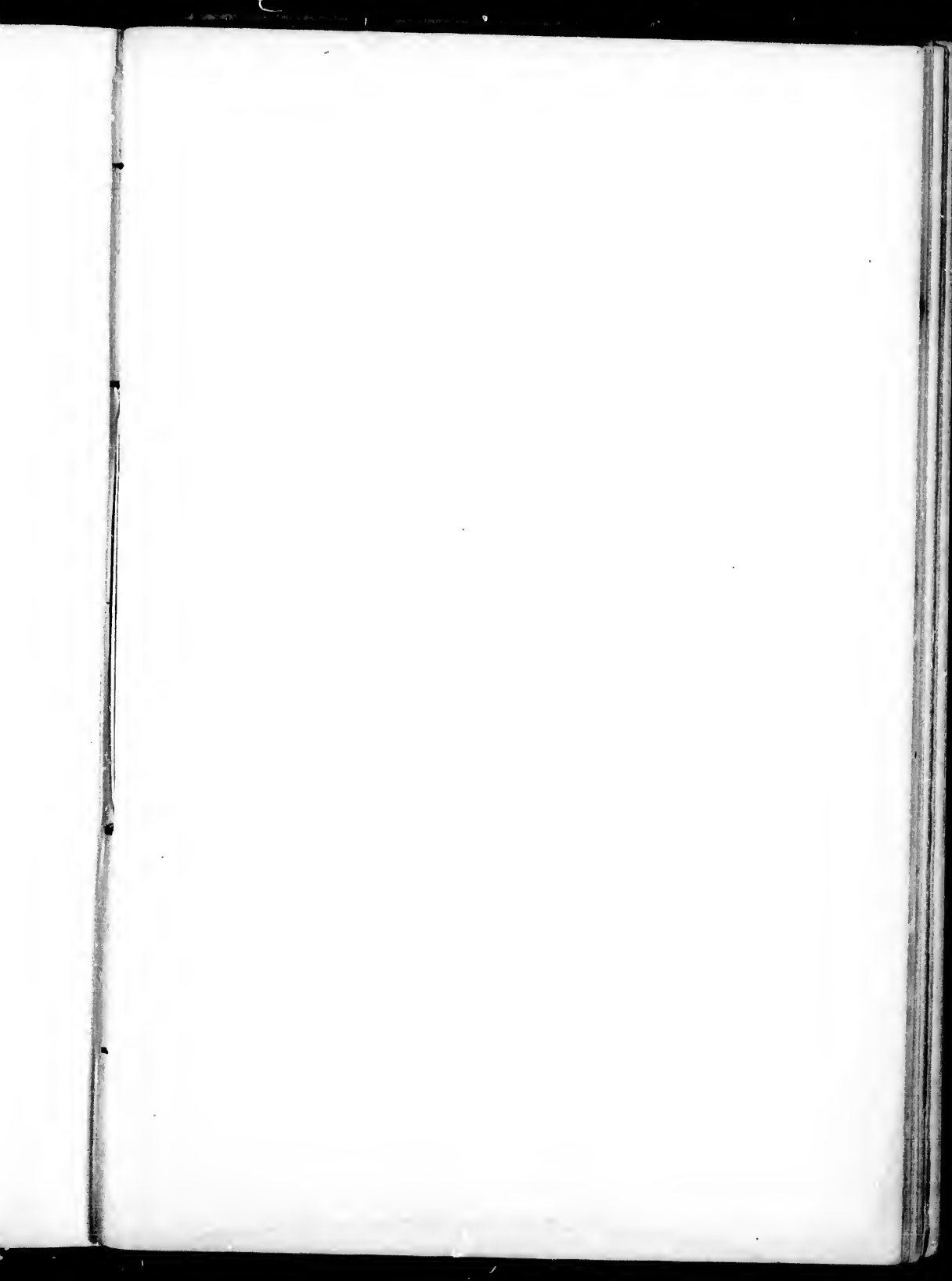
(b) Duct Cysts:—Always in the ducts, may burst through the duct, and form cyst-like galactocoele, usually remains in connection with nipple; when may give no trouble, but from chronic inflammation may become cut off; distends; hard indurated nodule; walls become thickened; apt to develop a papillomatous condition of the walls, fluid blood tinged, which escapes; clothing stained, and presence of bloody discharge from nipple should make us think of beginning carcinoma.

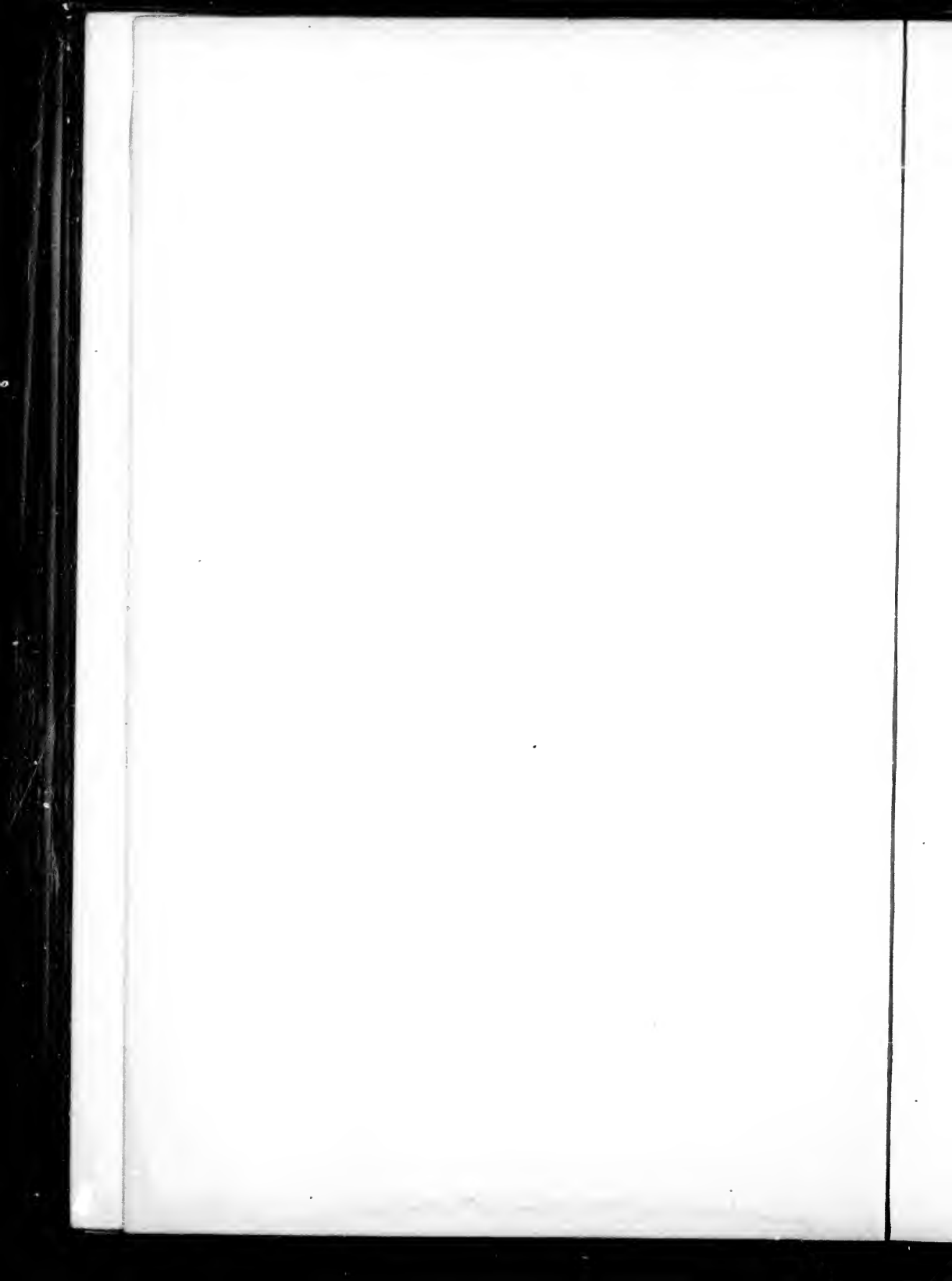
(2) Connective tissue or serous cysts:—Hydatids; Dermoids.

(a) Connective tissue or serous cysts:—Dilatation of lymph spaces, walls of the surrounding connective tissue pressed together and thickened, usually single, sometimes multiple, supra or sub-mammary preferring the margin. Ranging in size from the size of a filbert to containing several ounces of clear serous fluid, albumin and cholesterin. This is outside the breast structure proper. Never evacuated through the nipple. Grow a great size; thin translucent walls. (Hydrocele of the breast), get light test readily. Hydatids and dermoids are rare.

*Diagnosis*:—When it connects with the nipple it is easy; where lying deeply and tense it is difficult. If elastic, small yielding point in the centre points to a cyst, said growth in the centre is hard. If in doubt, use an exploring needle. Exam. patient lying down.

*Treat*:—Expectant for the time. Drainage through the nipple, may cure itself; aspirate, etc. Better free incision. Brush Iodine, or Zn. chloride; pack with Iodoform, and allow to granulate up. Where any suspicious contents, papillomatous growths, excise the whole breast.





## SOLID TUMORS OF THE BREAST.

## ADENOMATA, FIBROMATA, SARCOMATA AND CYSTIC ADENOMATA.

**ADENOMATA:**—True Adenomata are very rare, occurs as a circumscribed ovoid tumour, usually surrounded by a capsule of connective tissue, white or pink. Very much like breast tissue during lactation. True fibroma also exceedingly rare.

**FIBRO-ADENOMA:**—Common simple tumour of the breast, single or multiple, young women under 30. At age 18-25 frequent neurasthenics, or hysterical, caused by blows, or irritation during nursing. At first it is small, grows slowly, may attain a considerable size, varies from size small orange to one weighing 5 lbs.

First noticed at the border of the gland. Can be isolated from the Breast substance. Usually little pain except in anæmic and neuralgic subjects. In time becomes attached to the gland and tissues, does not affect the skin or veins, no oedema, does not affect the nipple, the axillary glands are free, does not return after removal.

*Treatment:*—May be largely removed by counter irritation, Elastic pressure, Iodine, Belladonna with I. and Pb. Ung. Blisters, and K. I. internally; the latter is well combined with Fe. treatment. If not satisfactory, recommend excision; occasions no disturbance of the gland. If very numerous and patient passed the menopause, excise the whole breast.

**CYSTIC ADENOMA:**—More Elastic; History of effusion from the nipple; usually painless except in neuralgic subjects.

Usually does not involve skin or nipple, but by pressure, may cause ulceration of the skin, presenting the characters of malignant growth.

*Treatment:*—In simpler forms, excision may be practiced of the cyst itself. If skin involved, and evidence of papillomatous growth shown by the blood, excise the whole breast.

**MALIGNANT TUMORS:**—Sarcoma:—Spindle cells are the most common. At first encapsulated, later infiltrating, most common in women over 30. Oval rounded tumors elastic feel, painless and movable for a long time, and show slight

tendency to infect the glands; seldom retract the skin or retract the nipple—tend to become cystic. As a rule, the health is not much affected.

Local malignancy is their remarkable feature. Tend to recur; softer growth; recurrence more rapid. Several removals may be necessary before tendency to recur wears out. Tends later to perforate the skin and protude as a fungus.

DIAGNOSIS:—Difficult between cystic growths and softer Carcinoma, known by absence of skin affection, freedom of glands. Prognosis is always serious.

*Treatment.*—Early and thorough extirpation. Local recurrences, should be thoroughly and repeatedly removed.

#### DISEASES OF THE TONGUE.

Malformations:—Bifid. Very small tongue. Hypertrophied. Few cases of absence. Adhesions to the floor. Shortened fraenum. Shortening is usually a central defect.

*Treat:*—Snip the muc. memb., and tear. Loose string—rarely occurs; the tongue falls back and get troublesome breathing.

Wounds and burns of the tongue, treated on general grounds; antiseptic mouth wash.

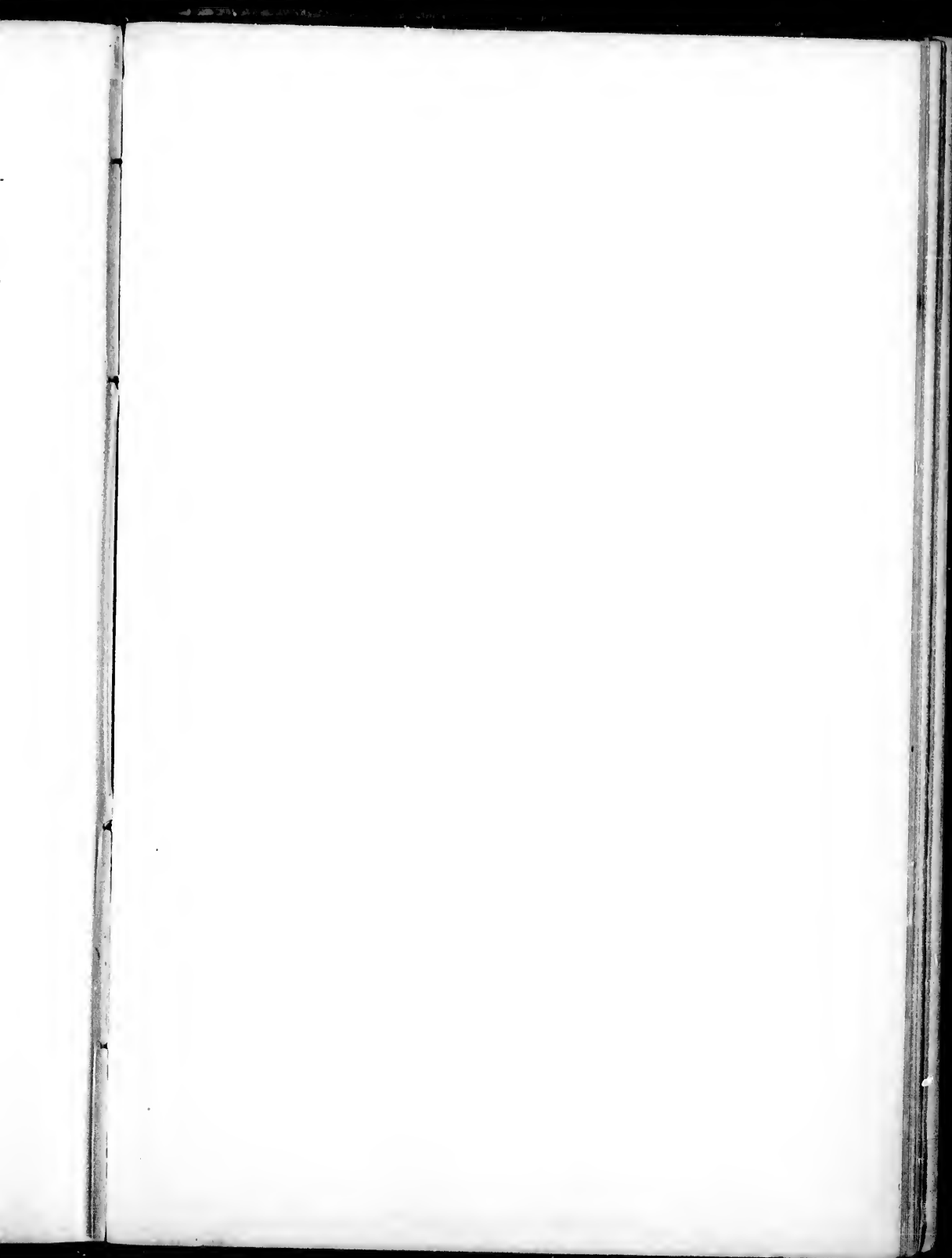
Glossitis:—Sometimes acute from too much Hg. in treatment of Syph., carious teeth, sleeping with mouth open and sting of spider or bee. Sometimes following fever.

Symptoms:—Rapidly swelling tongue, may threaten breathing, oedema of the glottis. Resolution or abscess; abscess to one side of raphe.

*Treatment:*—Ice and bleeding; gargle with Pot. Chlor. Incision in the long axis, and encouraged to bleed with hot water. Abscess; incise.

Chronic Abscess:—Following acute inflammation in tubercular subjects.

Chronic superficial glossitis:—Psoriasis of the T. Ichthyosis and leucoplakia. This is confined to the mucous membrane in smokers, common in dyspeptics; irritation of a tooth, and obstinate syphilis. Most common in smokers at points where







the smoke impinges. Swelling, collection of Epithelium, and white patch formed; may become raised, whole surface of the tongue covered. Epithelium may become heaped up, may become malignant.

Treat:—Not satisfactory, where of long standing not readily removed. Mouth wash; where heaped up, Lactic ac. and glycerine equal parts, increasing to 80 per cent. of lactic. Don't irritate with caustics. Where used always destroy growth. Where raised, and does not yield to treatment, and localized, better advise excision of the part involved A "V," shaped incision, or from surface of dorsum of tongue.

Cysts:—Tumors, naevi, fatty tumors, warts, dermoids, fibroma and enchondroma.

Naevi are most common, sometimes requiring operation, puncture and actual cautery.

Cysts in the floor Ranula, semi-transparent, lobular, walnut in size, on the floor beneath tongue, pushing the tongue up and back, interfering with swallowing, probably due to the dilatation of a duct of one of the mucous glands; beneath the tongue; contains a glairy stringy fluid; not cyst of Wharton's duct.

Treat:—Pinching up, opening with scissors, and drain.

Touch the whole floor with an armed probe. Seaton silk or horsehair for a couple of weeks with mouth wash; failing to close, dissect out the sac.

Ulcers:—Simple, Syphilitic and Tuberculosis; also Epitheliomatous, Actinomycesis; rare.

Simple:—Common dyspeptic; irritation of a tooth, dental ulcer, usually on the side; apt to become chronic raised; may become the seat of malignant disease. Relieve the cause, tooth or gastric; mouth wash, soothing. If becomes chronic, actual cautery.

Syphilitic. Tuberculosis:—Generally secondarily to the larynx, or the lungs, primary condition is rare. Prefers the tip. Begins as a minute white spot; others appear; herpetic patch; vessels burst. Ulcers extend along the border and under the surface, extremely painful. Becomes unhealthy; covered with sloughy granulations. Bacilli are fine, and hard to find; sometimes invades chronic abscess.

Treat :—Unsatisfactory, scraping and then canterize. Cocaine cover Iodoform, dissolved in ether; if this fails excise if localized, and surrd'g. tissue not infiltrated. In advanced phthisis; palliative treatment. Cocaine and morphia; Iodoform powder.

Epithelioma:—Squamous carcinoma. Ages 40-60 or 45-55. Men most frequently.

Causes:—Pre-existing irritation; some cases no such history, but the majority may be traced to some form of irritation. Sharp tooth; dental ulcer, ichthyosis; old syphilitic scar; badly fitting plate; false teeth; simple ulcer irritated by caustics; smoking.

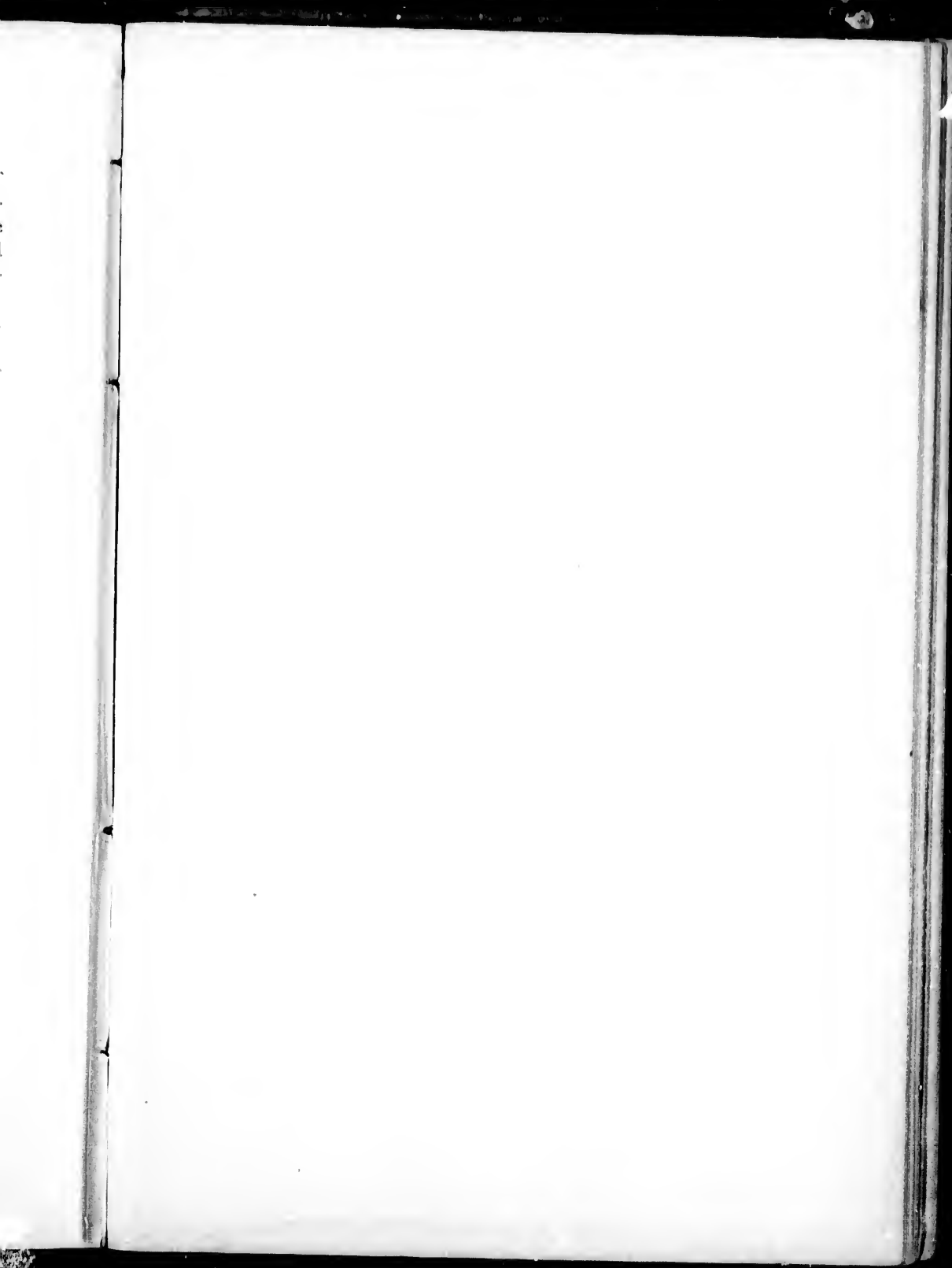
Begins at the edge above the middle third, or opposite the molar or tricuspid teeth, and tends to spread backwards. Get a few on the tip; floor, rarely on the dorsum, the posterior half rarely affected first.

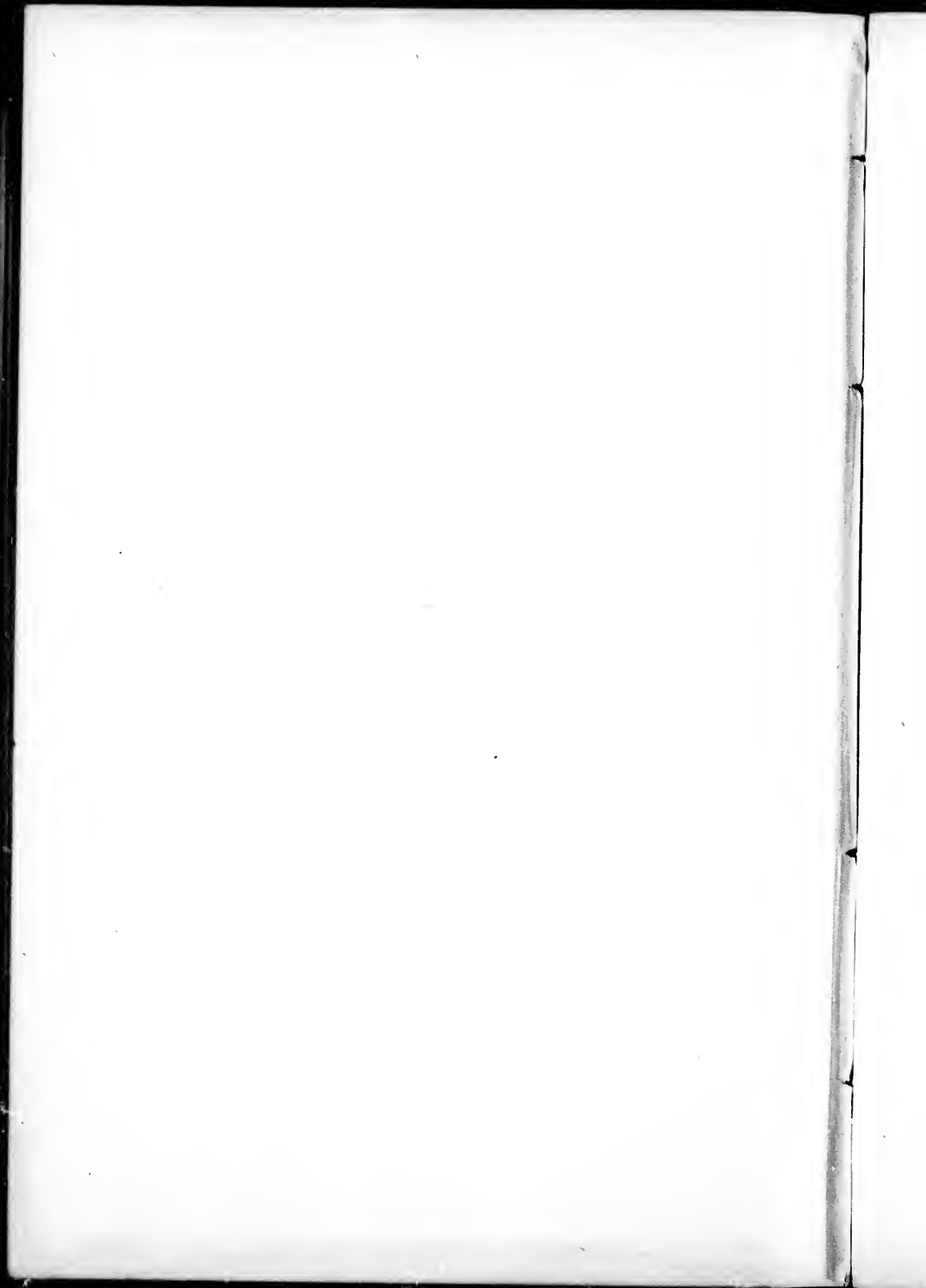
Begins as a fissure, tubercle, or watery growth, ulcer irregular, ragged, everted edges; sloughing base; difficult to clean; tissues infiltrated, growth rapid, foetor, salivation, pain, this becomes severe, at first localized, then shooting, neuralgic along the Br. of the 5th nerve over the side of the head, and the ear especially. Movements in deglutition, muscular and articular, gives pain. Glands are early involved. 1st under the jaw, then the glands of the neck. Tissues infiltrated. Later ulcers in the throat from breaking down these glands. Salivation becomes severe; swallowing foul discharges, hemorrhage, and sapaemia.

Diagnosis:—It is while it is localized that we meet with the difficulty. Where in doubt excise a small portion and examine. Where doubtful try syphilitic treatment; if malignant it will probably be aggravated.

Operations.—Removal of a portion of the tongue justifiable when epithelioma is confined to tip or border of anterior half, and if the submaxillary glands are not enlarged.

Draw tongue out by means of ligatures inserted into tip. Introduce a gag. Split tongue down middle and then free diseased half from floor and side of mouth and remove with scissors.





Where posterior half of tongue is involved, it is necessary to remove the whole organ. Hemorrhage is one of the chief dangers.

Heath's method of arresting hemorrhage, whether occurring accidentally during operation or afterwards:—Pass forefinger down to epiglottis, hook forward hyoid bone and drag up towards symphysis menti. This stretches lingual arteries, controlling the flow of blood for a time.

In operator must endeavour to prevent hemorrhage; prevent blood from entering air passages; and afterwards maintain asepsis of mouth and secretions.

Whitehead's Operation.—Introduce gag; draw tongue well forward by ligature through tip; divide fraenum with scissors; then while strong traction is made on tongue gradually free attachments by a series of short snips carried as far back as possible. Secure lingual arteries as cut. Keep stump under control, as regards hemorrhage, by silk ligature passed through remains of glosso-epiglottidean fold and retain for 24 hours.

After treatment.—As the greatest danger connected with this operation is septic pneumonia or other lung affections, produced by direct infection from discharges of decomposing wound, the most important point is to preserve a condition of asepsis. Wash mouth frequently with Condy's fluid, carbolic acid, etc., before operation; avoid too profound anaesthesia, and posture as far as possible so as to guard against the swallowing of foul discharges. After operation, pack wound with sticky iodoform gauze, or Friar's balsam, substituting a saturated solution of iodoform in ether for the rectified spirit. Feed patient early by mouth by means of a soft rubber tube and glass funnel. Encourage patient to sit up the day after the operation, thus preventing to some extent the discharges of blood from getting into the air passages.

Kocher.—First do a tracheotomy, plug pharynx with sponge, incision from below mastoid to middle point of anterior border sterno mastoid, then forward to middle point of hyoid, ligature linguals, remove enlarged glands—tongue removed through floor of mouth.

## SURGICAL BACTERIOLOGY.

Pus Microbes are of several varieties:—*STAPHYLOCOCCUS PYOGENES AUREUS* Albus, Citreus, Cereus Albus, Cereus Flavus and Tenuis.

The most common, and also the most virulent of these, is the Aureus. It grows on Agar, liquefies gelatine, coagulates milk and produces a diffuse cloudy sedimentation in bouillon. It is a facultative anaerobe, non-motile and does not form spores. Stains readily with the Aniline dyes and by Gram's method.

Found abundantly outside the human body, in dirty water, air and soil; but most commonly in the superficial layers of the skin, particularly in the axilla and other moist places, and under the finger nails.

*MICROCOCCUS EPIDERMIDIS ALBUS*:—A comparatively harmless, but mildly pyogenic microbe found in the deeper layers of the skin, thus making it impossible to obtain complete asepsis.

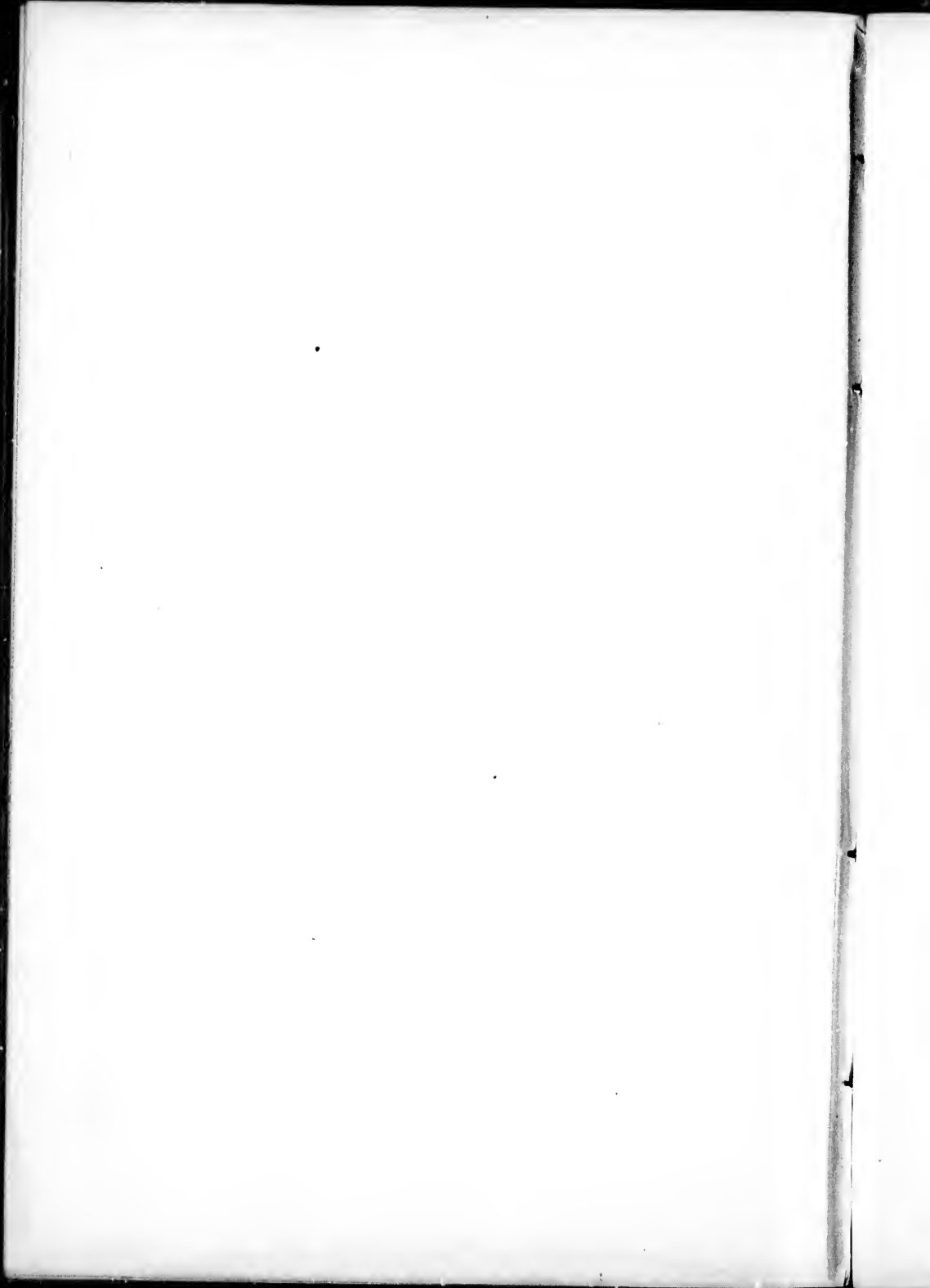
*STREPTOCOCCUS PYOGENES*:—Are of one species, growing in chains or rows. The specific organism of erysipelas, and is also found in puerperal fever, osteo-myelitis, etc. Under no condition is its growth luxuriant. In broth-growth slow, minute granules floating in fluid; gelatine, no liquefaction, small white dots along stab; Agar; a line of whitish pin-point colonies which do not coalesce. It is one of the most virulent of pyogenic cocci. Is found under normal conditions in the saliva secretions of the nostrils, vagina and urethra.

*BACILLUS PYOCYANEUS*:—Found in green or blue pus, is a small thin rod with rounded ends, which unite in chains. It is actively motile. When in contact with oxygen, the pigment is deposited; this is seen principally on the exposed edges of dressings, and is called *pyocyanine*.

The pyogenic cocci are not usually found in cold abscesses, but are found in all acute forms.

The Staphylococci are found in circumscribed abscesses, as in suppurating glands, osteo-myelitis, carbuncles, boils, empyema.

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The Streptococci, in spreading inflammations as erysipelas, ulcerative endocarditis, phlegmonous cellulitis and metastatic abscesses.

**GONOCOCCUS:**—A minute diplococcus found only *within* the pus cells. Is encapsulated; will not grow on ordinary media, but on blood serum, or serum and urine at 37, 38 degrees. Decolorized by Gram's method. In twenty-four hours it forms distinct greyish colonies. It is always present in gonorrhoeal discharges, and is found in gonorrhoeal arthritis, endocarditis, but may invade any tissue of the body. Its effects are most persistent in women, the usual portal of invasion being per urethra or vagina. May cause ophthalmia in new-born.

Gonorrhoea is peculiar to man; cannot infect lower animals.

**PNEUMOCOCCUS:**—A diplococcus having a distinct capsule, but this disappears when grown outside the body. It is the cause of about 96 per cent. of cases of Lobar pneumonia.

Grows on all ordinary media. Agar—minute dots; stains by Gram's method; when inoculated into ordinary animals of laboratory, sets up lobar pneumonia. One attack predisposes to another. It is found in pleurisy, meningitis and otitis media.

**BACILLUS TYPHI ABDOMINALIS:**—Is an actively motile, facultative anaerobic bacillus with rounded ends; does not form spores. Grows more abundantly in the air, at body temperature. Gelatine; pearly greyish case; milk grows rapidly, but does not coagulate.

The bacilli may be spread by dust, but usually enter by the digestive system in the milk or water. Those who have had typhoid are generally immune, but a person may be immune from the bacilli and yet not be toxine proof.

**TYPHOID OR VIEDAL REACTION:**—When the blood of a typhoid patient is added to a pure culture of the typhoid bacillus it causes a clustering and arrest of motion of the bacilli *agglutination*.

This bacillus is similar to, and frequently confounded with the Colon Bacillus; but may be distinguished by the following reactions.

1. *Elsner's test*:—To medium of growth, add Pot. Iod., only typhoid bac. and Bac. Coli Com. will grow, typhoid; small granular colonies. Coli, large colonies.

2. *Fermentation test*:—On lactose or glucose broth, typhoid does not produce gas. Colon does.

3. *Indol*:—Typhoid does not produce indol. Coli does.

4. *Litmus Agar*:—Colon, by its rapid acid production, turns it red. Typhoid does not.

5. *Milk*:—Colon rapidly coagulates milk, turning it acid. Typhoid either does not coagulate it, or else does so very slowly.

6. *Potatoc*:—Coli, a thick smeary yellowish brown growth; typhoid, a thin transparent film.

**BACILLUS TUBERCULOSIS**:—Stains with difficulty, decolorized with difficulty. Best stained by Carbol fuchsin when they are seen to be small fine rods, generally isolated. Frequently their protoplasm stains irregularly, giving them a beaded appearance. They are non-motile, and non-spore forming (?), grow badly outside the body, but once grown succeeding cultures grow more readily. The best medium is ordinary gelatine broth, with 5 per cent. glycerine added and temperature 37° C.

If the bacilli in a culture on this medium be killed, and the broth evaporated to a 10 p.c. solution, it forms the ordinary *Tuberculin*.

Its growth in the body is characterized by the formation of tubercles, in which giant cells are found (see Inflammation, Adami). Koch's method of treating Tuberculosis was 1. To pour into the system the toxins of Tuberculin. 2. To stimulate leucocytosis. 3. To stimulate absorption of the tubercles by mercurials.

This was found to be practicable in laboratory animals, but in man the proportionate dose could not be estimated, and there was great danger of converting a local into a general tuberculosis. It is now only used in minute doses for diagnostic purposes. Tuberculosis is very common in cattle, therefore of importance, re-milk supply.

The bacilli are to be found in the scraping of tuberculous sinuses, especially in the soft tissues. It is very difficult to

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demonstrate their presence in bones, and even in glands. In other tubercle lesions, this is comparatively an easy matter.

**BACILLUS OF LEPROSY:**—Is very similar in app. and staining to bacillus of tuberculosis, but is more rigid, and ends are more pointed. Cultivation of it has been unsuccessful. It is found in all stages of Leprosy, in the lymph channels of the skin, but sometimes it is embedded in the protoplasm of the cells.

**BACILLUS OF SYPHILIS:**—In 1884, Lustgarten described a bacillus similar to tuberculosis, but not stained by the Ziehl Neelson method.

**SMEGMA BACILLUS:**—Located in the smegma, and often found beneath the prepuce, and upon the vulva in health and in disease.

Differential diagnosis between Tubercle, Leprosy, Syphilis and Smegma bacilli.

Stain all with Carbol Fuchsin; treat with sulphuric acid. Bac. of Syphilis are immediately decolorized. Smegma Bac. resist for a longer time, but when treated with alcohol, quickly lose their colour. Leprosy and Tubercle Bac. are very retentive of their colour, even after treatment with acid and alcohol, but as Leprosy is so rare, it may be excluded.

**BACILLUS DIPHTHERIÆ:**—Is non-motile; grows best in the presence of Oxygen on Alkaline serum, will not grow in acid serum. Of about the same length as the Tubercle Bacillus, but much thicker. Is very variable in length, shape, and in the disposition of its protoplasm. Grows at a low temperature, especially on milk and potatoe; this of importance in connection with spread of disease. Chemically it produces a false membrane in the throat, at the same time elaborating a poison which is absorbed, causing the symptoms with a sequence of nephritis, paralysis, etc. Bacilli do not tend to invade the organism, but may infect wounds.

**Anti-toxin treatment:**—By injecting 500, 1,500 units, immunity may be obtained, seldom any serious ill-effects. An anti-toxin unit is that amount which will completely neutralize ten times its amount of normal serum.

**BACILLUS OF RABIES** is unknown.—It is probably a pro-

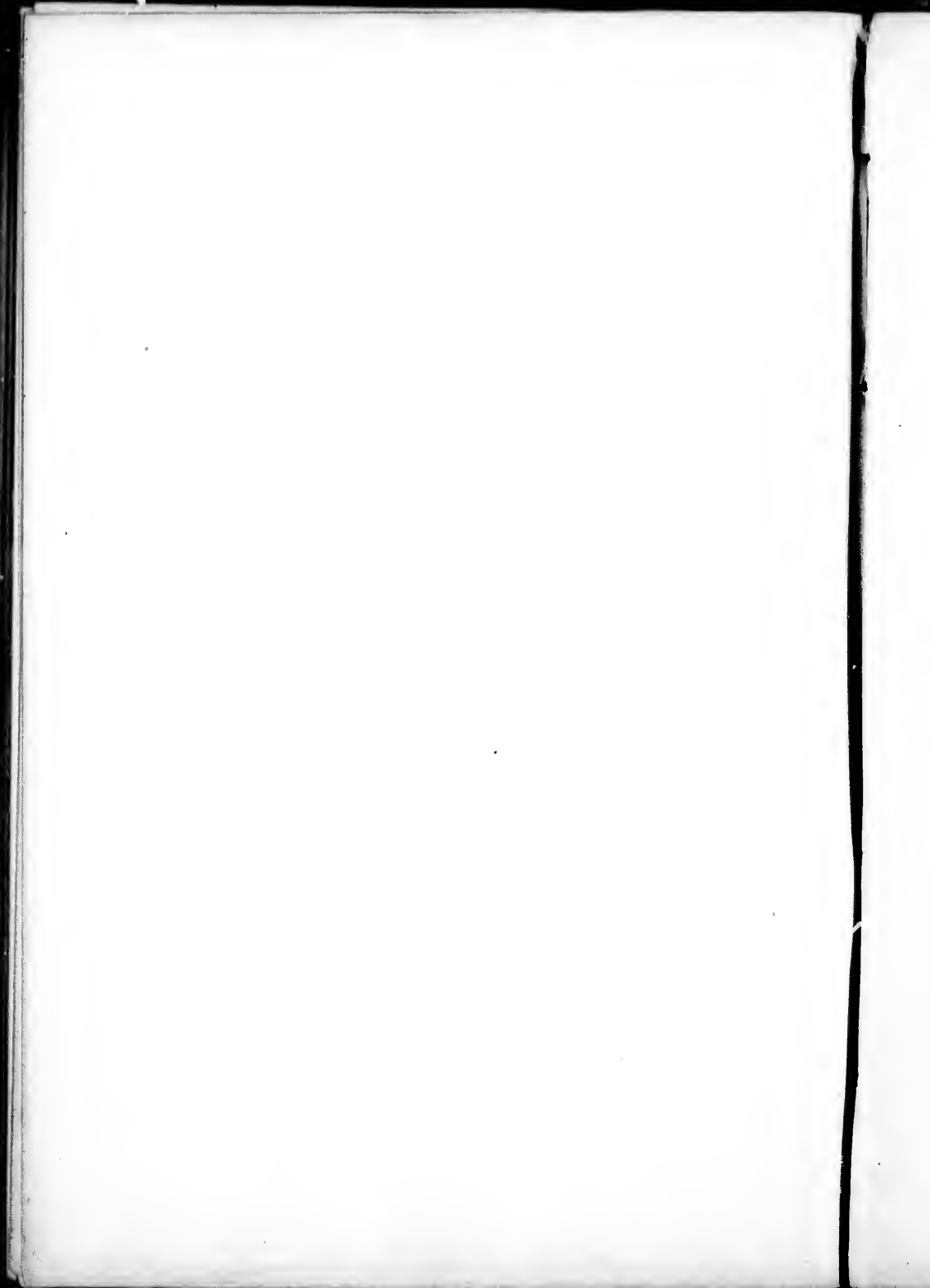
tozoa. Is inoculable. Pasteur attenuated the virus by drying the medulla of affected animals in a warm room for fourteen days, it was then non-virulent. This may be preserved in 30 per cent. glycerine, and by early inoculation may immunize. (See page 11.)

**BACILLUS OF INFLUENZA—GRIPPE:**—The smallest yet described. Found in the purulent discharge from the bronchi of patients suffering from epidemic influenza. As the two ends stain more deeply than the middle portion, it is sometimes mistaken for a diplococcus. It is of especial interest to surgeons, from the fact that lesions so frequently follow cases of epidemic influenza, but the relation of these lesions to the bacillus has not been clearly traced out.

**TETANUS BACILLUS :**—An anaerobic B. which forms spores. It is motile in early stages, and stains easily. Special methods are required for its growth, so as to exclude the oxygen. It forms aster-like bodies deep in the media, cultures emit a peculiar odour. It is extremely wide spread, being especially found in cultivated earth, stable dung, etc. As it is anaerobic it will only grow in deep punctured or penetrating wounds, or concomitant with a mixed infection of aerobic forms, which use up the oxygen. A toxine of enormous power is elaborated, .000005 grm. will kill a white mouse, death being preceded by convulsions, resembling strychnine poisoning. Tetanus anti-toxin treatment has not been successful, except where administration has been early. Prophylaxis—Is now a routine treatment to inject early in suspected cases.

**BACILLUS ANTHRACIS:**—A rod-shaped non-motile spore forming bacillus. In the blood of living animal it never contains spores, but shows as short thickened or joined segments with flattened or cup-shaped ends. When cultured grows in long filaments, grouped in bundles or forming a felted mass. If exposed to the air under unfavorable conditions spores are formed. It grows readily at ordinary temperature in neutral or slightly alkaline media, liquefies gelatine, on plates of which the colonies have the "Gorgon Locks" appearance. Spores are exceedingly resistant, remaining alive and virulent for years if kept dry.

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Malignant pustule and pulmonary anthrax in wool sorters disease are the diseases set up by this organism. It is, in fact, a true septicaemia, and after death, the rod-shaped bacilli will always be found throughout the body in the capillaries.

Inoculation is followed by oedema of connective tissue at site of injury, small hemorrhages, emphysema, pallor, flabbiness and moistness of neighboring muscles, cloudy swelling and hyaline degeneration. Spleen is enlarged and the liver has a parboiled appearance. They are both congested. See also page 84.

**ACTINOMYCOSIS:**—Ray fungus; is found in the pus from certain abscesses of the lungs, liver, and bones, especially the vertebrae. May invade the whole body. Is particularly common in cattle; lump jaw; found in small nodules rounded or mulberry-like in form composed of wedge-shaped rays. This (Adami) is an involution form found in old tumours. The active fungus appears in the form of cocci arranged in chains or leptothrix threads, which interlace freely so as to form a felted network in centre of colony with a radiate appearance at periphery. It grows well under anaerobic conditions, at body temperature. It lives outside the body, being propagated through barley and cereals. Portals of entrance, through the tonsils, or carious teeth, but may be introduced through wounds. The leptothrix form is that most commonly found in man.

**BACILLUS MALLEI:**—Glanders or Farcy; a motile bacillus, growing on gelatine at body temperature, forming a whitish mass composed of chains and threads. On plate cultures produces bright yellow colonies. On potatoe a bright yellow surface growth which gradually takes on a peculiar fawn colour, ultimately becoming chocolate brown. Stains best with an alcoholic solution of methylene blue. It is most prevalent amongst the equine species, in which it is associated with inflammation of nasal lymphatics. It is inoculable to man. The disease gradually spreads until it becomes a general infection.

**Diagnostic Test:**—1. By inoculation of guinea pig and examining the purulent exudate from between the layers of the

tunica vaginalis. After four days the bacilli are readily demonstrated. 2. By the injection of Mallein, which when injected into a glandered animal produces great local reaction, marked constitutional disturbances with rise of temperature. (See also page 85.)

**BACILLUS SEPTICÆMIÆ HÆMORRHAGICÆ:**—An organism or group of organisms important to surgeon, which are described under different names by different observers. B. of fowl cholera, Pasteur. B. of rabbit septicaemia, Koch. B. of swine plague, Loeffler. B. of deer plague of Hueppe.

It is a short bacillus with rounded ends, and is found in the blood and oedematous fluid of affected animals. Extremities of bacilli are stained by aniline colours, decolorized by Grams. The central zone always remains unstained. It grows best when supply of oxygen is restricted, as in the deeper layers of the tissues.

In a peptone solution of ordinary media, it produces indol. Drying kills; results, swelling of spleen and lymphatic glands, swelling and ecchymoses of mucous membranes; acute oedema at point of inoculation and hemorrhage, and degeneration of small areas of muscles. Bacilli continue to increase after death.

**BACILLUS OF BUBONIC PLAGUE:**—Recently described by Kitasato is similar to preceding, and is found in the blood, tissues, buboes and internal organs of infected patients. It may be single or in pairs, encapsulated, is slightly motile and grows best on blood serum at body temperature. The growth, which is yellow and moist, *does not* peptonize the medium, nor does it liquefy gelatine.

Guinea pigs, rabbits, mice and rats are susceptible. It is especially propagated by mice and rats.

By drying, moist heat 80°, and antiseptics, the bacillus is destroyed.

**BACILLUS LACTIS AEROGENES:**—Usually met with in the faeces of children and in animals fed on milk.

It bears the same relation to peritonitis as the B. coli does.

It grows on gelatine, producing nail-shaped colonies. In milk sets up an energetic lactic acid fermentation and produces gas (Carbon dioxide and water).





**BACILLUS PROTEUS VULGARIS:**—Is one of the commonest putrefactive bacteria. It occurs either in oval forms or as distinct bacteria, with rounded ends; usually in pairs. There are numerous involution forms.

Gelatine is liquefied, colonies yellowish brown, and eventually the whole surface is covered by zoogloea masses. Although spores are never found, it resists dessication. May grow anaerobically. Immunity on recovery. Surgically, it is important to remove the effete matter by the various emunctory channels, at regular intervals, because Cheyne found that, although the tissues will resist a large number of bacilli, a minute dose plus the accumulated toxine will result in death, the accumulating toxins devitalizing the tissues, and producing a favorable nesus for proliferation.

**BACILLUS OEDEMATIS MALIGNI, or *Vibrio Septique*:**—Is found like the Tetanus B. in the soil, and also in the water which has stood in pools near such soil.

It is a large bacillus, and occurs in chains or long filaments, the transverse divisions are not well marked; ends convex. Stains by Gram's; forms spores. Grows best in nutrient gelatine (plus 2 per cent. sugar), deep down in media which it liquefies, forming gas and giving off a characteristic odour. It is pathogenic to all domestic animals except cattle. In man it is accidentally met with. If it is injected directly into the veins, it is killed off, but if into the muscles or subcutaneously, the disease is set up.

**COLON BACILLUS:**—Recent observations on the morphology of colon bacillus, or rather on the colon group of bacilli, by Professor Adami, tend to show that the variety of the forms it may assume in its life history under various conditions is greater than heretofore described.

The attenuated forms are specially interesting; diplo-cocci, diplo-bacilli, and chains of diplo-cocci, in addition to the well-known varieties, being seen in preparations from cultures grown under different conditions of temperature and in various media.

## OMITTED FROM ULCERATION, PAGE 59.

Skin Grafting:—This is the method adopted in large ulcer.

1. Reverdin's method of skin grafting. This is applicable only where we have granulations. Asepsis is unnecessary. Tiny pieces of skin are placed here and there over the granulations, and covered with silk isinglass. In a few days they seem to have disappeared, but the granulations in this area are spreading rapidly. This method takes a longer time to heal skin, and is not so good as

2. Thiersch's method of skin transplantation. *Asepsis is absolutely necessary*, so scrape away all the granulations, and cut off the diseased skin at the edges. Shave off pieces of skin three-quarters to one and a half inches wide, and lay on, taking care not to go deeper than the epidermal layer; this is recognized by being hard and dense with bleeding points. If any fat present this points to true skin, which is not wanted; have adjacent pieces over-lapping.

Special Forms of Ulcer:—1. Phagedera; rapidly spreading; occurring usually in venereal sores. Chronic or acute.

*Treatment:*—Destroy the surface by caustic or cautery, and get acute ulcer healing well, except perhaps in syphilitic or debilitated subjects.

2. Exuberant Ulcer :—Treatment :—(a) If slight, apply Silver Nit. or Cu. Sulp. (b) If marked, shave it off, and apply pressure or cautery.

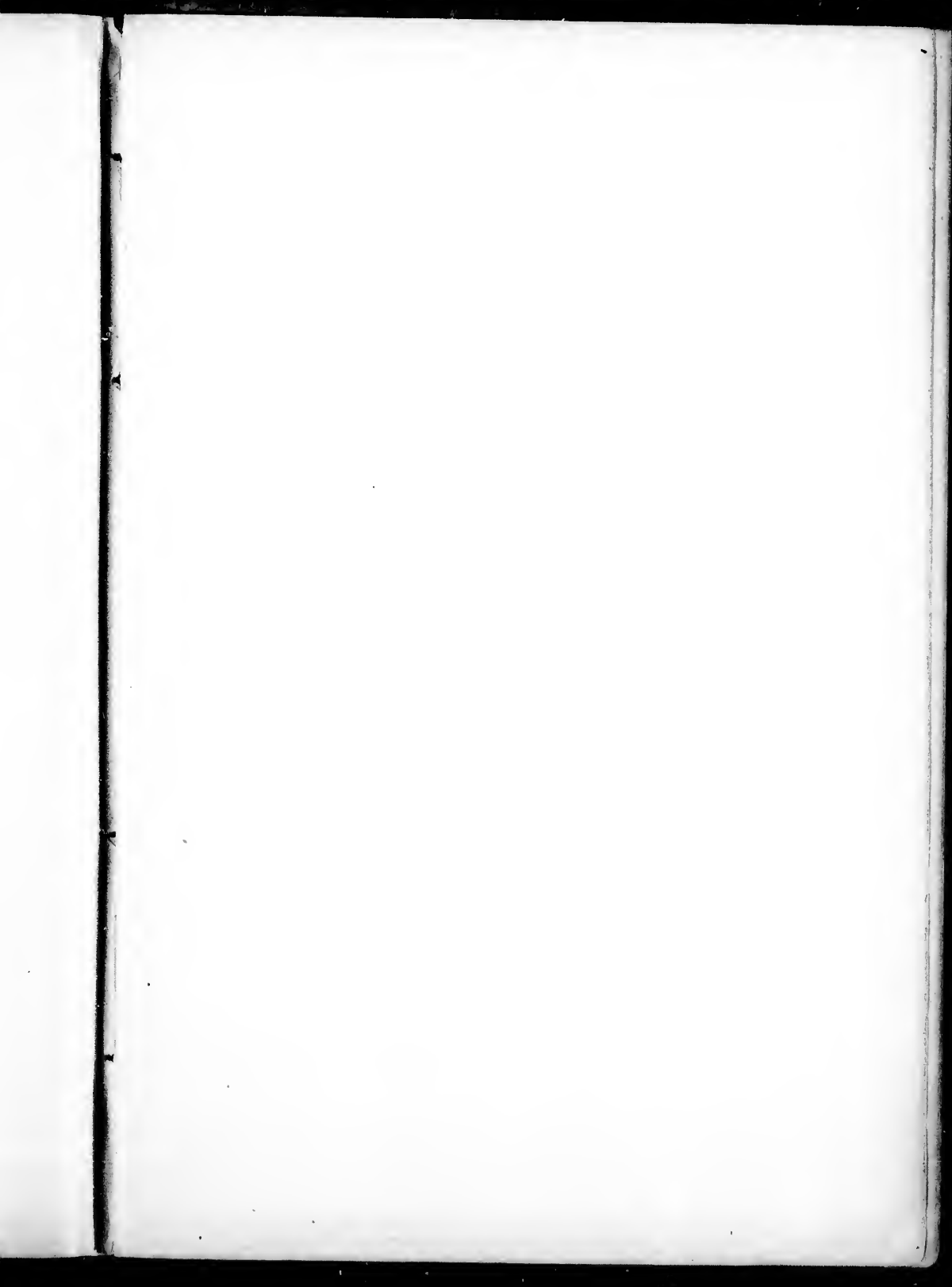
3. Painful Ulcer (nerve endings are exposed).

*Treatment:*—(a) Cut the nerve branch. (b) Chloral or Cocaine applied.

4. Rodent Ulcer:—This is an Epithelioma, growing from the sebaceous glands.

5. Decubitus:—From debility, but prevented by hardening the skin, and by scrupulous cleanliness.

6. Trophic Ulcer:—Pressure Poultice and stimulating the nervous system.







## ADDENDA.

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### TO IRRIGATE BLADDER.

Warm solution of Boracic Acid.

~~Thiersch's solution, Salicylic Acid gr. I.~~

~~Biborate of Soda VI.~~

~~Water oz. I.~~

Bichloride of Mercury 1-10000.

### EXTERNAL IRRIGATION.

Carbolic Acid 1-20, 1-40.

Bichloride of Mercury 1-1000 to 4000.

### IRRIGATION OF JOINTS.

Bichloride 1-5000.

### IRRIGATION OF PERITONEAL CAVITY.

Boiled Water.

Bichloride 1-10000.

### TRANSFUSION OF SALINE SOLUTION.

One drachm of Sodium Chloride to the pint of  
sterilized warm water.



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