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RECAP

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CHETWOOD

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The Students' Quiz Series.

GENITO-URINARY

AND

VENEREAL DISEASES.

A MANUAL FOR STUDENTS AND PRACTITIONERS.

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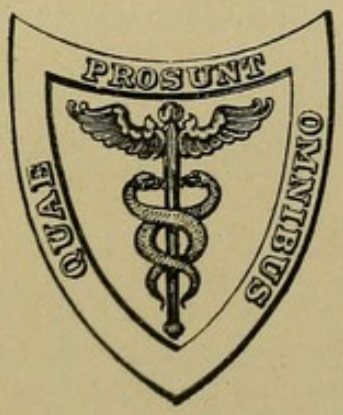

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PREFACE.

In preparing this work as a "Quiz Compend," the method which the author has endeavored to follow is to present the various subjects by questions which would be apt to arise in the mind of the student and practitioner, and to form the answers in a conversational and descriptive manner, avoiding terse summaries. The different authorities who should receive recognition are, first and principally, Dr. Edward L Keyes, whose exhaustive works on the subjects herein treated have been of the greatest assistance. Other works which should receive due mention as references are Professor Ultzmann's *Genito-Urinary Neuroses;* Sir Henry Thompson's *Clinical Lectures;* and Ashurst's *Encyclopædia of Surgery.*

In delivering this little work into the hands of my fellows with its merits and demerits, if it only succeeds in creating a more widespread interest in Genito-Urinary Surgery, and in directing attention toward the larger works on this subject, it will have attained at least one of the objects designed for it by the author,

CHAS. H. CHETWOOD.

120 East Thirty-fourth st.,
New York City,
June, 1892.

CONTENTS.

GENITO-URINARY AND VENEREAL DISEASES.

ANATOMY AND PHYSIOLOGY.

What are the male generative organs?

The penis and glands of the urethra, the testicles and appendages.

What is the first act essential to generation?

Coitus.

What organs in the male accomplish it, and are necessary to make it fruitful?

The *testicles* primarily, which make the vital elements of the seminal fluid, the *vesiculæ seminales*, reservoirs in which the semen is stored until expelled through the *ejaculatory ducts* opening on the floor of the prostatic urethra; the *prost te* and *smaller glands* opening into the urethra, which contribute a mucous vehicle for the semen; the *penis* during the phenomena of the erection and ejaculation.

What are the urinary organs?

The *kidneys* and their excretory ducts, the *ureters*, the *bladder*, and the *urethra*.

VENEREAL DISEASES.

What is a venereal disease?

One which is acquired during the act of sexual intercourse, or the origin of which is referable to this source.

What are the external genitals?

The *penis* and *scrotum* in the male, and the *mons veneris* and *vulva* in the female.

What venereal diseases commonly make their appearance here?

Syphilis in its different stages, notably as its primary lesion the chancre, chancroid (or the so-called soft chancre), venereal warts, and pediculi.

What other diseases not essentially venereal involve these parts?

Inflammation affecting the glans penis and adjacent mucous membrane, termed balanitis, herpes progenitalis, cutaneous affections, and tumors.

What anomalies of the external genitals occur?

Anomalies of size, defective development of the penis, absence of and double penis; hypospadias and epispadias, both of which may be only slight or may involve the entire external genitals.

SYPHILIS.

What is syphilis?

Syphilis is a general disease or dyscrasia of the blood, which in its acquired form appears first externally in its primary lesion, called chancre, which may be followed by profuse or only isolated outward manifestations in its later stage.

How is syphilis transmitted?

Generally during sexual intercourse, but in any manner by which the virus from one source is brought in contact with an abraded or mucous surface of another.

Into what stages is syphilis generally divided?

Three: *primary*, the stage of infection and incubation and the period of the primary lesion called the chancre; *secondary*, the stage of superficial lesions of the skin, mucous membrane, and lymphatic glands; *tertiary*, the period of deep-seated and destructive lesions.

How long after the absorption of the syphilitic virus does the primary lesion or chancre appear?

Generally after an interval of about three weeks. Periods of longer and shorter duration occur, but this may be called the average.

During this period do any symptoms occur to indicate the presence of the disease?

No.

What happens at the point of infection during this time?

After perhaps a temporary soreness or irritation, which is mechanical, the spot resembles in every way the surrounding tissues.

Where does the chancre make its appearance?

At the point where the virus has been absorbed.

Is its situation restricted to any one portion of the body?

No; it may attack any part under the conditions necessary for its infection.

Where is the most common seat of venereal chancre?

On the mucous membrane behind the corona glandis.

Is the chancre a single or multiple lesion?

While, as a rule, it is more apt to be single, as many points as are separately inoculated will yield the same number of lesions.

Does the chancre become multiple after its first inoculation?

No; the chancre is not "auto-inoculable." Multiple chancre occurs from separate points of inoculation at the time of exposure.

What is the first appearance that the chancre presents?

It first appears as a small papule or hard pustule, which soon moistens or ulcerates.

What is a common characteristic of syphilitic chancre?

Induration; hence the name "hard chancre."

What is the nature of this induration?

It may be thin or parchment-like under the chancre, only felt on manipulation, but is often more extensive, when it is easily distinguishable by the eye. It is situated beneath the ulcer, does not shade off into the surrounding tissues, and is freely movable.

When does it appear?

It may precede or follow the ulceration during the first week.

When does it disappear?

Sometimes before the ulceration, but generally outlasts it for several months, and rarely for years.

What different forms may the chancre assume when fully developed.

First and most frequently it appears as a flat erosion, generally behind the corona glandis (when venereal), undermined by parchment-like induration, which sometimes causes it to protrude farther than the corona itself. When multiple this gives it the appearance of a cartilaginous band with ulcerated surfaces, glistening and red. It may appear with superficial ulceration, presenting the appearance of a split pea, with slanting edges and underlying induration, the discharge being purulent or sero-purulent. The "Hunterian" chancre is not so frequent: it appears with an extensive cartilaginous induration, edges of the ulcer sloping and adherent, not undermined, and having a funnel-shaped appearance, rounded or oval; discharge sero-purulent. On the skin the chancre often appears as an indurated tubercle which does not erode, but remains thus until it scales off or becomes covered by a crust.

What is the general character of the discharge from a chancre?

Serous or sero-purulent and sometimes bloody—never thick or richly purulent unless subjected to great irritation.

What is the duration of the chancre?

From a couple of weeks to several months, the induration remaining after the sore has cicatrized.

What is the nature of the scar which it leaves?

It varies according to the nature and depth of the sore. Sometimes there is none at all. If present it first undergoes a period of pigmentation, commencing with a venous hue, which after darkening ultimately bleaches out, and the scar becomes whiter than the surrounding tissues.

What are the complications liable to accompany chancre?

Inflammation, chancroid (mixed sore, see p. 32), phagedæna and gangrene, vegetations, bubo, and lymphangitis.

What is a mixed chancre?

Where chancre and chancroid (the local venereal ulcer) become inoculated and develop in the same spot.

When a syphilitic chancre becomes inoculated with chancroidal pus, what happens?

The ulcer seems to take on the character of chancroid, while the induration remains.

When a chancroid is inoculated with syphilis, what happens?

The ulcer remains unchanged, but after a period of incubation induration sets in. If they be simultaneously inoculated at the same spot, the chancroid first appears, and after a variable period of incubation the induration sets in.*

What is syphilitic bubo?

Enlargement and induration of the lymphatic glands adjacent to the seat of the chancre. (The general glandular enlargement appears later as a symptom of the secondary stage.)

By what are bubos produced?

By absorption of irritating substance from the chancre and constitutional debility.

What situations of the chancre would affect the inguinal glands?

Penis, groin, scrotum, perineum, anus, etc.

What glands are affected in chancre of the lip?

The submaxillary lymphatic glands.

What is the general character of these glandular enlargements?

They are hard, freely movable, rarely painful, and vary in number and size. Sometimes there is one very large gland, but more often a chain of hard lumps. They may be unilateral or bilateral.

When does this glandular induration occur?

During the second week of chancre.

Is this condition of glandular enlargement regularly present?

Yes; it is one of the diagnostic symptoms of syphilis.

Does suppuration ever occur in these glands?

Practically, never. When present it is referable to direct violence or inflammation of the chancre in an undermined constitution.

What is syphilitic lymphangitis?

It accompanies chancre, and is an induration of the lymph-vessels which are adjacent to it, distinguishable by hard, knotty cords, which are not sensitive and are not marked by a reddened skin.

* The secretion of such a sore is capable of transmitting chancroid alone, as the pus of chancroid is more virulent than that of any other venereal ulcer.

On what does the diagnosis of syphilis depend when that of the sore is not established?

On the appearance of a syphilitic eruption indicating the presence of a general and not local disease, which syphilis *is* and *must* be without exception.

We have divided the later appearance of syphilis for convenience and from usage into secondary and tertiary stages.

Is there any clear line of demarcation between them?

No; the disease is constitutional from the start, but the first symptoms of general syphilis begin with the so-called secondary stage.

Is there an interval between the first and second stages?

Yes; a so-called "second stage of incubation," lasting on an average forty-three to forty-five days.

How long does the period last during which these secondary symptoms appear?

From a year to eighteen months—sometimes two years or more—with various exceptions on both sides of the rule.

Are there any prodromal symptoms to the secondary stage?

Yes; about a week or ten days before the eruption appears the patient passes through a febrile stage of a variable character, sometimes coming on as a simple febricula, in other cases as a malarial paroxysm, remittent or intermittent.

At this period of the disease what is apt in the appearance of the patient to indicate the presence of a constitutional disease or cachexia?

A sallow and anæmic complexion and a general condition of malaise.

Of what does this cachexia consist?

A hydræmia, or a diminution of the red blood-corpuscles in the blood.

What is the general term applied to syphilitic eruptions?

Syphilides.

Mention the different forms these syphilides assume during the secondary stage.

Erythematous, papular, vesicular, pustular.

What general characteristics do they usually present?

A general absence of itching and pain, appearing first in a livid hue, later becoming pigmented (presenting a characteristic coppery color), and finally disappearing white.

What general difference is there between the histories of the early and late eruptions?

Early eruptions tend to be superficial and general; the later tend to appear in patches, and affect the cutis vera. These patches generally take on a characteristic rounded form.

What other affections accompany the early outbreaks of the secondary stage?

The phenomena of syphilitic fever which have already been mentioned—alopecia, headache, and pains in the joints and bones, which are worse at night; general glandular swellings, iritis, sore throat, and mucous patches in, upon, or around the natural orifices. The latter comprise the syphilides of the mucous membranes.

What different forms do these syphilides of the mucous membranes assume?

Like those of the skin, they are divided into superficial and deep lesions, the latter appearing late in the secondary and during the tertiary stage.

Early, they appear as a general congestion or erythema, which may or may not be accompanied by "mucous patches"—small glistening whitish spots not properly called ulcerations. As the disease progresses these patches become infiltrated, and finally may break down and form real ulcers.

The late forms comprise the ulcerative syphilides of mucous membranes, which result from the breaking down of a "gumma" formed in the submucous tissue. The so-called gumma appears as a brawny swelling or tubercle in the soft parts, showing a tendency to destruction, and soon breaks down, after which it is liable to be mistaken for chancroid. The history of the case may assist in clearing up the diagnosis, which is settled by the use of anti-syphilitic medication.

When does iritis occur, and what does it consist of?

Possibly within a few weeks or months following the primary lesion, or as an accompaniment of the later phenomena of the secondary stage. There is nothing distinguishing in syphilitic

iritis, it having the same symptoms as inflammation from other causes.

The *symptoms* which present themselves are discoloration of the iris; smokiness of the pupil, which may be irregular; hyperæmia of the adjacent structures; lachrymation; the pupil does not expand when shaded from the light, and is inclined to be small; the pain may be situated in the eyes—generally located around the forehead and temple or anywhere in the course of the supra-orbital nerve. There is an exudation, which is apt to be more or less plastic, but may be simply serous. The vision is impaired. It may occur in one or both eyes separately or simultaneously.

The *prognosis* depends upon the extent of the lesion existing at the time treatment is resorted to. A large majority of the cases under proper treatment entirely recover.

The *treatment* comprises the general constitutional remedies for the disease itself, together with local measures, the most important feature of which is to produce complete dilatation of the pupil. This is effected by the use of solutions of sulphate of atropine, 2 gr. to the ounce. In mild cases the instillation of 3 drops of such solutions three times daily will suffice to overcome any adhesions which may exist, but it must be repeated with greater frequency according to the obstinacy and extent of the adhesions. Cold compresses may be applied to the eye, and if the inflammation is very high leeches may also be used; but the most efficient means of relief will be found in procuring a rapid constitutional effect from the mercurial remedies—namely, by hypodermic use of the various recommended solutions, by inunctions, etc.

What are the general glandular swellings which accompany the secondary stage?

They consist of an indolent engorgement of the lymphatic glands in different parts of the body, notably the post-cervical and epitrochlear. They may appear simultaneously with the first eruptive lesions or prior to their discovery. Their appearance is very useful in diagnosing the existence of the syphilis at its secondary stage. There is no special treatment indicated.

How does the alopecia which accompanies syphilis appear?

Either as a simple loss of hair, general or in patches, of the scalp, eyebrows, eyelids, whiskers, and variously over the whole body, the result of the syphilitic "hydræmia," analogous to the

same condition occurring after other acute causes, such as fever, etc.; or syphilitic alopecia occurs as a result of a seborrhœa, where scabby sores are formed upon the scalp, and later in the disease ulcerations form, in which case the lost hair is not renewed. Generally, however, the baldness accompanying syphilis is only a temporary affair.

The *treatment* in the case of ordinary baldness is the use of a stimulating lotion and proper washing or shampoo of the scalp at about weekly intervals. When a scalp becomes infested with scabs and sores, the general treatment is largely to be relied upon, while the scalp may be kept moistened with rags wrung out in mild solutions of bichloride of mercury, on general principles of antisepsis.

What different types of sore throat accompany the different stages?

(1) General congestion with or without ulceration;

(2) The chronic congestion and thickening about mucous patches or atonic ulcers;

(3) Destructive ulceration (more apt to accompany the later or tertiary stage).

The first variety is an early secondary symptom and an accompaniment of the early syphilides.

What are the later lesions of syphilis? and where do they appear?

The scope of these lesions is almost beyond description. They may affect any organ or involve any tissue. They appear upon the face of the individual, or they lurk secretly within and involve his internal organs, impairing their various functions.

It would be impossible in a compend of this description to attempt to enter into any but a general review of the many affections the causation of which syphilis enters into. There is hardly a disease in the whole nomenclature of medicine, of mind or body, which syphilis cannot enter the etiology of. It affects the eye and the ear in their different portions, and impairs or destroys the function of these organs of special sense according to the extent of involvement and the part it invades. It enters the sheaths of tendons and aponeuroses, bursæ and muscles, causing inflammation and wasting; and in the tertiary stage the so-called *gumma* may plant itself here, as it may—and does—in almost every other tissue of the body. In the bones it is inflammation of their cover-

ings and surroundings or substance, and again as a gummy tumor or as a dry "caries;" and so on through the digestive, respiratory, circulatory, and nervous systems, invading every part. The later the stage of the disease, the deeper and more serious the lesion, causing symptoms according to the part affected and the function over which it presides.

TREATMENT OF SYPHILIS.

What is the general treatment of syphilis?

Medicinal and hygienic.

Can the latter be effective without the aid of the former?

No; neither should be depended upon alone.

What is the hygienic treatment of syphilis?

It includes all the ordinary laws of health and living.

Can syphilis be aborted by excision of the chancre?

No.

Can the consequences sometimes be ameliorated by this procedure?

No.

What is the best method of local treatment?

Either dry dressing in the form of such powders as calomel, iodoform, aristol, dermatol, etc., or a mild astringent lotion containing sulphate of zinc or diluted nitric acid.

When should the constitutional treatment for syphilis be commenced?

As soon as the diagnosis is established, but not before.

What excesses are especially detrimental to the proper treatment of syphilis?

Excesses in drinking, venery, and work.

What is the so-called specific treatment of syphilis?

It consists in the judicious use of some preparation of mercury combined with iodine. The consideration of this specific treatment is divided into the treatment of early and of late syphilis.

What is the proper medicinal method of treatment to be pursued in syphilis as soon as the diagnosis has been established?

The tonic treatment, which consists in the continuous administra-

tion of small doses of mercury during the whole period of the syphilitic era.

What is the best method of starting the patient on the career of the tonic treatment of syphilis?

The protiodide of mercury is the best form to begin with, commencing with 1 centigram (gr. $\frac{1}{7}$) at a dose, and ordering this to be taken three times a day, to be increased 1 centigram every day until the physiological effects of the drug are felt, such as colicky pains, diarrhœa, and pains in the mouth experienced in eating.

After such symptoms appear what is the proper method to pursue?

By halving the dose which has procured such uncomfortable symptoms the tonic dose may be determined, and in most cases will be found to be the proper amount of mercury to be taken throughout the disease.

If a case of syphilis appears for treatment later in the career of the disease, and the tonic treatment is not chosen or not borne, what general plan of treatment may be laid down?

Early in the secondary stage some preparation of mercury may be given, either alone or combined with a preparation of iodine. Later in the secondary stage the iodine preparation has its special indication, and later still in the disease, where the lesions are deep and serious, the iodine preparation alone is to be relied upon for rapid and active work, the mercury to be taken up after decided effect has been produced by the iodide.

What are the different methods of administering mercury?

By the stomach, locally, by inunction, fumigation, and by hypodermic injection.

By the Stomach.—It is given in pill form as the protiodide. This is sometimes not well tolerated on account of producing pain and diarrhœa. The bichloride is generally well borne, and may be given in solution with a preparation of iodine. The "gray powder" (hydrargyrum cum creta), or "blue mass" (massa hydrargyri) is also used, or the biniodide may be given in place of the bichloride in combination with an iodide. In selecting a preparation different cases will be found to have individual peculiarities.

Locally.—Mercury is used for the treatment of local lesions, and its use often spares excessive internal dosing, and is a decided adjuvant to the latter measures. The superficial cutaneous lesions require no treatment unless appearing where they may be seen, as

on the hands or face. The different preparations which may be used for the ulcerative and moist lesions are the oleate of mercury, 5 to 10 per cent.; the white precipitate ointment (hydrarg. ammoniat.) in equal parts with zinc ointment or of milder strength; solutions of bichloride, from 1 to 4 gr. to the ounce of water, with a little glycerin, and as a dry powder calomel is used. Iodoform is often found useful on the ulcerative patches, or a little of it may be added to the combination of the white precipitate and zinc ointments.

By Inunction mercury often proves more efficient than by other means, as any possible irritation to the stomach is avoided and its use is thorough and efficient. The full physiological effects of the drug can be obtained by this means. The oleates have the objection of causing a great deal of local irritation. This method may be practised either by the use of mercurial ointment, which is kept constantly in contact with different tender surfaces of the body, being moved from one point to another as irritation arises, or by that method which is practised at the Hot Springs, and which is given in the following manner: The patient first takes a bath and is well rubbed by an attendant, after which, sitting astraddle a chair, the attendant rubs freely and vigorously with a circular motion over the entire back a certain quantity of mercurial ointment, generally from $\frac{1}{8}$ to $\frac{1}{6}$ of an ounce. The rubbing is kept up for about twenty minutes. A gauze shirt is put immediately in contact with the skin, and at the end of twenty or twenty-two hours the same process is repeated. Inunction is very valuable where rapid and thorough mercurialization is desired.

Fumigation may be had at any of the Turkish-bath establishments. It is also used when a prompt action of mercury is desired. It is a very good method and unattended with any disagreeable features, the only objection being that it is generally impracticable.

Hypodermic injections of mercury are coming into more favor, and their use attended with more favorable results. The following solution is a favorite one:

℞.	Hydrarg. bichlor.,	gr. viij;
	Ammon. muriat.,	gr. iv;
	Aqua bullien.,	℥ss.—M.

Abscesses may follow the puncture.

How are the iodides administered, and when called for, in the treatment of syphilis?

If the disease is taken in hand early and kept under a judicious dose of mercury, there being no tertiary symptoms, there is no positive indication for the use of the iodides unless the early symptoms are very severe and protracted. When both drugs are combined it is termed the "mixed treatment." The vehicle of such a mixture may consist of a stomachic or bitter tonic or syrup. When the symptoms are of such severity that it is desired to obtain a rapid full effect, the iodide of potash may be given in a saturated solution with water, 1 ounce of the drug to 1 ounce of water. In the mixed treatment, where the mild continuous effect of the drug is desired, it is generally given in doses of from 5 to 10 grains three times a day; but where it is desirable to obtain a rapid response from its use in the case of destructive tertiary lesions, where irreparable damage is threatened, there is no limit to the amount that may be given: 2½ ounces have been taken daily, and even more than this. Commencing with 5 or 10 grains, it may be rapidly run up, doubling the dose every day or every other day. Given alone and in such large doses, the iodides seem to be best borne if dissolved in milk.

What are the bad effects produced by the mercurial preparations?

Salivation and diarrhœa, with griping pains, may be caused, together with a peculiar mental condition which consists of a general depression and nervous disquietude, the patient being disconsolate and downcast.

What is the cause of salivation?

It may occur from an idiosyncrasy with a small dose or from large doses with no idiosyncrasy. A lack of cleanliness of the mouth is apt to favor the condition.

What are the symptoms of salivation?

The saliva overflows, sometimes to a very great extent. The breath becomes fœtid, and there is a metallic taste in the mouth; the gums become sore and may bleed; the teeth ache, and pain is caused by gentle pressure against them. The tongue swells, as may also the lips and teeth; the lymphatic glands in the vicinity become enlarged; sometimes the teeth fall out. Various degrees of this condition are met with. It may be very mild or appear with all the above symptoms.

What is the treatment of salivation?

It is sometimes warded off by administering good-sized doses of chlorate of potash during the course of the bichloride of mercury. When it occurs, chlorate of potash may also be used internally and the mouth washed with a bland cleansing lotion.

INFANTILE AND INHERITED SYPHILIS.

In what different ways may an infant become syphilitic?

Syphilis may be *acquired* by a healthy baby while nursing from a woman who has lesions around the nipple, or through vaccination, or in any other way which brings the virus in contact with an abraded surface. When the disease is so acquired it is virtually the same as in the adult. An infant may also become infected in its passage through the parturient canal. Syphilis is *inherited* from a mother who is syphilitic, yet who does not at the time show any outward symptoms of the disease. It may also become infected through the *mother* at the time of impregnation or during utero-gestation up to about the seventh month, according to Diday. This question is still under discussion.

When an infant has inherited syphilis, what is the time of appearance of symptoms?

This is variable. A syphilitic woman usually aborts if no treatment is employed, the cause of which is said to be contamination of the fœtus through visceral disease and degeneration of the placenta. Failing this, the child may be born and delivered with an eruption covering its body and advanced syphilis of the different organs. This is soon followed by a fatal issue. Often the infant comes into the world apparently healthy, but fails to continue so, develops an eruption and a coryza, and loses weight, generally about the third or fourth week, or it may be months before any signs appear, but this is uncommon. More rarely it happens that several years elapse before symptoms ensue.

What are the symptoms of inherited syphilis?

When the symptoms do not appear until weeks after birth, the child during this time generally shows a failure in gaining weight—has an unhealthy and weazened appearance. Generally the first outbreak is at the junction of the mucous membranes with the skin at the different orifices, which reveal fissures, excoriations, mucous patches, and ulcers invading the lips, the inside of the mouth and throat, and finally the genitals, buttocks, groins, etc. The nose

runs, and later becomes stopped up from swelling of the mucous membrane. If the disease continues, in bad cases the nasal cartilages may become ulcerated, and this ulceration continues so as to extend down the pharynx or destroy the bones of the nose; the mucous patches become covered with scabs or form dark crusts, which in turn may become the seat of true ulceration in different parts of the body, especially around the anus. Mixed with the scattered mucus and scabby deposits there may be a roseolar eruption and papules. Pustules and bullæ also occur in the feeble and poorly-nourished children. The eyes are not affected, except with a conjunctivitis in connection with the coryza. The bones, cartilages, and joints suffer as in the acquired form of the disease. Some especial lesions of these tissues, which involve degeneration and softening and syphilitic outgrowths, are described by different authors. The viscera may also be affected in the inherited as in the acquired form of syphilis, and it is these lesions which make the former so commonly fatal. There is something in the countenance of a child inheriting this disease which may be termed syphilitic. His skin is pallid and coarse; he is apt to have prominent cheek-bones and overhanging forehead, with perhaps sunken nasal bones; he is generally unintelligent and dwarf-like. The permanent teeth are irregular and defective, especially the two middle upper incisors, which are small and either converging or diverging; they are poorly developed, often marked with ridges and furrows in front, and their edges, which are thin and irregular when cut, break off centrally, leaving a regularly shallow vertical notch on the lower border. All syphilitic children have not necessarily these "blighted" teeth.

The *prognosis* of inherited syphilis is bad, and is generally proportionate to the date of appearance of symptoms and the general physical condition of the infant. Nasal catarrh may be severe enough to interfere with nursing; vomiting and diarrhœa, persisting, interfere with nutrition and make the prognosis graver. When a child is born with a general eruption, visceral lesions are most apt to be present, and death may be expected.

What is the treatment of inherited syphilis?

Before birth, if the infant is believed to be syphilitic, treatment should be commenced by putting the mother under mild mercurial influences. By such means an abortion may be averted and the child saved from an early death. The methods of treating a child

with inherited syphilis after birth are by inunction or by the use of the mercury with chalk or by solution of bichloride in water. The manner suggested of applying the former is to spread the mercurial ointment upon the child's bellyband or upon bandages applied to the anus or legs. The hydrargyrum cum creta is used in grain doses, repeated according to the symptoms and effect produced. The bichloride may be used in a weak solution, made so that an infinitesimal dose may be given with the food frequently or a larger dose three or four times daily. The iodides are not generally well borne by the infant stomach, but in the tardy lesions they must be resorted to. Administered to the mother, the iodides are eliminated with the milk, and may be thus transmitted to the child. Local treatment of excoriations and ulcers requires cleanliness and the use of some bland ointment or powder or mild mercurial. The general hygiene and the nourishment of the child claim the proper notice.

CHANCROID.

What is chancroid?

The local venereal sore.

Wherein does it differ from chancre?

Chancre is a local manifestation of a general disease, whereas chancroid is entirely a local malady.

What is the cause of chancroid?

Chancroid is always due to the inoculation of pus derived from a similar ulcer.

Is chancroid single or multiple?

It is multiple. Its own secretions are freely auto-inoculable.

What is the nature of the discharge of chancroid? and what are its properties?

Thick, richly purulent, brownish or reddish yellow, corrosive.

How long after exposure does chancroid make its appearance?

Almost immediately upon absorption. There is no period of incubation, as in the case of chancre, but it appears generally within the first two or three days after contact. If the virus be received upon an unbroken surface, there is a necessary delay in its appearance.

What general characteristics does the ulcer itself possess?

A rounded, sometimes oval, margin, abrupt, perpendicular edges, often everted and undermined; ulceration rather deep; bottom of ulcer irregular and grayish-yellow in appearance, covered by a pultaceous, adherent substance and flabby granulations bordered by a pink areola.

Is pain an accompaniment of chancroid?

Yes; its tendency to corrode causes a continual pain, and the inflammatory condition present renders it sensitive on manipulation.

What is the course of chancroid?

It increases in size from one to two weeks, preserving its characteristics, when it generally reaches its maximum size. At this period it usually continues to remain one size, undergoing no noticeable change until repair sets in.

How does repair of the ulcer show itself?

It shows itself in a more healthy condition of the discharge, a sloping of the abrupt edges of the ulcer, a more granular condition of the base, which gradually cicatrizes from its edges toward the centre.

What kind of a scar is left by the chancroid?

It varies with the depth of the ulcer. It may be so faint as to eventually disappear, or it may remain as a puckered and pinched-out, unsightly scar of a size proportioned to the previous ulceration.

What are the complications of chancroid?

Inflammation, vegetations, phimosis and paraphimosis, lymphangitis, erysipelas, gangrene, phagedæna, simple bubo, and virulent bubo.

How do vegetations occur?

These warty growths may complicate chancroid, as they may any other ulceration about the region of the prepuce or anus.

What is the cause of the inflammation accompanying chancroid?

It may be mechanical from friction, erection, or irritating applications, encouraged by a lack of cleanliness, debility, etc.

What are the concomitants of such inflammation?

Phimosis and paraphimosis are likely to accompany inflammation in chancroid where there is a long foreskin, and possibly erysipelas,

which in debilitated conditions tends to predispose to sloughing and phagedæna.

Wherein does chancroid in its general appearance differ from chancre?

In the greater amount of its discharge and its more purulent nature; in the irregularity of the ulcer and its undermined edges; in the pain which accompanies it, and in the absence of all induration.

What is the treatment of chancroid?

The *treatment* is entirely local, as there is no constitutional disease to combat except that which may exist from the absorption of the poison from the local sore.

What is the first method of treatment to consider?

Destruction of the ulcer by proper and effective caustics.

What agents shall we use to accomplish this end?

After applying to the ulcerated surfaces a 4 per cent. solution of cocaine to properly anæsthetize, we may use pure carbolic acid, followed up by fuming nitric acid. If the ulcer or ulcers be attacked in their early career, this may suffice to annihilate them; but if after a few days the patient returns not only with a healthy healing sore, but also with a partially unhealthy ulcerating surface, a remnant of the chancroid, by repeating this method of cauterization, as a rule, the ulcer may be entirely destroyed. A recent introduction known as "pyrozone" (containing 25 per cent. peroxide of hydrogen) is said to be effectual as a caustic for these ulcers.

Can the virulent properties of chancroid be destroyed and its career terminated prematurely by other than caustic remedies?

Only in mild cases, when strong solutions of bichloride of mercury, as strong as 1:500 or 1:1000, constantly kept in contact with the ulcer, are the best means suggested for this purpose.

What more active mode of destruction have we when the ulcer resists the ordinary means or phagedæna sets in?

The use of the actual cautery or the application of strong sulphuric acid made into a paste with willow charcoal (Ricord). The pain accompanying this latter procedure is extremely severe.

What is the difference between syphilitic and chancroidal bubo?

Syphilitic bubo has been already mentioned. Chancroidal bubo,

instead of being multiple, is generally confined to one gland, is boggy, extensive, and painful, generally suppurates, and is not freely movable under the integumentary tissues.

What is the difference between simple and virulent bubo?

Simple bubo is essentially the same as inflammatory glandular swelling, which may occur after any local irritation, such as vaccination or an inflamed corn. Virulent bubo is the result of absorption of matter from chancroid.

What are the differences in the characteristics of these two buboes?

Simple bubo may or may not suppurate. When it does, the causes of such suppuration are the same as might cause suppuration in any other portion of the body. Virulent bubo suppurates, as a rule, as it contains the same substance by absorption which the chancroid does, and its tendency is to expel it. After suppuration the entire area involved by the bubo assumes the appearance and characteristics of chancroid.

What is the treatment of bubo of chancroid?

If the bubo be simple, without any tendency to suppuration, sometimes external pressure, applied by means of a shot-bag or a closely-applied bandage, in conjunction with other local treatment, may suffice to reduce the inflammation; but if the bubo tends to suppuration, the only method of treatment which can be pursued is poulticing and incision of the gland so soon as the pus announces itself, at which time the necrosed and broken-down tissue may be scraped away or total extirpation of the gland be resorted to, which may hasten recovery.

Total extirpation of the gland is sometimes resorted to before suppuration shows itself, with the idea of obtaining primary union of the wound. The skin over the gland is too apt to be involved, and the undertaking is not often successful.

The *treatment* of virulent bubo after opening is the same as that of the chancroid itself.

What is the differential diagnosis between chancroid and chancre?

Chancre (Primary Lesion of Syphilis).	*Chancroid (Local Venereal Sore).*
Well-marked period of incubation.	No incubation appears soon after contact.
More apt to be single.	Usually multiple.

Chancre.	*Chancroid.*
Indurated base (exceptions occur).	Generally soft and succulent.
Generally flat; even with the surface or protruding.	Undermined and uneven.
Discharge thin, serous, or sero-purulent.	Discharge thick, purulent, or sanguino-purulent.

VENEREAL WARTS.

What are venereal warts?

Vegetations which appear upon the penis, which have derived this name from their association with venery in general, but which are not necessarily referable to this cause.

What do they consist of?

They are papillary outgrowths which appear upon the mucous membrane of the prepuce or glans penis. They are composed largely of epithelium, and are generally highly vascular.

What different appearances may they present?

They may be flat or pedunculated, generally multiple, but sometimes single.

What is the cause of their existence?

They are generally produced by irritation of some kind in the form of fluid, which may be present in the mere condition of uncleanliness.

Where do these warts generally appear?

Their most common seat is on the mucous membrane behind the corona glandis, but they often involve not only this site, but also the entire mucous membrane covering the prepuce and the glans, or even within the urethra. They are found also upon the scrotum and frequently around the anus. In women they may cover the entire mucous membrane of the labia.

Are they accompanied by any discharge?

They are generally moist, and when numerous are apt to be bathed with a serous and fœtid secretion.

Are these growths contagious?

Under similar conditions in which they seem to thrive there is a contagious element about them.

What is the proper method of treatment to pursue for these outgrowths?

In the flat and non-exuberant form local astringent applications or powders, accompanied by cleanliness, may suffice to effect their removal.

What applications are most effective?

Dilute nitric acid in solution and calomel powder.

When the warts are more numerous and extensive, what means must be resorted to?

Excision of the growths and cauterization of their bases by fuming nitric acid.

What is the best method of accomplishing this?

The warts may be nipped off by means of a pair of scissors, and their bases treated with nitric acid, or they may be tied off with fine silk, and then the nitric acid used. A most satisfactory way is to snare off the warts slowly by means of a small polypus snare, and then resort to the nitric acid for destruction of the pedicle. The advantages of this mode are that it is practically painless and free from the annoying hemorrhage that generally accompanies excision of these growths. The slower the snare be tightened, the less the pain and less the hemorrhage that follow.

GENITO-URINARY DISEASES—VENEREAL.

DISEASES OF THE MALE URETHRA.

What is the urethra?

The urethra is a collapsed tube or channel leading from the bladder to the external meatus.

What are its functions?

It serves as an excretory duct for the removal of the urine after it has accumulated in the urinary reservoir or bladder. It serves as a channel for the egress of the seminal fluid during the act of sexual intercourse, and also acts as a genital organ in supplying by means of its surrounding glands a mucous fluid which takes part in the composition of the semen.

How long is the male urethra?

Eight inches.

How is it divided for description?

Into the pendulous or spongy portion, or that portion lying within the pendulous organ, about 6 inches in length; the membranous urethra between the triangular ligament and the apex of the prostate, about ¾ of an inch; the prostatic portion, about 1¼ inches, situated within the prostate and terminating at the neck of the bladder.

What is the construction of the spongy portion of the urethra?

It is surrounded throughout by the erectile tissue of the corpus spongiosum, or spongy body of the penis, commencing at the meatus or external opening and terminating at the bulb, which is the enlarged portion of the corpus spongiosum below.

Where is the triangular ligament? and what are its relations to the urethra?

The triangular ligament is a firm and dense fibrous fascia which is pierced by the urethra just before reaching the bulb of the corpus spongiosum, and which stretches across a space bounded on either side by the bony rami composed of the ischium and pubis, and is the boundary-line between the erectile urethra and the membranous.

By what is the urethra covered after it loses its erectile properties and becomes membranous?

By voluntary muscular tissue, which surrounds it.

What is the importance of the muscular covering of the membranous urethra?

It is often the seat of spasmodic stricture, and its contraction may oppose the passage of the instrument into the bladder.

What action has this muscle?

It is the so-called "cut-off" muscle, which controls the act of urination, by means of which the urine may be stopped during its flow. Relaxation allows an involuntary flow.

What is the natural condition of this muscle in health?

Its natural condition is that of tension, the degree of which may become more or less modified by excesses and disease. This muscle also acts as a valve, preventing fluids injected through the meatus from entering the bladder.

URETHRITIS.

What is inflammation of the urethra called?

Urethritis.

How is urethritis divided?

Into specific and non-specific urethritis.

What is non-specific urethritis?

Inflammation affecting the urethral mucous membrane, the result of irritation from any cause.

What are the most frequent causes of non-specific urethritis as it is found in general practice?

Excessive venery, self-abuse, excessive indulgence in alcoholic stimulants, intercourse with a female during her menstrual epoch, or a combination of any or all of these causes. Thus it may be seen how often the non-specific or simple urethritis may be confounded with and looked upon as a case of gonorrhœa, the history being of a suspicious intercourse when possibly under the influence of liquor, followed by the most noticeable and cardinal symptom of gonorrhœa—namely, a discharge of pus from the urethra.

Any irritation which might reach the urethra from without by means of violence, acids, and like substances which may be eliminated through the urine in sufficient quantities to cause irritation.

What are the symptoms of simple urethritis?

A burning sensation during urination, a discharge of a mucous, muco-purulent, or purulent nature according to the grade of the inflammation, accompanied by painful erections.

Has this simple inflammation generally any period of incubation?

No; it need have none. It often appears the day after a sexual intercourse, but it is apt to be produced by a combination of causes and the result of continuous irritation, the amount of which may not be sufficient to produce inflammation for several days after sexual intercourse, as from a continuous indulgence in alcoholic stimulants, and thus it may be seen that an apparent period of incubation will exist.

What is the treatment of simple urethritis?

Often relief from the exciting cause may be sufficient to terminate the trouble, and the disease will get well itself. If, however,

medicinal means be required, the administration of a saline diuretic in sufficient quantity to alkalinize the urine should be sufficient to produce the desired effect.

Are local measures of treatment sometimes necessary?

They may be, and if used a very mild injection of sulphate of zinc or some vegetable astringent can be employed, but care should be taken that the injection itself does not keep up the disease by continuing the irritation.

What is specific urethritis?

Specific urethritis, from the frequency of its occurrence, has received a special name for its distinction—namely, gonorrhœa—and is inflammation of the urethral mucous membrane derived from a source containing the specific germs which produce this disease; in other words, the same disease in another. It is almost invariably derived during sexual intercourse.

GONORRHŒA.

What, then, is the essential difference between simple urethritis and gonorrhœa?

The existence of a peculiar micro-organism or specific germ in the discharge from the urethra of the latter disease.

What is this micro-organism called?

It has been named by Neisser, who first pointed it out, the "gonococcus."

How is this gonococcus to be distinguished, and its existence determined upon?

A small specimen of the discharge is collected upon a cover-glass and thinly spread by the pressure of another cover-glass over it, after which the specimen is dried by passing it once through the flame of an argand burner rapidly. The specimen is then stained with a saturated solution of methyl-violet, which is accomplished by placing a drop of the latter solution upon the dried specimen, and after it is spread over the entire area it is allowed to remain for a couple of minutes, after which the specimen is gently irrigated under a small stream of water in order to remove the surplus coloring matter. The cover-glass is then mounted on a slide with glycerin, and by the use of a microscope of 500 diameters the gonococcus, if present, may be discovered. The picture which presents itself in a specimen of gonorrhœal pus

is the following: The nuclei of the pus-cells are very darkly stained by the methyl-violet; the outlines of the cells are only lightly tinted with the blue, while the cocci are distinctly and deeply marked out in dark-blue dots arranged around and within the pus-cells in pairs and in parallel lines. Any other arrangement of dots means nothing, and may be confounded with other cocci likely to be found in discharges from the urethra and elsewhere.

Has gonorrhœa a period of incubation? and if so how long after exposure does the disease announce itself?

There is generally an incubation of about five days, during which time there need be no evidence of the impending disease.

What are the first symptoms which appear?

Generally the patient's attention is first called to his urethra by a suspicious burning sensation, accompanied possibly by a small amount of mucus or a muco-purulent discharge. This discharge rapidly increases in quantity and the subjective symptoms increase in violence, so that at the end of the first or the second day in ordinarily severe cases the discomfort during urination is very intense, the discharge is thick and yellowish-green, and erections, if they occur, are extremely painful.

What appearance does the urethra present during this acute stage?

The lips of the meatus are swollen and separated, reddened, and bathed by the thick and copious discharge. In uncleanly persons a balanitis may also present itself from constant contact of the discharge with the surrounding mucous membrane.

What is the duration of gonorrhœa?

In ordinary cases it lasts from three to six weeks, but the discharge may continue long after this.

What is the course of a gonorrhœal inflammation?

The urethral inflammation commences at the meatus and travels slowly backward; the intensity of the symptoms generally increases more or less during the first week, and then for a time remains stationary, after which a chronic period is attained, the duration of which is lessened or increased according to the treatment pursued and the care the patient takes of himself.

What is this chronic stage termed when lasting an undue length of time?

Gleet.

Is gleet a symptom or a disease?

Gleet is practically a symptom, and is dependent upon various causes during the last stage of a gonorrhœa, such as neglect of treatment or persistent treatment without reason, or excesses of various kinds which would be mentioned as causes for a simple urethritis, or it is often accounted for by a more serious condition, the result of a gonorrhœa—namely, structural obstruction of the canal or "strictura urethræ."

TREATMENT OF GONORRHŒA.

Can gonorrhœa be aborted by any means?

Certain methods of treatment are resorted to with this idea in view, and it is claimed, with a practical showing of cases, that this can be accomplished.

What are the means used to accomplish this end?

Nitrate of silver and chloride of zinc, which were formerly used, attained a reputation, but are now no longer relied upon. It is probable that acute outbursts of a chronic trouble, which so often occur, were frequently relieved by these drugs, and as this condition has so often been confounded with fresh attacks of gonorrhœa, their reputation no doubt was derived in this way.

What are the means at the present day by which gonorrhœa is claimed to be aborted or the course of the disease substantially curtailed within the minimum time that the disease usually runs?

By means of the free irrigation of the urethra with solutions of bichloride of mercury, ranging in strength from 1 : 20,000 to 1 : 30,000.

Is there any limit to the period of the disease during which this treatment can be resorted to with any efficacy?

Statistics show that it is most successful and most effective during the earliest stages of the disease. Indeed, it may be said that to be effective it should be resorted to within the first twenty-four hours of its appearance.

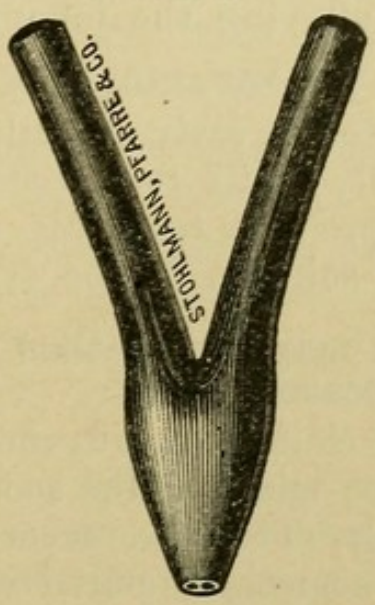
How can this treatment be carried out?

Either by the physician or by the patient himself. An ordinary fountain syringe can be used, with a small nozzle on the end of the tube, and the fluid allowed to flow through the urethra as far as it will go, after which it will pass out alongside of the canula, suf-

ficient space being left between it and the bottom of the meatus. Different attachments have been devised for the fountain or other syringes to facilitate an urethral irrigation, the principal ones of which are depicted in the accompanying illustrations.

Fig. 1.

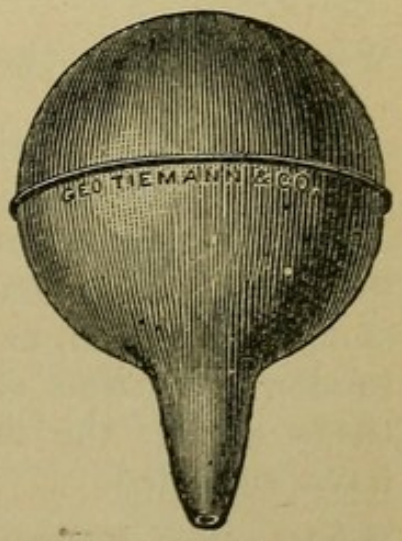
Fig. 2.



Nozzles.

No. 1 allows the fluid to pass out between the canula and the bottom of the urethra. In No. 2, however, there is a second opening running through an extra arm, which obviates the necessity of allowing any space for the passing out of the irrigating fluid.

Fig. 3.



Universal Injector.

How is a patient enabled to irrigate himself?

This may best be accomplished by a fountain syringe with attachment No. 2, the triangular-shaped affair, or by means of the so-called "Universal Injector" shown in Fig. 3, which consists simply of a soft-rubber bulb possessing a properly pointed nozzle, which when used is introduced as far as possible into the meatus, the urethra then being distended by the irrigating fluid, and the nozzle then withdrawn enough to allow its escape. This process is continued until the contents of the injector are exhausted, which is then refilled as many times as required to

exhaust the amount of fluid used for each irrigation. This latter method is the simplest for the patient's own use, together with a prescription for 1 grain of bichloride of mercury, to be divided into eight powders, and each powder to be added to a tumbler of hot water, and the entire contents used in the manner set down. The use of hot water is especially advised for these solutions, as it assists in allaying the inflammation.

What are the advantages of this method of treatment?

If resorted to early enough in the career of the disease, it often substantially limits its career, and may actually abort it (?). It does not produce too great irritation or endanger stricture, and unless the solution be too strong never produces great irritation.

How much may this method of treatment diminish the career of the disease?

Various claims are advanced for it. In a general way it probably may be said that the sooner it is resorted to the more effective is the result. That the career of the disease is shortened by it, and that it is sometimes cured early in the second week, is the most that can be said of it. This is probably not an extravagant claim: others pretend to even better results.

If this means of treatment is not attended with success or is not pursued, what is the methodic treatment of gonorrhœa?

This treatment is largely symptomatic, commencing from the start, when the inflammation is acute and accompanied by distressing symptoms, which it aims to relieve.

What drugs in the early period can be resorted to with good effect?

If the inflammation be very acute, the urination very painful, and the parts much swollen, the administration of $\frac{1}{12}$ of a grain of tartar emetic and 1 grain of nitrate of potash every hour for four to six doses may produce a beneficial effect. A saline diuretic should be given, as in simple urethritis, in sufficient quantity to render the urine alkaline. Many resort to no other means but these during the first few days until the more acute symptoms have subsided.

What other internal treatment has received reputation in this disease?

The administration of balsam of copaiba and the oil of sandalwood, which seem to have an especially soothing effect upon the

mucous membrane of the genito-urinary tract, is resorted to during the first stage, either alone or in the combination known as Lafayette's mixture. These medicines are increased up to the full tolerance of the stomach, and then held at the maximum dose during the stationary period of the disease. If the balsam of copaiba is used and has not already been combined with cubebs, the latter can be effectively used at this time, and either these or the sandal-wood oil continually pushed.

What injections should be used during the attack of gonorrhœa?

In any case during the more acute stage, whether it be early or late, it is well to commence with the bichloride irrigations, and even if not pursued in the same manner as laid down for the earliest treatment of the disease, the irrigation of the urethra once a day or once in two days with bichloride solution often produces a desirable effect.

In regard to the time of commencing other injections, while it is claimed by some that it is best to wait until the departure of all acute symptoms, yet often if the injections used be mild enough they will produce a satisfactory effect even during the very acute stage. Sulphate of zinc, $\frac{1}{2}$ or $\frac{1}{4}$ grain to the ounce of diluted lead-water, is a favorite injection, and probably the best to be used in the earlier stages of the disease. This may be increased in strength and run up to about 8 grains to the ounce.

After treatment has been pursued for a certain length of time during an ordinary case of gonorrhœa, is it sometimes well to discontinue?

At times a long and tiresome chronic stage may be avoided by the discontinuance of all treatment, which may be at the bottom of keeping up a slight and continual discharge.

If the disease lapses into a chronic stage, in spite of treatment, to the extent of acquiring the title of "gleet," what methods of treatment should be resorted to?

When the sole remnant of the disease is a persistent mucous or muco-purulent discharge which apparently resists all the ordinary methods of treatment, invasion of the deep urethra may be expected, which is unreached by the injections in the hands of the patient, being met at the triangular ligament by the cut-off muscle. In such cases the systematic passage about once in five days of a full-sized steel instrument into the bladder, after a number of introductions, may suffice to terminate the career of the gleet.

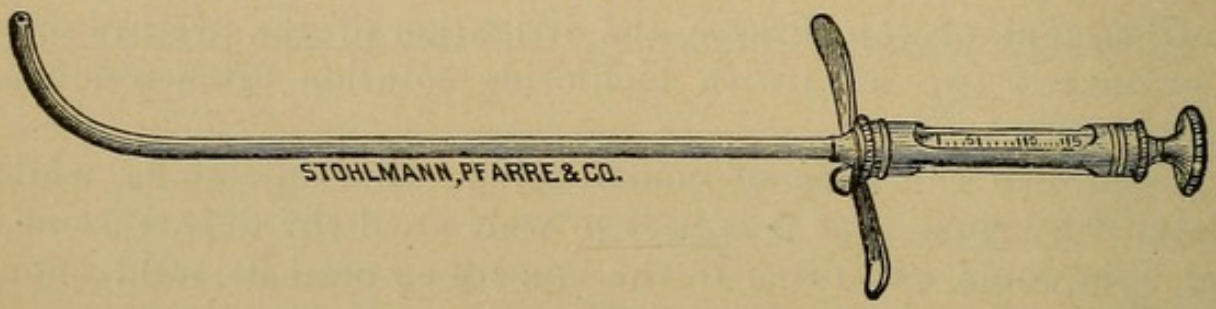
What other methods of treatment have we for these uncomplicated cases of chronic urethritis?

Means which will enable us to bring our medication directly in contact with the affected area.

How can this be accomplished?

By the use of a syringe so constructed that it can be introduced from without through the anterior urethra and beyond the grasp of the cut-off muscle, and an instrument devised for this purpose is the Keyes' deep urethral syringe, shown in the accompanying illustration, improved and modified from Ultzman's. It is given

FIG. 4.



Keyes' Deep Urethral Syringe.

the curve and shape of an ordinary steel urethral sound of a size corresponding to about a No. 8 of the English scale, the barrel of which is graduated so that the exact quantity of fluid introduced can be determined.

What applications can be used, and have given the best results with this instrument?

Sulphate of thallin, nitrate of silver, sulphate of copper, and glycerite of tannin, each of which seems to have its special adaptation in different cases, yielding different degrees of irritation and astringency. While some cases yield to the use of one, in others the same may fail, and relief may only be had by resort to another. In general it may be said about these injections, that for the more chronic and unruly cases the sulphate of copper or nitrate of silver is more applicable, and the sulphate of thallin in the milder cases. The sulphate of thallin may be used in solutions of 2 or 3 per cent., introducing at each sitting the full contents of the syringe, or about 20 minims, and running the strength up to a saturated solution, 12 per cent. The nitrate of silver may be used in solutions of various strengths. Some seem to tolerate it well, while others are easily upset by it. It is well to start with a mild solu-

tion of about a grain to the ounce, which can be run up according to the chronicity of the case, the tolerance of the patient, and the result of the injection.

Sulphate of copper is astringent, more irritating than thallin and less so than nitrate of silver. It may be prepared in a 10 per cent. solution in glycerin diluted with water to the desired strength, which should be at the start 1 grain to the ounce, and subsequently run up to full strength, increasing the intervals with the strength of the injections. Glycerite of tannin is decidedly astringent and less irritating. It should be employed in solutions reduced 75, 50, and 25 times its full strength with water.

What is to guide us in the choice of these applications?

The conditions upon which the gleety discharge depends and is kept up, and the idiosyncrasies of the patient.

What are the different conditions which may be the causes of such a gleet?

They are congested and inflamed patches, chronic cowperitis, inflammation of the seminal vesicles, enlargement of the prostate from acute or chronic inflammation or chronic hypertrophy, tubercular disease, mucous patches, and stricture of the urethra.

What is the most common cause of keeping up a urethral discharge?

Stricture, and what may be said to be the next in frequency of the causes of this disorder—probably altered patches of the mucous membrane with or without granulations.

Is there any other element which is important as a cause of a long chronic discharge from the urethra?

Yes; a neurotic element seems in many cases to be if not the most potent cause, certainly a very important one to consider and act upon.

What instrument have we for diagnosing the conditions of the urethral mucous membrane?

The endoscope.

What can be accomplished by its use?

A careful exploration of the entire mucous surface can be made, and a comparison of the appearance and texture of different portions can be accomplished.

Is its use essential in these cases?

By some it is thought to be almost indispensable, but by others it is believed not to be essential for the rational treatment or care of this disease, nor to be able to accomplish or determine much more than could be detected by the touch with proper instruments. This much must certainly be said: that if the neurotic element enters into the causation of a very large number of cases, as it probably does, the more elaborate the means which are resorted to in endeavoring to relieve this disorder, the more appalling will it appear to the susceptible patient and the more difficult to overcome the neurotic condition. In other words, in such cases the simpler the means and the less time made over them the more effective the result.

In the use of the endoscope what topical applications are suggested?

Iodine, sulphate of copper, thallin, and carbolic acid, and nitrate of silver in solution of from 2 grains to an ounce up to a saturated solution, applied by means of cotton twisted on the end of a probe. This latter is most suitable where granulations are present. Through the endoscope the healthy mucous membrane presents a rather pale, pink color, while the congested spots are bright red and may be covered by granulations.

How long is the duration of this chronic condition of urethral discharge or gleet?

It may last a fortnight or six weeks after the decline of the acute stage, and spontaneously disappear or readily submit to the ordinary means of treatment. It may, on the other hand, continue months, with no other complications than patches of urethral congestion kept up by irritating urine and irregular excesses.

What will the urine show in such cases?

When passed into a clean conical glass and held up to the light, one or more fine filaments or shreds may be seen floating or swimming in the urine.

If examined by the microscope, what will these shreds present?

They will be found to consist of pus-corpuscles, free and in patches, which amount to a scab peeled off from the urethra. These shreds are always found in cases of forming stricture.

What other sequelæ of gonorrhœa are sometimes met with after the discharge has apparently nearly ceased or is very slight?

Constant pain of varying degree in passing water, which may be the only symptom and may last almost indefinitely, or the pain may be confined to erections and ejaculations.

To what may these disturbances be attributed?

A neurotic condition of the prostatic urethra. Sometimes urethral neuralgia is present, or pains which are not associated with any of the functions of the urethra.

How are these neurotic conditions treated?

Sometimes the use of steel sounds may be effective, or the cold sound, which consists of running cold water through a closed tube which has two arms at the end, one for the entrance and one for the exit of the cold water, or the application of electricity. Where none of these meet with success, discontinuance of all treatment is recommended, and, if possible, proper physiological exercise of the organ—namely, by the marriage relation—after a careful examination has been made to eliminate stricture, and to establish positively the absence of any gonococci and the deep urethral congestion.

Do these chronic conditions of urethral inflammation ever have acute outbursts?

Yes; at such times they resemble closely a fresh attack of gonorrhœa, and are often misleading to those who do not closely inquire into their history or determine the presence or absence of the specific organism.

What are the causes of these acute outbursts from chronic conditions?

Venereal excesses, indulgence in alcoholic stimulants, sometimes undue muscular exercise, and any of the causes which might under ordinary conditions produce an acute urethritis.[1]

[1] In my examination of these cases of urethritis at the Demilt Dispensary for the presence of gonococci I have found a large majority of cases to be acute outbursts of chronic conditions; and the number has been so large that I take it to be a good rule that if an answer to the question as to the number of attacks of gonorrhœa be three or more, the case in hand can confidently be named an acute outbreak on top of an old attack which may occur during the course.

What are the complications of gonorrhœa?

Folliculitis, cowperitis, severe chordee, inguinal adenitis, lymphangitis, gonorrhœal rheumatism, gonorrhœal conjunctivitis, epididymitis, cystitis.

What is folliculitis?

Folliculitis occurs during the acute stage of a gonorrhœa, distintinguished by one or two hard lumps on the floor of the urethra, and consists of cysts which are formed by the openings of the lacunæ Morgagni becoming occluded, the secretion thus continuing to form, and thus producing this condition. They are accompanied by pain, and continue stationary for a certain period, after which they may soften externally, open, and leave a fistulous track.

What are Cowper's glands?

Round glandular bodies situated behind the bulb of the urethra, having ducts which open on its floor, through which they contribute to the fluid substance of the semen.

What is cowperitis?

Inflammation of Cowper's glands of the urethra. It rarely occurs except as a complication of urethritis, and generally before the third or fourth week of the gonorrhœa.

What are the symptoms?

Pain and tension in the region of the perineum around the bulb, increased by pressure and friction of any kind. Examination reveals a small ovoid tumor which resembles somewhat in feeling the bulb of the urethra. Early in its career cowperitis involves the surrounding tissues, after which the detection of a well-defined tumor is impossible, and the after-occurring symptoms resemble perineal abscess. It may undergo resolution or go on to suppuration.

What is the treatment of this affection?

Early in the disease the application of leeches, rest, and any means to allay inflammation should be resorted to. If, in spite of treatment, suppuration becomes inevitable, poultices should be applied and an early incision resorted to.

What is chordee?

Chordee is a peri-urethritis, or extension of the inflammation into the tissues surrounding the urethra.

How does it announce itself?

Excessive pain is felt during erection, most frequently at night and toward morning: a great deal of the pain is felt in the stretching of the erectile tissue. On account of the inflammation attacking the corpus spongiosum, a certain amount of plastic exudation surrounds the urethra. During erection of the corpora cavernosa the urethra is not allowed to distend to its full length, and consequently a characteristic downward curve of the penis is produced. This serves to aggravate the pain.

What may be the result of the so-called "breaking the chordee," as practised by those who think it may relieve their suffering?

Urethral hemorrhage is caused, and possibly may be the starting-point of organic stricture.

What is the treatment for chordee?

Preventive measures may be adopted in the use of such sedatives as bromide, chloral, and opium. It is well also to avoid lying on the back, as toward early morning, when the bladder is full, this position seems to favor erection. When the chordee is present the application of cold in the shape of ice or water may help to reduce the severe tension.

When inflammation and enlargement of the inguinal glands accompany gonorrhœa, are they apt to be mild or severe?

They are generally of a mild type and suppuration exceptional, except in unhealthy subjects.

What is the nature and character of the lymphangitis accompanying gonorrhœa?

It is similar to that complicating chancroid, distinguished by knotty cords under the skin.

What is the treatment?

Rest and soothing lotions.

GONORRHŒAL RHEUMATISM.

Is gonorrhœal rheumatism a distinct variety of rheumatism? and if so, why?

Yes; individuals who are not subject to rheumatic attacks often have a form of rheumatism with gonorrhœa, and none of

the ordinary causes of rheumatism seem ever to produce this special variety.

Has it any relation to stoppage of the discharge or neglect in treatment?

Apparently not, and it does not seem to be the result of cold. A person once affected with gonorrhœal rheumatism seems always to suffer a return of the complaint with recurring attacks of the disease.

How soon does gonorrhœal rheumatism follow the appearance of gonorrhœa?

It is variable—generally appearing during the first week or ten days, but may appear later, rarely during the second or third month.

Where is the seat of gonorrhœal rheumatism?

This is also variable. The joints are most frequently attacked; often the synovial sheaths, tendons, and muscles, and sometimes the bursæ and nerves. The larger joints are more frequently affected, and the disease is rarely confined to one joint.

What different forms of gonorrhœal rheumatism are met with?

(1) Hydrarthrosis, generally seated in the knee, and sometimes the ankle or elbow. The effusion is generally very great; the pain is but slight, and is increased during exercise. This is rather a latent form of the disease, and is apt to disappear slowly.

(2) The second form which is described is more like the ordinary rheumatism, but more moderate. Constitutional symptoms may accompany it, such as fever, etc., which subside after a few days. It is apt to affect more than one joint. The concentrated condition of the urine found in ordinary rheumatism does not seem to accompany gonorrhœal rheumatism. Resolution is apt to be very slight, and articular pains or persistent stiffness may be left behind. Hydrarthrosis sometimes persists after all other symptoms have subsided.

(3) The third form is where there are pains in the joints, which do not seem to have disturbed functions. The pain may be the only symptom, and may strongly resist all treatment, and finally after it has disappeared is apt to return with the urethral discharge.

How are the synovial sheaths of tendons affected?

They show rather intense swelling externally along their course, and redness of the skin; sometimes very severe pain, which is increased on pressure. Resolution from this condition is gradual.

How do the bursæ suffer?

They also are in a condition of effusion, the tension of which causes very acute and severe pain.

What bursæ are most liable to be attacked?

The one situated between the tendo Achillis and the os calcis, and that sometimes found beneath the tuberosity of this bone.

What is the differential diagnosis between general rheumatism and gonorrhœal?

Gonorrhœal rheumatism is accompanied by urethral inflammation, and has not as one of its causes cold or exposure. Simple rheumatism comes from cold and hereditary tendency. Gonorrhœal rheumatism is conspicuously infrequent in women; not so simple rheumatism. Gonorrhœal rheumatism has not so much of the febrile character as simple rheumatism. Simple rheumatism is more general and the symptoms more severe. Sweating is one of the striking symptoms of simple rheumatism, while it is not present in gonorrhœal. Cardiac complications are frequent with the simple, and uncommon in the gonorrhœal.

Does the treatment useful for ordinary cases of rheumatism seem to be efficacious in the gonorrhœal form?

No; such drugs as salicylic acid and iodide of potash and colchicum do not seem to produce the same effect as in the simple form.

What treatment should, then, be pursued in gonorrhœal rheumatism?

The local *treatment* is very important. Rest is essential, and during the acute stage leeches, hot fomentations, and the like to allay the inflammatory symptoms, and rational measures generally for this purpose. In the chronic stage counter-irritation, massage, and douching are the measures to be pursued. In the most aggravated form of gonorrhœal arthritis, where the joint becomes thoroughly disorganized and firm fibrous ankylosis takes place in a *malposition*, excision of the joint is called for.

GONORRHŒAL OPHTHALMIA.

What is gonorrhœal ophthalmia?

It is the resulting ocular trouble which accompanies and is caused by gonorrhœa. It may appear as either of two kinds—namely, rheumatoid gonorrhœal ophthalmia and simple gonorrhœal ophthalmia.

Describe the rheumatoid kind.

It is nearly always accompanied by other rheumatic complications, but not necessarily so. It has no connection with contagion, and affects the conjunctiva, the iris, and the membrane of Descemet.

What is the second kind of ocular complication in gonorrhœa?

It is the most common affection of the eye accompanying gonorrhœa. It is more to be feared, as it always results from contagion or contact of the urethral discharge with the conjunctival mucous membrane.

What are the symptoms of the rheumatic form?

There is a smoky appearance of the fluids in the anterior chamber; moderate congestion of the conjunctiva; the sight is somewhat clouded; the pain is not apt to be present, and generally the iris is unattacked.

What is the duration of this form?

The duration is variable. It may last several weeks or only a few days. It generally runs a rapid course, and relapse is not infrequent. No serious damage to the eye is done, except sometimes in cases where the iris has been attacked.

What is the treatment?

The *treatment* is mainly rest and the use of soothing lotions. All other measures are without avail, except where there is iritis, when atropine may be used, or where the pains are very severe anodynes may be administered.

What is the cause of gonorrhœal conjunctivitis proper?

Contact of the urethral discharge with the eye of the patient or that of another, or of a secretion from a similar inflammation from a sponge or other instrument brought in contact with the disease during treatment.

What are the symptoms?

The symptoms are those of purulent conjunctivitis, but are intensified in the rapidity with which they appear and become intensely severe, doing damage within a few days, and may possibly irretrievably affect the sight within this time or even less.

What takes place after infection?

Almost immediately the vessels of the conjunctiva become engorged and the tissues succulent with serum. The eyelids become puffy and pus bathes the surface of the eyeball and oozes over the lid. If the inflammation is not rapidly gotten under control, ulceration of the cornea will soon ensue, and if perforation is produced, the aqueous humor escapes and hernia of the iris may occur.

What are the principal differences between these two forms of gonorrhœal complications?

Conjunctivitis must come from contagion, and is rare, while the ophthalmia is not contagious, and, though not common, is much more so than the contagious form. The *ophthalmia* can only affect those suffering from gonorrhœa. As a rule, in conjunctivitis one eye only is affected, while in the other it is apt to be both eyes, and sometimes passes from one eye to the other. There is no tendency to relapse in conjunctivitis, while there is in the other form, which is apt to be coincident with gonorrhœal rheumatism.

The *prognosis* of conjunctivitis is very grave, and it often causes the loss of an eye; it is free from gravity in the milder disease.

What are the rules of treatment in conjunctivitis?

Treatment should be resorted to immediately; delay is most dangerous. Measures should aim at the cleanliness of the eye, the relief of the tension caused by the congestion and "chemosis," and the use of a strong and effective cauterant. The well eye should be carefully protected. Strong purgatives should be at once given and a low diet enjoined, together with such local means as will actively lessen the tension, such as bloodletting, leeching, or cupping, and scarifying the mucous membrane. The affected eye should be shaded from the exertion of bearing the light. As soon as the pus begins to form, a strong solution of nitrate of silver, of about 10 or 20 grains to the ounce, should be painted over the affected mucous membrane and cold applications constantly

applied. Every few hours the silver solution should be reapplied. The strength of the solution should be run up to full strength or the solid stick employed. When the acuteness of the symptoms commences to subside milder astringent lotions may be used as applications.

STRICTURE OF THE URETHRA.

What is stricture of the urethra?

Roughly considered, it consists of a narrowing of the canal, the result of former disease or injury or the symptom of present trouble. The former kind is called organic and is permanent; the latter is symptomatic and transient.

What are the causes of this second class of stricture?

Predisposing.—Neurotic conditions, hereditary or acquired; emotional, irritable, morbid, and rheumatic subjects.

Exciting.—Any local irritation caused by a foreign body, reflex from the rectum or direct from the urine, etc.

Where is the seat of the contraction of spasmodic stricture?

In the unstriped muscular fibres surrounding the urethra at the point of irritation. It is commonly found at the membranous urethra in the "cut-off" muscle.

Mention a few instances of spasmodic stricture.

Obstruction of a sound or bougie passed in the healthy urethra of a young man for the first time, inability to pass water from some nervous trouble, as fear, shame, anxiety, etc.

What are the points in diagnosis of spasmodic stricture of the urethra?

It always occurs suddenly. The stream of urine, while small during, is of normal size after, the spasms, and when it occurs in the introduction of a sound so as to obstruct its passage, gentle pressure of the sound against the contracting urethra will generally overcome the spasm and allow its entrance into the bladder.

What is the treatment?

Removal of the cause when it is discovered is the first principle upon which to work. The spasm is often relieved by a hot bath or by the local application of heat or cold, or more effectively by the use of an anæsthetic.

What are the different forms of organic stricture?

(1) It may simply be a linear fold or band surrounding the urethra in a transverse or oblique direction in one or more positions.

(2) The same condition may exist in the form of a flat band to the extent of about a quarter of an inch surrounding the canal.

(3) It may consist of more or less irregular, contracted, and nodular cicatrical tissues.

Where does a stricture generally develop?

It generally surrounds a congested or inflamed area the remnant of a gonorrhœa or the result of an injury.

How is this to be explained?

In inflammations of other portions of the body, such as in joints or in the sheaths of tendons, the natural tendency is to quiet and temporarily discontinue the function of the affected portion, and during the period of rest, as a result of the discontinuance of use, the joint or muscle becomes more or less stiff from the throwing out of lymphatic material around the affected area. If there were no means of restoring the joint to its regular function, this thrown-out material would be permanent here as it is in the urethra. We have as a result of the different causes already mentioned spots of inflammation or ulceration in one or more portions of the canal. These may or may not succumb to the regular modes of treatment ordinarily pursued at the present day, but as a result of the diseased condition of these portions of the urethra and partial disuse of the contractile fibres which surround it, as in the case already mentioned of joint disease, there is thrown out a lymphatic material surrounding the affected area. The extent to which this condition may exist and be permanently cured cannot be definitely stated, but in a general way it may be said to be permanent when once fairly started, as the condition itself tends to encourage an increase. There are probably certain cases and conditions which in different individuals tend to increase or hasten this fibrous condition, which may be found in the irritating state of the urine, the use of unnecessarily strong injections, and extension of the inflamed area.

What are the number of strictures generally found in one individual?

There is generally one, although two or more may exist.

What are the most common seats of stricture of the urethra?

Probably the most common seats of stricture are the bulbo-membranous junction and the fossa navicularis.

What are the causes of organic stricture?

Stricture may be congenital. Otherwise, organic stricture is always caused by injury or inflammation. Inflammation (gonorrhœal) is the most common cause.

What is the pathology of stricture in its simplest form?

The tissue-change may be a mere thickening of the mucous membrane like a linear scar, or if more advanced a patch of cartilaginous hard material, which is an extension or aggravation of the simple variety, consisting of a thickening of newly-formed tissue over a proliferation of the cell-elements by a continual chronic inflammation. This process takes place beneath the mucous membrane, and not on its surface. The stricture, then, when very slight, is merely a linear ring surrounding the canal, or it may be a dense mass of fibrous and callous material encircling the canal and holding it in a permanently contracted condition; or, on the other hand, the tissue may be cartilaginous, exuberant, and of an uneven, nodular distribution. Added to these different conditions there may be also bands and flattened nodules.

How long after an attack of gonorrhœa has run a persistent course may stricture be suspected?

It may commence to form within one year or not until several years have elapsed. Generally speaking, in any case of an urethral discharge which has continued to flow for a period of from eight months to a year or longer, stricture should be searched for.

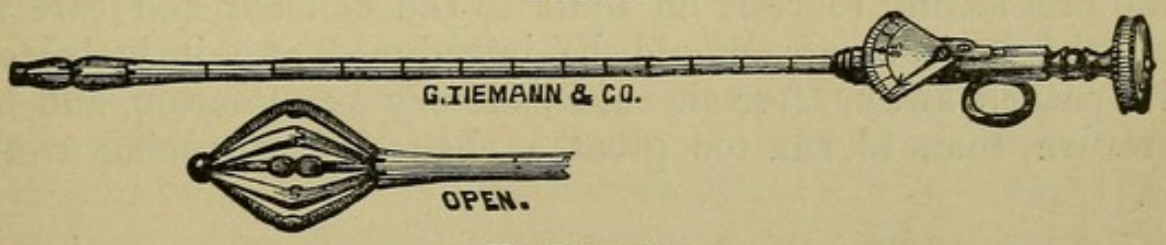
What is the proper method of exploring the urethra with the idea of discovering whether a stricture be present?

A blunt steel instrument may be used, of the largest size which may comfortably be introduced into the meatus, having been previously warmed and lubricated. This may be introduced until met by some obstruction, upon which the instrument is removed and another smaller one selected and passed up to the obstruction. If this does not pass, a number of smaller instruments, going down the scale, are introduced until the one which passes through the stricture without any appreciable obstruction is reached; and this one is the measurement of the size of the stricture. When the sound which is small enough to pass through the strictured area is with-

drawn in organic stricture, there will be a peculiar grasping of the instrument, which is hard to describe, but soon becomes familiar to those who have made many examinations. This is never felt in a case of spasmodic stricture, which if situated in the deep urethra generally has a tendency to expel the instrument, instead of holding it in its grasp as does the permanent form.

Another way of examining is by using bulbous bougies, starting on a small size and running up to a size which meets with some obstruction, and then returning a size or two to the one which will pass through the stricture, thus measuring the size of the stricture. In general, the steel curved blunt instruments are the best for the determination of recent and slight stricture, and are less liable to fallacy than the bulbous bougies in these cases; whereas in decided and extensive stricture the bulbous bougies are most convenient for their examination and measurement. The bulbous instrument when withdrawn, if there be an inflammatory area on or around the stricture, will generally be found to contain a drop of pus and blood on the rounded edge of the bulb. The urethrometer is an instrument devised for measuring the urethral calibre, and consequently for the diagnosis of stricture. It is best described by an illustration (Fig. 5). The size of the bulb at the lower end (rubber

FIG. 5.



Urethrometer.

caps made to fit the wire frame accompanying the instrument) is enlarged or contracted by the screw at the top. When used it should be screwed down to its smallest size, passed to the bottom of the urethra, then screwed up to normal calibre; and in withdrawing any variation from this size can be detected.

What are the dangers of urethral examination?

If it be not pursued with proper delicacy and care, damage may be done to the delicate urethra, and there is danger of producing a false passage with the point of the instrument, and thus be entirely off the path to the bladder. Such mistakes may result in increas-

ing the strictured area or in producing peri-urethral inflammation and abscess. There is also a danger of causing so-called "urethral fever" and chill susceptibility to which seems to vary in different individuals.

Of what does this urethral fever consist?

Different explanations have been made, and the cause, on account of the difference of opinion, cannot be definitely given. It may be an absorption of septic material or a reflex impression made through the sympathetic nervous system by peripheral irritation.

May some individuals be subject to a greater amount of interference in this region than others?

While in some the most trivial interference by instruments seems to bring on this peculiar condition, others seem to tolerate all manner of instrumentation, and those who at first are sensitive to the use of instruments may in time be made to tolerate them.

What precautions should be taken in making exploratory examinations of the urethra?

As septic absorption is one of the theories of causation of this condition, whether it be accepted or not, antiseptic precaution is a proper expedient.

The instruments should be scrupulously clean if not sterilized. At the first sitting there is no limit to the delicacy and care with which the instruments should be introduced, and it is better to send a patient away, after an unsatisfactory examination, and have him return, than to run too great a chance of producing urethral fever.

Are there any drugs which succeed in warding off an urethral chill after examination?

Quinine was formerly used, and by some it is held still in esteem, but with others it has fallen into disrepute, as the number of cases in which, after its administration, the urethral chill has occurred is great enough to make those cases, where no chill has occurred free from this after-result by coincidence only. Of late two new drugs have been introduced into the materia medica of urethral surgery, which may have just claim of lessening the severity of, if not entirely preventing, this peculiar disturbance following urethral exploration. They are salol and diuretin. The former is given by way of purifying and sterilizing the urine; the other is of too recent introduction to state here its physiological action or its

special effect in preventing the condition in question. Substantial reports, however, go to show that, whatever be the cause of this condition, and whatever the effect of this drug, its use has been accompanied by a freedom from the urethral fever which has seemed to be greater than has previously been experienced with other drugs.

How should diuretin be used after an examination for the purpose of preventing urethral chill?

If possible, one dose of 10 gr. should be given one hour before the examination, followed up every two hours by a repetition of the same, according to the severity of the examination and the condition of the patient. If desired, it may be kept up for twenty-four hours, but this is probably never required after an examination.

What are the symptoms of stricture?

Stricture may exist a long time without giving rise to any symptoms of obstruction or discomfort. There generally exists a small amount of gleety discharge from a congested condition existing on the surface of the constricted area. This may be very slight, so that it may be entirely unnoticeable; or if the urethra be subjected to any amount of irritation, as a result of excessive drinking, etc., the discharge may be very profuse and resemble an acute urethritis, and be taken for a fresh attack of gonorrhœa. The strictured area, acting more or less as an obstruction to the outward passage of the urine, causes a narrowing of the stream according to the extent of the constriction, and in a slowly-forming stricture the gradual narrowing of the stream may be the only symptom noticed by the patient during a period of years. There may or may not be frequent urination. This will depend upon the condition of the deep urethra and the mind of the patient, both of which may act as stimulants to the frequent flow of the urine.

As the stricture progresses, what other symptoms may be discovered?

A cartilaginous hardness may be felt from the outside at the constricted portion, and the opening at the meatus may look blue and congested from obstructed circulation. The stream becomes small, and is often forked or twisted like a corkscrew just after leaving the meatus, or there may be two or more streams running

in different directions. The last few drops of urine are retained within the canal and dribble after urination. If the amount of strictured tissue formed be great, erection is often quite painful.

STRICTURE OF THE URETHRA.—TREATMENT.

What are the different modes of treatment for stricture of the urethra?

Dilatation, divulsion or rapid dilatation, electrolysis, urethrotomy or division of the strictured area.

What are the different kinds of urethrotomy?

Internal urethrotomy, or division of the stricture by means of an instrument passed through the meatus to the point of stricture, and external urethrotomy, or division of the stricture externally, reached through the perineum.

In general terms, when are these two methods applicable?

In strictures of the anterior or pendulous urethra internal urethrotomy is used; in strictures of the deep canal external urethrotomy or perineal section is best, being the safest and most satisfactory.

How deep in the anterior urethra may internal urethrotomy be resorted to?

It is hardly advisable to cut internally deeper than from $4\frac{1}{2}$ to 5 inches.

What is the danger of cutting deeper by the internal method?

There seems to be a greater liability to the occurrence of urethral chill and suppression of the urine when the deep urethra is cut without making provision for the continuous outward flow of urine—namely, by division through the perineum, and preferably by the introduction of a perineal tube for drainage of the bladder.

How is dilatation employed in stricture?

After determining the sized instrument which will readily pass through the strictured area, the next largest size is introduced, which will produce a partial dilatation. One or two sizes larger are then employed, and the patient is told to return about two days later, at which time it is better to commence with an instrument one size smaller than was last introduced, as the stricture is apt to undergo a partial recontraction, and then the sizes are run

up again as at the first time. This is kept up until the normal calibre is reached by the use of a full-sized instrument.

Is there any rule to direct us as to the normal size of any individual urethra?

There is a rule—that of Otis—which, roughly given, is that a penis 3 inches in diameter should receive through its urethra a No. 30 instrument of the French scale, and that each ¼ of an inch over 3 inches in the size of the penis should add 2 sizes to the number on the scale of sounds which should normally be taken by the urethra in hand.

What kind of instruments are best used for dilatation?

The conical steel instruments or sounds are generally adopted for this purpose, as the narrow end can be more readily engaged within the constriction, and dilatation up to the full size of the instrument be gradually effected. Straight steel instruments are sometimes employed, but are not so serviceable as the curved ones, as with the latter, after a full introduction, rotation of the instrument will decide whether the bladder has been reached, and the danger of making and enlarging a false passage will be obviated; also, it is of advantage at the same time, in dilating the stricture, to treat the deep urethra by the gentle and uniform pressure which these sounds will afford. Hard-rubber flexible bougies with tapering ends are also made, and used by some for the purpose of dilating the stricture, but they are not so effective nor so desirable for this purpose as the curved steel instrument. There are two kinds of flexible instruments, the English and the French. The French are more flexible than the English, and flexibility makes them desirable for some purposes. The English elastic instrument is valuable in that it will preserve any curve given to it when heated after it is cold. Perhaps these flexible instruments are safer to put into the hands of the patients, as they are liable to do less harm with them, having the tendency to bend when met by an obstruction, instead of pushing everything before them, as do the steel instruments.

What are the naturally-contracted portions of the urethra which should not be confounded with an acquired condition, and are sometimes misleading?

Just within the meatus, about an eighth to a quarter of an inch, there is a point of congenital narrowing, and it is sometimes cut, when unusually small, for the purpose of allowing an instrument

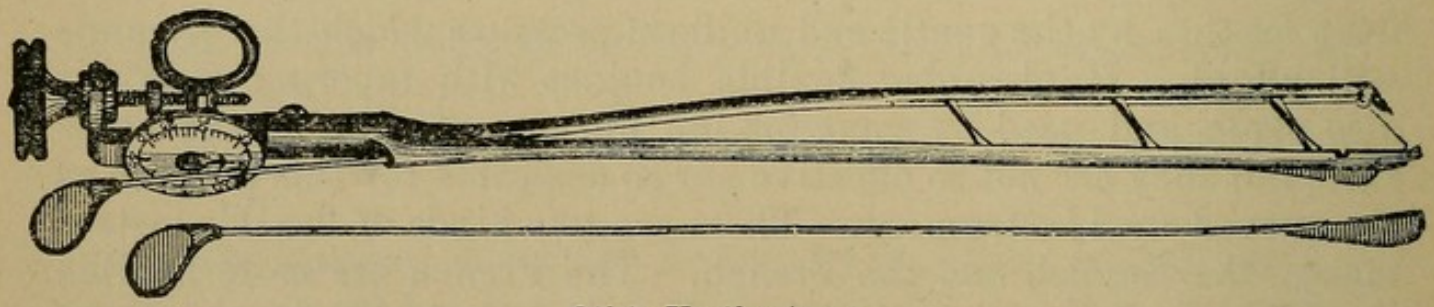
to be passed, but otherwise it is of no account. There is also another natural point of narrowing at the bulbo-membranous junction. Thus it is seen that the natural urethra is never uniformly the same size throughout, and an effort to establish a uniform calibre must necessarily require a division of these constricted portions, which may often be perfectly innocent in the causation of a chronic urethral stricture.

INTERNAL URETHROTOMY.

How is internal urethrotomy, or inward division of stricture, effected?

By the bistoury when near the external meatus, and by the urethrotome when deeper than, say, 1 to 2 inches. The urethrotomes used at the present day are the Otis or Wyeth's instruments, which distend the passage at the same time that the incision is made. The urethrotome of Maisonneuve was formerly adopted, but has at the present day fallen more or less into disuse. This latter instrument has not the advantage of the Otis of dilating as well as cutting (Fig. 6), but is constructed with a blunt point on a triangular

FIG. 6.



Otis's Urethrotome.

knife placed on a side of a wire or steel bar; which blunt point, coming in contact with the strictured area, sinks deeply into the healthy portion, whereas the knife receives on its cutting edge the obstructing tissue.

How is internal urethrotomy effected by means of the dilating urethrotome?

The stricture having been measured both as to depth and calibre, the instrument is introduced to the bottom of the urethra and the screw at the top turned, which controls the dilating portion, up to the size which is normal to the case in hand; or if the stricture be very cartilaginous and tight within several degrees of the normal

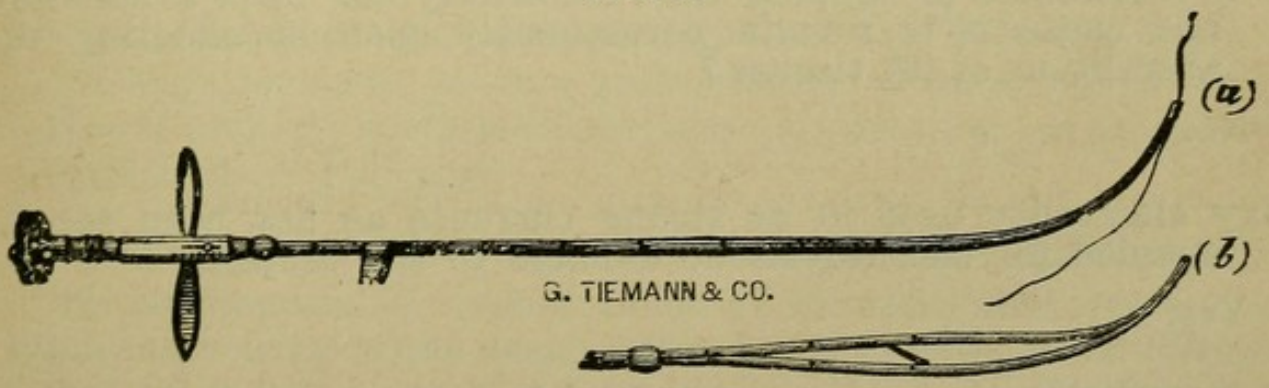
point, the knife is then drawn out, up to and through the strictured area, but never entirely out of the instrument. The detection of the stricture by the knife is felt by a practised hand in the density of the tissue which is being cut, so that it can be appreciated by the operator when he has entirely passed through. Having made the primary cut, the dilating screw is again turned up to a few degrees beyond the natural size of the urethra, and another cut with the knife is made, and if the stricture be entirely divided it will be appreciated by the softness of the tissue into which the knife enters. The instrument is then withdrawn, and a steel sound, the full size of the urethra or a couple of sizes larger, is passed down to, but not through, the deep urethra, as there seems to be a greater tendency to urethral chill following this operation when the deep urethra is traversed after the cutting.

After the operation a sound of about the size of that to which the stricture has been cut should be passed every two or three days for the first two weeks through the stricture only, and subsequently, at intervals varying from two weeks to a month, into the bladder for a period of about six months. This may be done by the patient himself. Finally, it is well to recommend the patient to return after a period of several months has elapsed without the passage of sounds, to be examined for a possible recontraction.

TREATMENT OF STRICTURE BY DIVULSION.

Divulsion of stricture is an unnecessarily rough procedure, and while it was used more or less formerly, since the invention and per-

FIG. 7.



Urethral Dilator.

fection of the urethrotome it is fast losing favor. Divulsion is effected by an instrument which was originally devised for rapid dilatation with tearing, but, adapted as a divulsor, it is made to stretch to the

extent of tearing the strictured point. The instrument is depicted in the illustration on page 65. The screw-head at its handle is turned so as to make the blades separate laterally, the extent of separation being indicated on a scale in the handle. The latest instrument is tunnelled, so as to enable it to be passed over a filiform bougie; which advantage renders it an instrument of real value in cases of very tight stricture, where a partial dilatation can be effected by its means, allowing the entrance of a larger instrument—the dilating urethrotome, for instance—and in the deep urethra, when the treatment by dilatation has been elected to open the way for steel instruments. It also may be useful to pick up foreign bodies from the urethra.

ELECTROLYSIS IN THE TREATMENT OF STRICTURE.

The opinions and belief of about all the surgeons of standing at the present day in regard to this procedure are so universally similar that it seems hardly necessary to enter into the subject other than to give it a passing notice.

Is it possible to cure an organic fibrous stricture by the use of electricity alone?

No.

Has it ever been shown by any practical report of cases that such an end could be effected?

No.

Is it reasonable to suppose that electricity can open a stricture and cause it to remain permanently open by effecting the absorption of its tissues?

No.

May electricity used in as strong currents as has been recommended for electrolysis do damage to the urethra?

Yes.

Is it probable that whatever actual benefit reported cases have obtained during a treatment by electrolysis is due to instrumentation, and is the same which is often experienced by a similar treatment minus electricity?

Yes.

CHOICE OF TREATMENT OF ANTERIOR STRICTURES.

What is to guide the surgeon in the choice between cutting or stretching the strictures of the anterior urethra?

It will depend partly upon the patient, and partly upon the stricture and the symptoms accompanying it. If the stricture be recent and of large calibre, the symptoms accompanying it being perhaps only a slight gleet with no obstruction to the urinary flow, dilatation should always be first resorted to, and by the curved steel instruments, which may also favorably affect the deep canal.

Is the discharge accompanying stricture of the urethra necessarily dependent upon this condition?

No; it is often referable to a congested or eroded condition of the deep urethra, and dilatation or division of the stricture may still leave the gleet behind it. A promise, therefore, that an operation or full dilatation of an anterior stricture will result in removal of the accompanying gleet can never be wisely given. If the stricture be one of great density and one that interferes with the free passage of the urine, thus possibly tending to an incomplete emptying of the bladder and debilitating its action by throwing too much work upon it, operation by internal urethrotomy can be properly advised, although the gleety symptom, which is generally the most offensive to the patient, is not necessarily removed by this procedure.

What are the chances for permanent cure of anterior stricture?

Stricture is said to be a permanent affair, and once acquired can never be removed; but, since the later improvements in the operation of internal urethrotomy, statistics seem to show that, by this method, although cure and permanent relief from symptoms are not always constant, yet in a great number of cases, where the operation is properly performed, recontraction does not occur and other manifestations disappear.

In what manner does internal urethrotomy cure stricture?

By terminating the recontraction of the strictured area and continual narrowing of the canal, which is apt to occur when dilatation is left off, it being one of the properties of stricture thus to recur.

Does dilatation ever cure stricture?

While it cannot be said that stricture is cured through this procedure, permanent relief is claimed to have been obtained in certain

cases, and for this reason it is best adapted in simple and recent forms.

What portion of the urethra should be divided—the floor or the roof?

In strictures at or near the meatus division may be made upon the floor, but in all strictures below this point division should be made upon the roof.

What method of treatment should be chosen for strictures of the deep urethra?

As dilatation offers no reliable promise of radical relief, when treatment is pursued with this idea in view it is useless to consider dilatation; but the operation necessary for strictures in the deep portions of the urethra is not such a simple one as internal urethrotomy, and is a more formidable affair and more apt to be accompanied by hemorrhage and shock; therefore, if the patient be satisfied with a condition of affairs which leaves him with a full-sized urethra, allowing free passage of the urine, and is willing to follow up the use of a sound for the rest of his life, dilatation can offer this much comfort and consolation; but in cases where the individual is willing to take greater risks for the purpose of having greater chances of radical and permanent relief, external urethrotomy is the only means which can give him any promise; and even this operation, it must be remembered, is not necessarily met with success.

EXTERNAL URETHROTOMY.

What are the steps in this operation, and what are the conditions which render it a simple and straightforward procedure or a difficult and complicated one?

Strictures of the deep urethra may be of variable size, and allow the passage of an instrument into the bladder, small or of moderate size, which in either event will act as a guide for the external incision of the operation; but in old strictures of long duration, which have become suddenly impassable from some cause or other, allowing neither the passage of the water from within nor of an instrument from without, the operation must then be done "without a guide" through the course of the urethra where the stricture exists; and this is a much more serious and difficult undertaking, and is distinguished from the former operation by the name of "perineal section." In strictures where an instrument of moderate size can be readily passed into the bladder a grooved instrument or staff is

used, and after introduction is held by an assistant in a perpendicular position directly in the median line of the body. The operator then cuts down upon this staff until the groove is reached, making a free incision externally and endeavoring to reach the groove with the point of his knife. When this is felt by the assistant the staff is partially removed. The operator, with his finger in the rectum, having found the urethra, changes his knife for a blunt bistoury or blizzard knife, with which as the staff is being removed he cuts his way along the course of the urethra to the bladder. The strictured area should be cut upon the floor as well as upon the roof. If strictures of the anterior urethra accompany those of the deep portion, a urethrotome is introduced and the normal calibre of the urethra established throughout. A sound much in excess of the normal calibre, to stretch the entire urethra, is then passed into the bladder. The hemorrhage in simple operations is slight unless the bulb of the urethra be invaded to a great extent, and can generally be stopped by hot water and moderate packing. A perineal tube of large enough calibre to ensure the non-passage of urine between it and the walls of the urethra is introduced through the perineal wound, and tied in place to protect the deep urethra for the first forty-eight hours. In simple linear stricture, or stricture of moderate bands surrounding the canal, incision through the strictured area in the floor and roof of the canal is all that is necessary; but where the amount of cicatricial tissue is excessive or nodular, excision of this is called for, and when the loss is great, a transplantation of the mucous membrane by Thiersch's method is indicated. This latter consists of transferring a piece of healthy mucous membrane from another portion of the body of the patient or from an external source, and restraining it in position by means of catgut sutures.

What medication, etc. should be adopted during the course and treatment of a case by this operation?

It is well for forty-eight hours before the operation to put the patient on 10 grains of salol every six hours or four times a day, and about twelve hours before to give 10 grains of diuretin every two hours. These measures may be kept up for a few days after the operation, or until such time as the patient shows his kidneys are in good working order and a protective membrane is formed over the cut area. The bladder may be washed before the operation, as it always is afterward, and this procedure is kept up in accordance with the amount of cystitis which exists.

What causes make a stricture impassable in many attempts at instrumentation? and what means should be used to overcome this difficulty?

Inflammation on the surface of a urethra, a tortuous and twisted canal with a very tight stricture, and incompetence or inexperience of the operator. In examining a urethra with a tight and tortuous canal or in an inflamed condition the greatest delicacy should be used and care in the choice and application of instruments. If this is not observed, a false passage may be produced and the course of the canal entirely lost, thus adding to the difficulty of passage. If a stricture be not unduly tight, having received a fair-sized instrument previously, inflammation on its surface may cause difficulty in entering or passing it. In such a case, if a tapering hard-rubber bougie, well oiled, be gently introduced, the small end of the instrument may become engaged in the stricture, and thus be readily passed into the bladder. In all cases of this kind too much care cannot be used, as much force applied to the instrument will result in a false passage. Sometimes if the stricture be small and has not been tampered with and torn, olive oil by means of a small syringe can sometimes be forced through the stricture, and then an instrument introduced while the olive oil is made to remain in the urethra. In a tortuous and tight stricture we have for our use the whalebone filiform bougies. These generally have twisted ends, and by gentle usage may sometimes find the hidden opening of the urethra in the strictured tissue. By means of these instruments the different portions of the canal can be examined either for false passages or for obstructing bands. As a false passage is most frequently found on the floor of the urethra, on account of the spongy and soft condition of the tissues, one of these instruments or a small flexible rubber instrument can be introduced first, and made to fill the roof of the canal, and then the same course can be pursued, filling the right side and the left side, and finally the floor. If none of these methods are successful, a number of filiforms may be introduced consecutively, and perhaps by filling with these little instruments the various byways and corners, one out of the several introduced may find the desired passage. When the opening in the stricture is found, that little "grasping" peculiar to this condition can be distinguished; but even when this be attained the dangers of false passage are not over and the difficulties of entrance not overcome, as a replicated mucous membrane beyond may meet the instrument after it passes the stricture. It may, however, be made to successfully

reach the bladder by continual turning, endeavoring to avoid the obstructions; but if it cannot be passed without force, it may be well to leave it several hours or as long as possible within the grasp of the stricture, when it may be found to pass more easily. If an instrument be once successfully introduced into the bladder through a tight stricture of this kind, it is advisable not to remove it, but to allow it to remain for a subsequent operation, thus affording a guide and doing away with the necessity of cutting without one. If the instrument successful in entering the bladder be only a filiform, grooved sounds have been devised and grooved cathcters of various dimensions, one of which may be successfully introduced into the bladder over this filiform guide, and retained for operation, or sufficient dilatation may be effected to introduce a catheter to relieve retention. These tunnelled instruments contain a small groove which traverses their under surface, and a small eye at the point, through which the end of the filiform is passed, and the instrument is then made to travel the whole length of the filiform, which is a guide for its passage. The sounds are hollow, and have the advantage of being able to prove beyond any doubt that the instrument is in the bladder by the withdrawal of a small amount of urine. If there be doubt as to whether the instrument is in the bladder or in a false passage, a finger passed into the rectum will discover the course the instrument has taken. If it be in the bladder, the tissues of the prostate will be felt between the instrument and the rectum; and if in a false passage, it is apt to be away from the median line, and the distance between it and the rectum is measured only by the thin walls of the rectum.

If the efforts to pass a stricture have been throughout unavailing after long trial and patience, what means have we of temporary relief pending another attempt at entering the bladder or prior to a necessary delay in operating?

Aspiration of the bladder after sufficient urine has accumulated to distend the organ, so that its outline is easily made out both by inspection and percussion above the pubic bone. This procedure is effected by piercing the abdominal walls in the median line just above the pubis with a good-sized aspirating needle, having previously carefully cleansed the instrument.

If an operation be decided upon, what are the steps?

After the patient is anæsthetized for the operation, another attempt made to enter the bladder may be successful, and a guide

then be obtained while the patient is in this relaxed condition. It is therefore always advisable to make this attempt before proceeding with the knife. If, however, this trial is fruitless, a curved steel sound or staff is introduced down to the stricture, and its point cut upon through the perineum, after which the strictured tissue is dissected through and an effort is made to find the urethra beyond. Sometimes when there is a great deal of cicatricial tissue this is somewhat difficult, as the canal may have deviated a great deal from its central course. After the right of way is established between the urethra above and below the stricture the steps in the operation are substantially the same as in ordinary external urethrotomy. There is always a greater danger of hemorrhage, however, in perineal section, as the bulb of the urethra is apt to be largely invaded by the incision. This is generally stopped by packing the perineal wound with an ordinary gauze or muslin bandage inside of a "tent" consisting of a muslin bag tied to the perineal drainage-tube at its point of exit from the wound.

What is the after-treatment in these cases?

In the way of medication the diuretin, in about 10-grain doses every two hours, is continued until the kidneys show no signs of restrained action; salol, 5 grains every six hours for the first few days; anodynes in sufficient quantity to overcome spasm, and whatever else special indications may require. The bladder is generally washed at least once a day for the first few days in all cases, and if there has been much cystitis a greater number of times a day is advisable. At the end of forty-eight hours a good-sized instrument is introduced, and again two days later, and repeated every two or three days for two weeks, after which the intervals are increased and a sound passed about once a week for some time, when the intervals may be increased to even a longer time, but it is best to continue the use of a sound at intervals from a few weeks to a month for about the first year after the operation, when a trial may be made to determine whether or not the stricture recontracts, in which case the sound must be passed indefinitely at the intervals necessary to keep the urethra up to a standard size; and the discontinuance of the instrument can only be advised in cases which for several months or a year after *this* show no signs of recontraction, and even then it is well to have the patient return after a period of some length of time to submit to an examination.

What are the results of stricture of the urethra?

The immediate and constant results which follow stricture are simply those of obstruction to the urine or semen, which becomes evident according to the extent of the stricture and the condition of the patient. Among the most frequent and important indirect results accompanying stricture is retention of urine, which may come from a very tight or from a moderately tight stricture, narrowed by the existence of inflammation caused by the indiscretion of the patient, excesses in drink, or cold, and as a result of this condition the bladder becomes over-distended; if this condition is allowed to continue, it will permanently impair the contractile power of the bladder and produce what is called atony. Retention may be the first symptom or result of stricture which presses the patient to take medical advice. If retention does not occur, and inflammation has been caused on the surface of a stricture by the indiscretion of the patient, this inflammation may travel back over the stricture through the prostatic urethra into the bladder, and we have what is called cystitis of the neck of the bladder. An inflammation of this portion of the tract occasions the symptom of frequent micturition in a greater or less degree according to the degree of the inflammation. Hæmaturia is occasioned sometimes by the presence of a stricture, and may be the first symptom which calls the attention of the patient. Certain pains of a reflex character may be present, either in connection with the exercise of the physiological function or without such connection.

Extravasation of urine is one of the most dangerous and appalling results of stricture. A urethra which has become thin through ulceration breaks during the effort of a violent straining, and allows the urine to escape into the tissues around the canal.

What are the symptoms of this condition?

The patient is sometimes conscious of something having given way, and a certain amount of relief is often felt when the bladder previous to this course has been for some time over-distended. The amount of extravasation may be small or large, and if it be small such a condition need not be suspected until abscess has formed. When the extravasation is large, its presence is indicated by the feeling of a hard lump around the urethra which may either become enlarged or form an abscess. When it enlarges extensively, infiltration of the urine takes place, in which case it may take one of several directions: It may travel into the tissue of the corpus

spongiosum and cause sloughing of the penis, or, without penetrating the spongy body, it may travel on its surface, forming a fistulous track and opening near the glans. It may extravasate behind the triangular ligament and infiltrate the tissues around the prostate and rectum, or possibly travel up behind the pubes in the tissue of the hypogastrium. If it escapes outside of the common fascia of the penis and in front of the triangular ligament, it will gradually distend the perineum and the scrotum, the subcutaneous tissue of the penis, and may mount up on the abdomen.

What are the symptoms which accompany this complication?

They are those of shock. A chill usually forewarns, which is followed by general depression, rapid and irregular pulse, and symptoms of septicæmia.

How and what are the fistulæ formed with infiltration of the urine?

They are the natural effort on the part of the urine to obtain an external outlet, and after opening do not close until the natural outlet has been re-established, or they may be caused by the formation of abscesses from infiltration, which abscesses make the external opening and narrow down to fistulæ.

What other complication of stricture having analogous symptoms occurs?

Rupture of the bladder.

What course may the urine take here?

In some cases the urine may escape into the peritoneal cavity, usually the result of an existing sacculus, or it may escape into the subperitoneal tissue, as in infiltration, behind the triangular ligament.

What other complications or results of stricture occur?

Abscess of the prostate may occur as an extension of inflammation into the interstitial tissues, or the inflammation may extend through the ejaculatory ducts to the seminal vessels. Epididymitis may affect one or both testicles. It sometimes leaves behind it an induration of the canal and subsequent sterility. Constitutional symptoms and complications vary and depend upon the existence or absence of local complications, such as cystitis, epididymitis, etc. Under such circumstances the symptoms are those of general debility.

What are the proper measures to be adopted for the relief of these various complications following stricture?

Retention is relieved by passage of the catheter and withdrawal of the urine if this measure be possible; by aspiration if deemed expedient; and by the operation of external urethrotomy. Cystitis of the neck of the bladder should be treated by rest, remedies to render the urine alkaline and soothe the mucous membrane, such as oil of sandalwood and fluid extract of pechi. In selecting an alkali, one that is least diuretic should be given, in order to put as little work as possible on the inflamed bladder. The local application of a few drops of the solution of nitrate of silver, commencing with 1 and increasing to 3 grains to the ounce, can be used by means of the deep urethral syringe.

Extravasation of urine calls for immediate operation to establish a proper drainage from the bladder, to allow the escape of the extravasated urine, and to prevent the occurrence of septicæmia. Multiple incisions made freely through the entire œdematous tissue accomplishes free drainage and lessens the dangers of this latter condition.

Rupture of the bladder also calls for rapid operative interference, and is probably the gravest condition which occurs as a result of stricture.

Epididymitis is not generally severe, and is treated the same as when it occurs under other conditions.

GENITO-URINARY DISEASES—NON-VENEREAL.

What are the non-venereal affections of the genito-urinary system?

Diseases of the penis, scrotum, and adjacent skin, of the prostate, of the bladder, kidneys, and ureters, and parasitic affections. These are considered in distinction from venereal diseases, since they have no necessary connection with sexual intercourse in their origin.

DIAGNOSIS.

When a malady exists in the genito-urinary apparatus, what questions should be asked in order to determine its site?

First, in regard to urination. Is it frequent or not, and if fre-

quent whether relatively greater by day or at night? Secondly, in regard to pain. Is there pain in the genital region, and if so what relation does it bear to the passage of urine—whether during the act, following it, or prior to? Thirdly, the character of the urine as it appears to the patient—whether clear or containing a deposit, whether it contains an admixture of blood apparently, or whether the passage of blood is irrespective of the urinary flow?

What is the significance of the various signs brought out by the foregoing questions?

Frequency of urination accompanies urethritis when it has invaded or is entirely located in the deep urethra, being due to a hyperæsthetic condition of the deep canal. It also accompanies common cystitis, the bladder being unable to retain urine to its full capacity. In hypertrophy of the prostate the frequent micturition is strangely more frequent at night than by day, while, on the contrary, when there exists a foreign body within the bladder, such as a stone, urination is more frequent by day, and especially increases with exercise.

The Pain.—In urethritis and prostatitis it is felt during the urinary act, generally at the end of the penis, and in prostatitis notably also at the end of the act, when the emptied bladder contracts down on the inflamed prostate. In cystitis the pain is usually felt before urination from the distension of the inflamed mucous membrane, which pain is generally felt above the pubis. In calculus of the bladder we may have this pain before urination as a result of the accompanying cystitis, but notably the pain is felt at the end of the act as a result of the stone being brought in contact with the walls of the emptied bladder.

In Regard to the Character of the Urine.—If it contains a copious sediment, its nature and the source from which it has been derived must be determined. A copious deposit of pus is easily recognized in its gross appearance. If present only sufficiently to render the urine turbid, a small quantity of such a specimen shaken up with liquor potassa will become clear. The deposit of excessive phosphates or urates sometimes misleads. The former is dissipated by the addition of an acid, and the latter by heat. If the deposit be pus and comes entirely from the urethra, it may be demonstrated by passing the first gush of urine into one glass and the remnant in another. The first specimen will contain all the pus, and the second will be transparent and apparently normal. If, however, it

comes from the bladder, the second specimen will contain equally as large, if not a larger, amount of free pus, which will eventually settle down in the bottom of a glass. When the greater part of the pus is derived from the kidney as the result of pyelitis, it generally settles down in the bottom of the glass in a clear-cut, smooth-looking, cup-shaped mass, leaving the urine perfectly clear. Of course the best and most accurate means of determining the source of pus is by the cystoscope. These gross appearances must necessarily carry only trivial weight, but may at times be useful, combined with other signs, in arriving at a diagnosis.

Blood in the urine is generally regarded as of serious import, but it may accompany a chronic deep urethral inflammation, when it may be very copious. Blood is generally a more or less constant symptom of tumors in the bladder and of stone, sometimes invariably present, at others coming in irregular gushes. In these maladies it is always increased by exercise.

After eliciting from the patient the required amount of information by questioning, what is the next means to resort to in establishing a diagnosis, and how is it conducted?

Physical Examination.—In this procedure instruments take a very important part in the rôle. The examination for stricture has been already carefully considered. The passage of a steel instrument into the bladder in chronic prostatitis will reveal a hypersensitive state in this region, and this, coupled with frequent urination and the absence of symptoms indicating cystitis, together with a knowledge of the causation of the existing trouble, will establish a diagnosis. In patients who have passed the age of fifty, where the possibility of a hypertrophied prostate must always come up for consideration, examination per rectum will reveal the condition of the prostate gland, and the passage of an instrument with a short beak, such as the Thompson searcher, discovers the presence of a prostatic protrusion or a prostatic bar; and in this condition, by the use of the catheter, the presence or absence of residual urine may be discovered, as well as the demonstration of the contractile power of the bladder-walls. Washing of the bladder and examination of the urine immediately after this manœuvre will assist in locating a trouble higher up in the genito-urinary apparatus. The use of the cystoscope in this connection is of great value, but requires a special study and practice. Palpation of the abdomen, with or without an anæsthetic, is used to assist in detecting tumors

of the bladder-walls and of the kidneys; and when the other symptoms point toward a stone in the bladder, its presence may be demonstrated by the use of the proper instrument (Thompson's searcher).

What are the final means we have of locating a malady in this region?

Examination chemically and microscopically of the urine.

What is the proper mode of proceeding upon this examination?

The urine should always be received in two separate portions: the first and smaller part, being received in one vessel, represents the washings of the urethra. The second portion represents the urine as it comes from the kidneys, and will contain whatever evidences there may be of bladder trouble. This second specimen is the one to be used for all tests except where the trouble exists in the urethra, when the first specimen will contain the elements of importance in forming a diagnosis.

The examination of the urine other than by inspection in an acute urethritis is unimportant, but when the disease is situated in the deep urethra or when there is a stricture forming, the first specimen will reveal characteristic shreds of mucus and epithelia from the seat of the malady.

In examining the specimens of urine microscopically in order to locate a lesion in the genito-urinary apparatus, we must be acquainted with the character of the epithelium of its various portions. It is not intended here to give a detailed description of these elements, as it requires a careful study and experience to become acquainted with them.

In order to use the microscope with any degree of satisfaction or value, one must first become versed in locating the characteristic epithelia of the different regions, so that when a given specimen is examined these epithelia may be recognized in combination with the various products of inflammation. If it be casually stated that from the prostatic urethra are derived round and oval epithelia of translucent appearance, and from the bladder columnar epithelium of different degrees of texture, and from the pelvis of the kidney caudate epithelium, such a description will be only misleading unless it serves to direct the student or practitioner to a careful and painstaking study of the subject.

In acute cystitis we will find mostly a copious amount of free

pus combined with the epithelial elements of the first layer of the bladder.

In chronic cystitis we find combined with the free pus the elements of decomposition—deeper epithelia and crystals of ammonio-magnesium phosphates; and where ulceration exists, this will also be revealed by the presence of blood; but blood and pus also come from the kidney, and it is only by an interpretation of the clinical history and other general signs, together with the attained knowledge of the various epithelial elements, that we are enabled to arrive at an accurate diagnosis. Cancer elements and entozoa are found by the microscope by those who are acquainted with them, as well as tubercle bacilli when properly stained. For the latter several examinations should always be made, as their absence in one or two specimens is only negative evidence, they being very difficult to obtain.

The microscope also reveals the presence of spermatozoa and of the crystals of uric acid and oxalate of lime, each having their special significance. Finally, a chemical analysis of the urine is specially important to determine the presence or absence and quantity of albumin or sugar and other abnormal constituents, as well as the excess of the normal elements. The specific gravity is taken to determine the relative quantity of solid constituents, and the litmus shows its normal reaction or over-acidity or the reverse.

DISEASES OF THE PENIS AND ADJACENT PARTS.

EPITHELIOMA OF THE PENIS.

Where does the epithelioma of the penis most frequently first appear?

It usually attacks the prepuce and spreads to the glans, although it often has as its starting-site the latter part, especially around the meatus, and generally appears after middle life, first as a small flat, warty excrescence or an excoriated surface with a slightly indurated base.

What are the symptoms?

The surface of the starting sore, if it has not already become excoriated, soon takes on this condition, when it bleeds a little and is the seat of darting pains or burning sensations. A scab soon

forms over the exposed spot, which is dark-colored, and if it be picked or falls off, reveals an ulcerating surface. Other scabs form and fall off, and thus the ulceration extends backward, invading all tissue within its course. The discharge it emits is thin, blood-stained, and fœtid. The ulcer which it forms is irregularly deep and unhealthy in appearance, with indurated, unhealthy, everted edges. Its course, if slow at first, progressively increases in rapidity, and the disease commences to vent itself upon the health and strength of the individual. The inguinal glands on both sides enlarge, becoming involved, and also ulcerate. If the strength of the patient holds out, there is no limit to the area over which this dire disease may extend. It may involve the entire external genitals, causing their destruction and perhaps total loss, and spread down the thighs and over the abdomen. In this extreme condition the patient may die of hemorrhage, some large vessel being opened by the ulceration.

The *diagnosis* of this disease should not be a difficult one. If it commences as a warty growth, it is difficult to decide until ulceration has set in, and warty growths of a flattened appearance occurring after middle life and in cleanly subjects should always excite suspicion. After ulceration has well set in and started on its course, the nature of the disease is at once revealed, and radical means for its removal should immediately suggest themselves. In fact, the only good chance for recovery is in attacking the disease early, before it has spread to the inguinal glands, and complete removal of the affected area accomplished. If it be slight, extensive scraping and cauterization may effect a cure, but where a great deal of tissue is involved no halfway measures should be adopted. Complete removal, well up into the healthy tissue, is the only hope to hold out. Should the inguinal glands become involved, they also should be removed thoroughly at the same time, and even such removal holds forth only a slender hope of permanent cure. Cancer of the penis in other forms than the above-described epithelial variety is very rare.

BALANITIS AND POSTHITIS.

What is balanitis?

Inflammation of the mucous membrane surrounding the glans penis.

What is inflammation of the prepuce called?

Posthitis.

Do these two troubles generally accompany each other?

Yes.

What is the cause of their existence?

A long and tight prepuce accompanied by uncleanliness, retention of the sebaceous discharges, or prolonged contact with gonorrhœal pus are the exciting causes, added to which there is a predisposition which some individuals possess to this condition of inflammation of the mucous membrane around the glans penis.

What are the symptoms of this malady?

First, redness of the mucous membrane, which is soon accompanied by a disagreeable discharge and infiltration of the surrounding parts. These become sensitive on manipulation, and are accompanied by a burning pain during any exertion. Sometimes ulcerations are produced, which may be confounded with chancroid or herpetic eruptions.

What is the nature of these ulcerations when they appear?

They are rarely deep, and simply appear as irregular excoriations. They may be accompanied by a free purulent discharge, but have not the symptoms of chancroid which have already been mentioned.

May they be accompanied by enlargement of the inguinal glands?

The glands sometimes become large and tender, but they rarely suppurate in this condition.

What other complications may accompany balanitis?

Warty growths sometimes appear, the condition being those that favor their development. Phimosis may be produced, which also may lead to paraphimosis.

What is the treatment?

Cleanliness is the first and most important item in the *treatment* of this malady. Warm water without soap should be resorted to, and then the parts dusted with a mild and unirritating powder, such as calomel or calcined magnesia, iodoform or aristol. This simple method, frequently resorted to during the day, will often effect a cure. Other modes of treatment are found in the astringent and

soothing lotions, such as spirits of wine and water 1 part to 4, the officinal lead-and-opium wash, or the following lotion:

℞. Aluminis, 1;
Plumbi subacetat., 5;
Aquæ, 500.

What conditions accompanying inflammation of the prepuce intensify the malady?

A long foreskin and phimosis.

PHIMOSIS AND PARAPHIMOSIS.

What is phimosis?

Phimosis is contraction of the natural orifice of the prepuce, which condition may be congenital or acquired.

How may it be acquired?

By injuries, burns, etc., and inflammation (balanitis), which tend to narrow further by swelling a perhaps naturally small orifice. The inflammation may be the result of an existing chancre or chancroid.

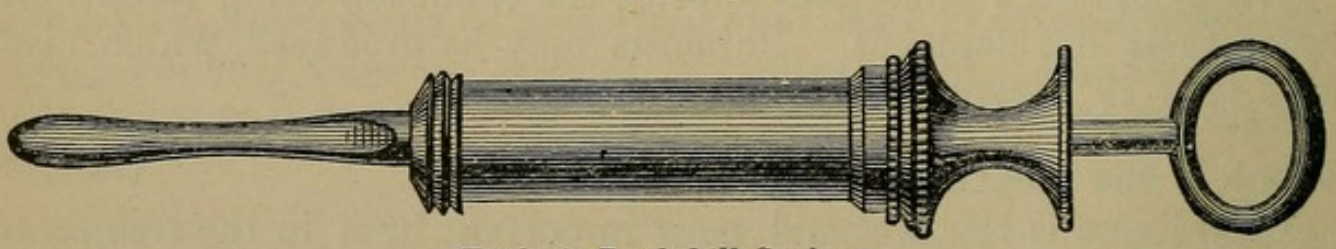
What is paraphimosis?

Paraphimosis is where a tight prepuce in an inflammatory condition is retained behind the corona glandis by an increased swelling, which prevents its release, and thus presents the appearance of a tight band around the mucous membrane behind the corona.

What is the treatment of balanitis and phimosis?

Phimosis may be the cause of balanitis by being a continual source of irritation to the glans penis, and therefore its removal

FIG. 8.



Taylor's Duck-bill Syringe.

may prevent a continual tendency to this condition. On the other hand, balanitis may cause phimosis, and its cure also will relieve this condition and may also prevent a possible paraphimosis. The treatment of uncomplicated balanitis has already been given.

(The accompanying cut shows a flat-nozzled syringe used for applications between glans and prepuce.) Phimosis, which has often as its cause a balanitis, may be cured only temporarily by the method of treatment which is used for the latter, and is apt to return upon slight cause. If a chancre or chancroid exists within the foreskin, the treatment must be expectant and cleansing. It is difficult to decide with certainty the nature of a sore under these conditions, and incision must be a dernier resort. Astringent and alterative applications can be made by the use of the "duck-bill" syringe (Fig. 8) with usual benefit. If by the induration and condition of the inguinal glans a chancre is decided upon, the use of a mild solution of oleate of mercury (5 per cent.) may benefit.

What is the radical means of curing phimosis?

Circumcision.

What does this mean?

Removal of the foreskin.

How is this practised in surgery?

The amount of foreskin decided to be removed is first nipped off by the scissors or knife, and the "mucous membrane," after being trimmed down close to the corona, is sewed to the freshly-cut edges of the skin by interrupted sutures of horsehair or catgut. If after removing the portion of the foreskin the opening is found to be still tight for the glans, the mucous membrane may be slit vertically on either side; and when the mucous membrane is trimmed, a triangular-shaped flap is left on both sides to fit in and enlarge the opening of the foreskin.

How is paraphimosis relieved?

Sometimes by soaking the inflamed organ in a vessel containing water as hot as can be borne will suffice to partially allay the swelling and permit the inflamed skin to be rolled over the glans penis. If this cannot be effected, a strip of bandage, rubber, or muslin, applied first uniformly over the glans penis very tightly, and then over the rest of the penis, so as to force out the contained blood in the veins of the organ, then quickly released, may allow the passage of the foreskin beyond its obstruction. If this cannot be accomplished by such means, incision must be resorted to.

What are the objections to this latter procedure?

Sometimes the inflammation which produces the paraphimosis is

due to a chancroid. An incision would naturally allow an infection of the newly-denuded area.

If, however, the constricted portion be so great as to endanger the loss of a large amount of tissue from sloughing, and incision is inevitable, chancroid being present, what means should we resort to to guard against an extension of the chancroidal ulceration?

Free and copious cauterization of the cut edges by the use of fuming nitric acid.

HERPES PROGENITALIS.

What is herpes progenitalis?

It consists of an accumulation of vesicles, resembling in their character herpes of other portions of the body, situated on the mucous membrane of the glans and the prepuce, often involving the adjacent skin.

What symptoms accompany these vesicles? and what is their cause?

They are accompanied by a slight burning sensation and itching. Those upon the skin remain as vesicles, and as vesicles run a course similar to herpes on other integumentary portions of the body; but those situated upon the mucous membrane within the prepuce become flattened down from rupture, and present more the appearance of small and multiple ulcerations. Under these circumstances they are more apt to produce secondary inflammation of the surrounding parts, and lead to the same complications which accompany balanitis.

What is the treatment of these lesions?

Proper attention to cleanliness of the parts is the essential feature, and astringent lotions, or preferably powders, such as calomel or bismuth, are a proper means of medicinal treatment.

Are they ever complicated with swelling of the inguinal glands?

They are quite apt to be attended by tenderness in this region, and liable under the same conditions which would encourage suppuration elsewhere to result in abscess; that is to say, a condition of ill-health and poor nourishment of the body.

With what may these herpetic lesions be confounded in diagnosis?

Chancroid and balanitis with ulcerated spots.

What are the distinguishing points in their differential diagnosis?

In their early career, when they appear as vesicles, the *diagnosis* is not difficult. When they become flattened and more or less ulcerated, the fact that they have formerly appeared as vesicles is a distinguishing point in diagnosing them. Balanitis comes on after the vesicles have appeared in the case of its accompanying herpes, whereas it precedes the appearance of any ulcerated spots which may occur during its course.

What is the nature of the discharge of these broken-down herpetic clusters?

It varies according to the amount of inflammation surrounding them. It may be sero-purulent, or even purulent under irritation.

What is the distinguishing feature between this discharge and that of chancroidal pus?

It is not auto-inoculable. If inoculated in another portion of the body it will not produce similar lesions.

CUTANEOUS AFFECTIONS.

PEDICULOSIS PUBIS.

What parasitic disease frequently attacks the external genitals?

Pediculi pubis.

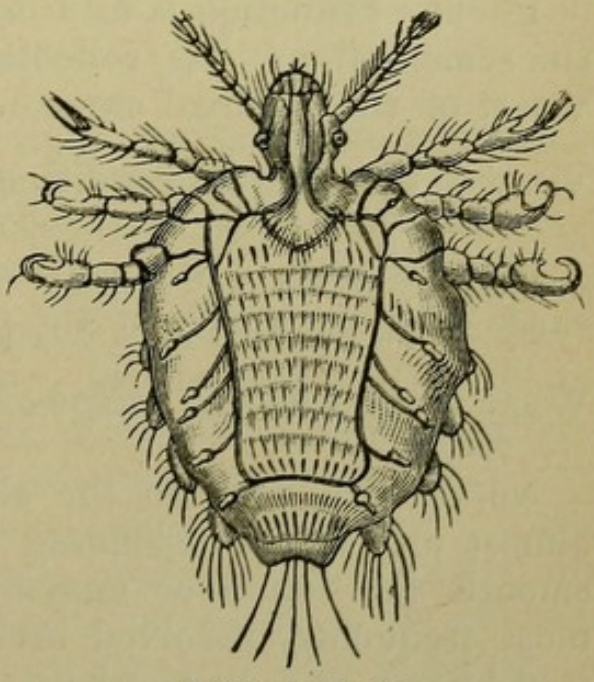
How is this malady generally acquired?

By contact with the same disease in another person, or by acquiring the parasites from a water-closet.

What does the disease consist of?

The presence around the genital organs of certain parasites or pediculi, which are generally found upon the scrotum and upper portion of the thighs or any portion of the body where the hairs of puberty occur.

FIG. 9.



Pediculi Pubis.

In what manner does this disease show itself?

The only symptoms are the itching and lesions caused by the

bite of the insects, and the *diagnosis* of the disease is established only by the discovery of the pediculi.

What treatment is to be pursued for the removal of these parasites?

The old-fashioned blue ointment, rubbed freely into the hairs of the mons veneris and around the regions of the scrotum and upper thighs, is the most effective treatment. The insects may also be destroyed by sprinkling the parts with calomel or applying a strong lotion of corrosive sublimate.

THE PROSTATE GLAND.

What is the prostate gland?

A small glandular body, consisting mostly of muscular tissue, surrounding the neck of the bladder and the first inch of the urethra. It contains mucous glands which open on the floor of the urethra, and is pierced by the two ejaculatory ducts, each of which is made by the union of the vas deferens with the duct of the seminal vesicle on the same side. The prostate is covered by a fibrous capsule. The pelvic fascia or posterior layer of the triangular ligament holds it in place, together with the pubo-prostatic ligaments. It is composed of two lateral lobes which form one symmetrical body.

What is the function of the prostate?

Its main function is as a muscular organ to contract and expel the semen after it has collected in the prostatic sinus, which act is a part of the venereal orgasm.

What is that morbid condition which the prostate is most liable to, and which most commonly appears before the physician?

Hypertrophy, either general or partial or circumscribed. The cause of hypertrophy of the prostate is not known.

What is the size and shape of the prostate under this morbid condition?

No definite limit to the size can be named, and it may take almost any shape, depending upon the part involved. It may be smooth and round or unsymmetrical and nodular. The portion most frequently involved in hypertrophy is the posterior median part known as the "third lobe," which latter is a pathological condition, and consists of a growth of the prostate between the two ejaculatory ducts, and may be, perhaps, due to the absence of

capsule here. It is usually an oval or rounded tumor which juts out posteriorly into the cavity of the bladder. When the hypertrophy proceeds laterally, it may affect one or both sides, and when both are affected the outgrowth in the middle partially fills up the orifice of the urethra, leaving only a small passage on either side, and the mucous membrane is often drawn up at these points, forming a "bar" at the neck of the bladder. Imbedded in this mass it is common to find small nodular tumors, easily enucleated, from the size of a pea to a marble. Hypertrophy of the prostate may assume various other formations.

What varieties of prostatic "bar" exist in these cases?

(1) Where there is a transverse bar or wall of hypertrophied tissue instead of the usual rounded tumor; (2) the elevated folds of mucous membrane between the lateral lobes or between them and the so-called third lobe; (3) a bar formed by the hypertrophy of the bladder tissue just behind the prostate, seated in the muscular fibres which run across the trigona vesica. This latter bar may produce an obstruction which is totally distinct from any prostatic outgrowth.

What are the symptoms of enlarged prostate?

The symptoms of enlarged prostate are, like stricture, the symptoms which occur from mechanical obstruction. These symptoms are derived especially from the part which suffers most as a result of the obstruction—namely, the bladder.

What is the effect of hypertrophy upon the prostatic urethra as regards its normal dimensions?

As the prostate enlarges in its vertical diameter the urethra elongates at the same time. Its course may be affected, and become even tortuous, and its calibre diminished. There may be a considerable amount of hypertrophy, involving only slightly the prostatic urethra, or a small amount of hypertrophy, with a large obliteration of the canal, posterior median hypertrophy, which comprises a majority of cases which come under observation. Unless an enlarged prostate develops as this median hypertrophy, producing an obstruction to the passage of urine, there is apt to be no symptoms which may call the condition to the mind of the individual, as there happens to be no source of discomfort for which to seek relief.

What is the most prominent symptom in the distressing form of hypertrophied prostate?

Retention.

How is this determined?

By the urgent desire of the patient to pass water, the history of a long interval since the last act being given, and the appearance of the over-distended bladder above the pubis, the outline of which may be mapped out by percussion.

How is this condition relieved?

By the introduction of a proper catheter for the withdrawal of the urine.

Is there any difference in the kind of instrument which should be used under such conditions?

An instrument of the ordinary curve must strike against the obstructing prostate and refuse to enter the bladder. Steel instruments are made with the proper curve, which curve should be bent so as to be exaggerated, and its last inch show a more decided turn than the rest. The hard-rubber English catheter may be used, and if desired it may contain a stylet, so that any curve given to it will remain. The Mercier instruments are exceedingly useful in these conditions, and are made with a slight turn, about half an inch from the end, which gives them the tendency to ride over any obstruction in the prostatic region. There are few cases of prostatic obstruction accompanied by retention which cannot be relieved by experienced hands with the proper instruments; but an occasional case occurs where the obstruction seems to be impassable, and aspiration of the bladder becomes necessary, or perhaps continual drainage over the pubis.

What are the first symptoms which announce the presence of an obstructing enlarged prostate?

Frequent urination: the patient generally complains of rising once or twice during the night; pain in urinating, which occurs at the end of the urinary act and is felt at the tip of the penis.

What is the condition of the urine which is voided during this condition?

It depends upon the extent of the obstruction and the length of time it has existed.

What effect does the obstructing prostate have upon the bladder itself?

By continually causing it to overstrain in its attempts to overcome the obstruction it necessarily becomes weakened, and gradually develops atony. As a result of this weakness there exists a certain amount of retained or residual urine in the bladder, which, undergoing decomposition, causes a cystitis and is voided in a foul, ammoniacal state.

How is the existence of residual urine determined?

By asking the patient to pass all the urine possible, and then by introducing a catheter an amount of residual urine may be removed.

What other condition shows itself in the early career of an enlarged prostate?

Urinary overflow. Distension of the bladder, caused by the obstruction, forces through the narrow orifice a small amount of the retained urine, which condition is called overflow, and must not be confounded, as it sometimes is, with incontinence, which is really a lack of power to retain the urine.

What precautions should be used in the first examination of patients suffering from an enlarged prostate?

The patient should be questioned in regard to a previous examination as to the effect instrumentation produces, and the same care should be used here as in the examination for stricture. If after a patient has passed his urine a catheter be introduced for the purpose of determining the amount of residual urine, and it be found, the entire quantity should not be removed unless a small amount of a disinfecting solution be introduced to replace it, as the liability to urethral fever is just as characteristic from such a procedure as in cases of stricture after examination.

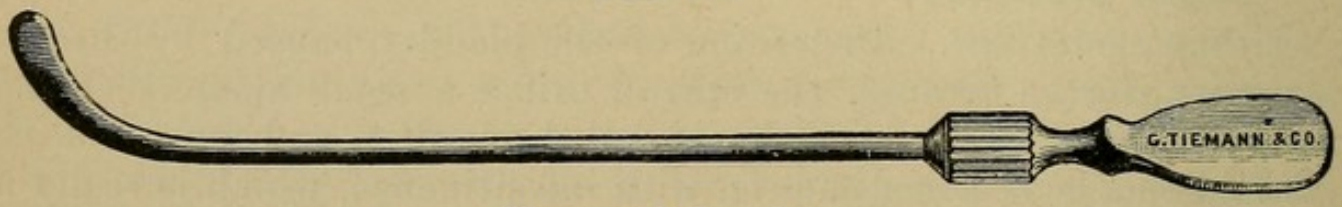
How do we proceed to enter the bladder in prostatic cases?

The proper instrument should be selected, and one especially adaptable to a given case cannot be discovered without trial. As a rule, the Mercier catheters are suitable for these cases, and the little bend at the small end serves to override the prostatic obstruction. If this fails, select a small-sized English catheter and with the stylet bend it so as to give it the characteristic prostatic long curve.

How do we estimate the character and extent of a prostatic hypertrophy?

Introduce a silver catheter with a prostatic curve, and if the urethra be deviated to either side a corresponding deviation of the point of the instrument may be felt on its introduction. The elongation of the prostatic urethra may be roughly determined by marking the depth to which the instrument has to be introduced before the urine flows. Instead of the natural 7 or 8 inches, it may perhaps be from 10 to 12 niches. To map out the contour of the growth around the neck of the bladder a Thompson's searcher, such as is used for exploring the bladder for stone, will render the necessary amount of information. (The accompanying illustration (Fig. 10) shows Thompson's instrument.) In intro-

FIG. 10.



Thompson's Searcher.

ducing this instrument it is necessary to depress the handle markedly, so as to introduce it through the last part of the prostatic urethra, in order to make it ride over the median enlargement. If the beak of the instrument seems to strike emphatically against an elevation or to slip with a sudden start over a mound, it is probably the prostatic "bar." When the beak is fairly in the bladder the instrument can be held horizontally if the prostate is healthy or if only a bar exists, and rotation of the instrument can be effected without deviating the direction of the shaft; but if there be any obstruction inside of the bladder, such as a jutting tumor from the prostate, the direction of the shaft must be deviated to allow the instrument to pass over this obstacle, and thus the position of the growth may be determined. In the case of a healthy prostate the instrument may be withdrawn with its point turned down, but in the case of the median enlargement the instrument will hook against the impending lobe. By this instrument the character of the texture of the walls of the bladder may also be investigated, and by carefully exploring the bladder systematically on one side and then on the other by a rotatory movement of the sound, the presence or absence of a stone may be determined.

What is the course of treatment to pursue in cases of enlarged prostate which require attention?

There is no medicine or application known which can be said to cure this condition. Simple inflammatory enlargement may be successfully alleviated by the same means of counter-irritation and pressure which have formerly been used. The specific treatment for the enlarged prostate is the use of the catheter, and while by this means a cure of the condition need never be hoped for, it being a mechanical obstruction, yet there is hardly any limit to the comfort which may be given by its proper use, the subjective symptoms being almost entirely removed. It is well to commence the course of treatment of a prostatic hypertrophy by blunting the sensibility of the deep urethra by the passage of a steel sound or rubber bougie at proper intervals, endeavoring to overcome the muscular spasm to which most of the symptoms are due. A great deal of satisfaction is found in combating prostatic irritability and inflammation of the neck of the bladder by the use of nitrate-of-silver injections by means of a deep urethral syringe (shown in a previous illustration), throwing in the membranous urethra several minims of the solution of nitrate of silver, beginning with ½ grain to the ounce and running it up to 10 or 15, commencing with an interval of two or three days, increasing the interval as you increase the strength of the solution. This finds its proper use in certain cases, while some do not respond to it. Where there is a small amount of residual urine and no cystitis the catheter has small value; but where Nature lacks the ability to carry out this function of emptying the bladder, the assistance which the catheter affords under these circumstances is indispensable; but too much care cannot be taken in introducing the patient to the habitual use of the catheter. A great deal of danger accompanies this procedure, unless it be pursued with a delicacy that is hard to teach those who have not had an unfortunate case which has resulted from a lack of proper care. After the first test for residual urine, as previously described, the patient should remain quiet for several hours, and preferably for a day, and after a few days the same process may be repeated; and if the symptoms do not contraindicate it the bladder may be entirely emptied and left empty. The most common form of catheter fever which comes on in these cases happens four or five days or so after the first introduction, evidenced by a chill and general feeling of malaise, the urine being heavy and foggy from the existence of mucus and pus.

After the surgeon has settled upon a proper instrument and gotten the bladder in a state of tolerance, and perhaps carried the patient through a fever or cystitis, the next course is to properly instruct the patient himself in the use of his instrument, impressing upon him firmly the fact that it will be necessary for him to care for himself in this way for the rest of his life. The warmth of his body must be carefully looked to, giving special attention to those more or less exposed portions, such as the feet and ankles. There is no necessity for a change of diet in ordinary cases. Exercise is good, and as a general rule the catheter should be used according to the amount of residual urine and corresponding to the regular intervals of normal urination. In ordinary cases, where the increased desire to urinate is mainly at night, the emptying of the bladder before retiring may be all that is required until early morning, when the process can be repeated. Where there is a large amount of residual urine it is better for the patient to rely entirely upon the catheter and pass it at frequent intervals, without attempting to urinate at all. This treatment may place a patient in a comfortable position, and he may live for years with a great deal of comfort and satisfaction. In cases where there is considerable atony the washing of the bladder by means of a warm solution of boracic acid, about 3 per cent. or more, is necessary to destroy the formation of a stone and a possible inflammation incurred by the decomposing urine. The number of washings to be employed is determined by the condition of the urine. The patient should be carefully instructed both in the proper passage of a catheter and in the process of properly washing the bladder. There is always a danger during the course of these cases of a cystitis lighting up from the effect of cold or irritating urine. This may result in retention of the urine, when it will become quite necessary for the patient to be able to introduce a catheter.

Supposing retention of urine occurs and repeated attempts to introduce the catheter fail, what course can be pursued?

The aspirator should be used twice daily above the pubis, and in the interim repeated attempts may be made to introduce the catheter. If all efforts finally fail, a permanent opening may be made above the pubis and a canula be employed. But if catheterization and aspiration both fail, it would seem best to delay measures and quiet the patient with anodynes until preparations have been made for a radical operation.

What is the proper manner of washing out a bladder?

After the residual urine has been withdrawn by means of the same catheter employed for this purpose, a warm boracic solution is introduced into the bladder with a bulbed syringe, which is most manageable in the hands of the surgeon, distending the bladder with the fluid up to its full capacity or to the amount that the patient can comfortably hold, and then allowing the same to pass out. The process is continued until the returned fluid becomes clean. For the patient's use the best washing apparatus is an ordinary fountain syringe, with a "two-way" metallic stopcock attached (the Van Buren and Keyes' bladder-washer), the mechanism of which is to force the fluid into the bladder, freely distending it; after which by a turn of the stopcock it returns through the catheter and out of the side arm of the stopcock. Boracic-acid solution is most commonly used for bladder-washing, but where a mild cystitis seems to increase and the secretion of pus becomes greater, it is well to change this injection to that of dilute nitric acid, diluted 20 minims to the pint, or, better, nitrate of silver 1 to 5 grains to the pint, or stronger if it can be endured.

What are the complications which are liable to occur in the early stage of hypertrophied prostate?

One or both testicles may enlarge. This is not a serious condition, and may be relieved by the ordinary methods. The introduction of the catheter can be continued. The swelling generally subsides under rational treatment. The most troublesome complication liable to occur during the treatment of these cases is congestion of the neck of the bladder, which is apt to lead up to cystitis. The latter announces itself by a diminished capacity of the bladder to contain fluid, increased amount of pus, and generally by the presence of blood in the urine. This cystitis is more apt to light up in recent cases or those in which the treatment by catheterism is a novelty. In the old and well-worn cases it is not so liable to occur. Unusual gentleness in the use of the catheter is called for in these cases of cystitis with enlarged prostate.

What complications come on later in the course of prostatic hypertrophy?

Atony of the bladder from its inability to overcome the prostatic obstruction and entirely empty itself; chronic cystitis as a result of the retention and decomposition of the urine; urinary

calculi; and finally the inflammation may be driven up the ureters to the pelvis of the kidneys and result in pyelitis.

What internal treatment is useful in these cases of prostatic hypertrophy?

Anodynes in sufficient quantity only to allay pain, under which circumstances the patient should be sent to bed, so that the bladder may have the greatest amount of rest possible, and, by raising the hips with a pillow, that freer drainage of venous blood from the pelvis may occur; counter-irritation or poultices applied to the hypogastrium, and the rectum emptied,—all of which means will assist in determining the smallest amount of anodyne which it is necessary to use in a given case. The only other internal remedies which seem to render service are those which tend to sterilize the urine and possess diuretic properties, such as salol, in doses of from 5 to 10 grains three or four times daily, possibly combined with fluid extract of pechi, 10 or 15 minims at a dose, and the employment of such waters as tend to thin and increase the urine, such as Poland or the New Highland Spring water. If partial suppression sets in, copious draughts of these waters should be employed, together with diuretin or some other diuretic, which the physician is apt to elect according to his special liking.

What are the surgical means which may be employed for the radical relief of the conditions accompanying hypertrophied prostate?

Disregarding old methods, which have been accompanied by only a small showing of success, it may be said that there is only a choice between two surgical procedures—namely, either suprapubic cystotomy, by opening the bladder above the pubis and reaching directly the hypertrophied offending portion, or perineal section. The former of these two operations is rapidly gaining reputation at the present day, and, while it is a procedure of gravity, yet from the fact that it has to offer, for successful cases, a far better condition of affairs after the operation than any other surgical interference, the probability is that it will forestall eventually these other older methods, and stand alone as the only reliable means to be held out to a patient for permanent relief.

What is the most common complication which tends to lead to a fatal issue in cases of prostatic hypertrophy?

Inflammation of the ureters, which is very liable to accompany these cases and which may lead to a pyelitis, is a very serious

condition, which is aggravated by cold, imprudence of living, and under these conditions a mild uræmia develops, accompanied by symptoms of a general anorexia, a dry skin, a reddened and dry condition of the tongue, headache, slight delirium, albumin in the urine. A fatal termination under these circumstances is likely to occur.

What is the treatment of this complication?

Confinement to bed in a warm room, measures to excite the action of the skin and the bowels, the free and copious use of diuretic waters, and a milk diet; the use of diuretin in doses of 10 grains every two hours.

What other affections of the prostate has the physician to deal with which are not brought so prominently to his notice as hypertrophy?

Prostatitis; simple congestion of the prostate, parenchymatous, gonorrhœal, and tubercular; abscess of the prostate; syphilis of the prostate; cancer of the prostate; prostatic concretions and prostatic calculi; neuralgia of the prostatic urethra.

PROSTATITIS.

What is the cause of congestion of the prostate?

It occurs physiologically during any sexual excitement, and is induced by any of the means which tend to excite a sexual appetite; but when this condition of hyperæmia is unduly prolonged without obtaining physiological relief, the organ may remain congested, giving the sensation of being tense and hard, with a frequent desire to urinate, and be accompanied by a small gleety discharge. This same condition may be excited by sexual excess, masturbation, etc., which may lead to a chronic condition. It may complicate gonorrhœa, and is generally a concomitant of stricture.

How can it be relieved?

In its simple form it generally yields to rest and a cold or hot sitz-bath.

What is parenchymatous prostatitis?

Inflammation of the substance of the organ, generally traumatic, or an extension of inflammation from other parts, seldom idiopathic. It may be caused by gonorrhœa, stricture, excessive venery, concentrated urine, cold, and mechanical means, such as instruments or foreign bodies. The gonorrhœal inflammation may be driven to the

prostate very rapidly by the excesses of the patient. It generally commences as a congestion, and during resolution produces a discharge from the surface; it may lead to abscess, and may become a chronic inflammation.

What are the symptoms?

The organ swells rapidly, and the condition announces itself by a feeling of tension, and the enlargement may be felt as a hard mass in the rectum, throbbing, sensitive, and hard. Pressure on or about it produces the desire to urinate. These sensations of heat and throbbing are felt by the patient himself, and may be accompanied by pain in the back and in the limbs. If it be a concomitant of a previous discharge from the urethra from a gonorrhœa or gleet, the discharge is reduced in quantity and in density, to return when the inflammation subsides. The stream during urination is small and the act labored. The swelling may be such as to cause temporary retention. The congestion of the neck of the bladder which invariably accompanies it produces the constant and unsatisfied desire to pass the water, so that even when the bladder is perfectly empty this feeling still exists. In regard to pain, it is felt during the passage of the urine, but is most acute when the last drops are being expelled, as the bladder contracts down upon the sensitive organ, often expelling blood derived from the congested vessels, and thus discharging the blood with the last remnant of the urine. It is similar to that felt from stone in the bladder, and runs from the perineum to the end of the penis on its under surface. The febrile disturbances accompanying it are very marked, and the excitement of the patient is apt to be great. If the disease attack the seminal vesicles, spermatozoa are discovered in the discharge. A false membrane may rarely form.

If resolution occurs, when does it take place?

Generally not later than the twelfth day, and recovery is not complete until about three weeks; but instead of going to resolution the inflammation may become chronic as a "folliculitis" or as an interstitial inflammation, which may lead to an indurated condition simulating hypertrophy.

What is the treatment of prostatitis?

Absolute rest is necessary. An alkaline diluent and an anodyne sufficient to control the pain and the excessive desire to urinate should be given. Moderate draughts of certain mineral waters, such as the

Highland or Poland Spring, are useful as diluents, although if there be much congestion of the neck of the bladder the bulk of urine should not be largely increased. If the affection comes on during gonorrhœa, treatment for the latter should be discontinued, especially the injections, and if the inflammation and tension be sufficient, such active means as leeching or bleeding may be resorted to. If retention complicates the case a small soft instrument should be gently introduced.

If either of these former conditions lead to abscess in or around the prostate, what are the symptoms?

All the symptoms of the inflammation become aggravated, throbbing is more marked, and the pains less dull and more lancinating. The condition is generally ushered in by a chill, and the pus as it burrows toward the urethra causes a still greater diminution in its calibre, which may become obliterated and result in retention. The whole substance of the prostate may suppurate or it may contain multiple suppurating foci. The abscess may burrow toward the urethra, bladder, or rectum or through the perineum, and if left alone discharge at these different situations.

What is the outcome of this condition?

If the abscess opens spontaneously or is incised, almost immediate relief from the symptoms is experienced. If only a small focus exists, it may not burrow nor point, but the pus becomes absorbed and leaves behind a calcareous concretion. The usual course after the abscess has opened is that of cicatrization, repair being by granulation; but this process may be interfered with by communication with the bladder or rectum, and thus materially interfere with the prognosis, which is ordinarily good unless this latter condition exists or the collection of pus be very extensive. If the abscess exists not in the prostate, but in the tissues around it as the result of the same causes, the symptoms are the same, but less intense. It is then termed *periprostatic* abscess. In this condition a finger in the rectum will distinguish œdema on either side instead of a clearly-defined and over-distended throbbing prostate. It may point and open in a similar manner to the prostatic abscess.

What is the treatment of these conditions?

Whenever fluctuation can be distinguished through the rectum, a trocar should be introduced at once and a puncture made to prevent burrowing and allay the symptoms. After the abscess has

burst the treatment is rational. When no fluctuation can be distinguished and retention supervenes, its coming must be watched for and catheterism or aspiration practised meanwhile.

What is follicular prostatitis?

Follicular prostatitis, or "prostatorrhœa," is inflammation of the mucous membrane and follicles and ducts and the sinus of the prostate, the substance of the organ not being involved. It starts as a subacute affection, generally in the course of a gonorrhœa when it has reached this depth, and runs a chronic course, with possible acute exacerbations brought on by excess or neglect.

What are its symptoms?

A slight muco-purulent discharge exaggerated by muscular effort, especially during defecation, when it may appear from the meatus in pulpy lumps and be taken by the patient for spermatorrhœa. Examination by the microscope will show the absence of spermatic elements and the presence only of fatty material, epithelium, and pus-cells.

What are the symptoms accompanying this condition?

If follicular prostatitis be accompanied by a certain amount of parenchymatous inflammation, as is apt to be the case, the symptoms of both affections present themselves in combination. A certain amount of weight may be felt in the perineum, increased on exercise; defecation may be painful, added to which is the frequency of urination in a variable degree. The urine contains pus, and blood sometimes accompanies the end of the stream. The pain felt during urination is at the neck of the bladder and at the end of the penis at the finish of urination. There is apt to be a spasmodic condition of the bladder and of the "cut-off" muscle, the latter acting sometimes so as to interrupt the flow. Other symptoms of general depression, constitutional and emotional, are present. The slight gleety discharge is very persistent against treatment. In all these cases an exploration for stone should be made, as the symptoms so closely resemble this latter condition.

What is the treatment of follicular prostatitis?

Repeated blistering of the perineum by cantharidal collodion is said to be very efficacious, confining the patient to the bed and making the application alternately on either side. The usual course of alkaline diluents should be observed, and this course is to be kept up until relief is felt, which may come in a few weeks, but

the disease may be very persistent and last a long time. A frequently valuable adjuvant to the treatment is the local application of a mild solution of nitrate of silver, from 5 to 10 grains to the ounce, in the membranous urethra at intervals of four or five days.

What is tubercular prostatitis?

A form of chronic prostatitis which appears in tuberculous, scrofulous, and broken-down subjects, characterized by cheesy degeneration in the ducts and follicles of the prostatic sinus. If this material be small and situated only around the sinus, it is hard to establish a diagnosis of the disease, but if abundant the organ can be felt through the rectum in a lumpy condition, or the two vasa deferentia can be distinguished as hard cords running from enlarged inodular seminal vesicles. The epididymis is apt to be the seat of tuberculous foci, as may be the lungs or other organs.

What are the symptoms of tubercular prostatitis?

The same as severe chronic prostatitis, with a slow and persistent course, the *symptoms* varying in their intensity from time to time. Ulcerations form in the prostate, as do abscesses from different foci, leaving cavities or fistulæ with a great lack of tendency to heal. Hemorrhage from the urethra appears at different times. The prognosis of the disease is very bad. Death occurs from general undermining of the system from tuberculosis. If recovery from this affection occurs, it does so only under fortunate hygienic surroundings.

What is the treatment of tubercular prostatitis?

The *treatment* aims at the general more than the local condition, but the same measures adopted for the other forms of chronic prostatitis may be resorted to with some effect.

SYPHILIS AND CANCER OF THE PROSTATE.

Does syphilis often affect the prostate?

No, but it is possible for it to appear here in its own peculiar way. There is no special syphilitic condition of the prostate.

How does cancer affect the prostate?

Rarely as a primary growth, usually secondary to disease of the kidney or testicle. It may appear in any of its different forms, generally in advanced life.

What are the symptoms of cancer of the prostate?

They are, first, those of obstruction, causing increased desire to urinate, which is accompanied by pain. The general symptoms resemble more or less those of hypertrophy and inflammatory enlargement, but they do not occur so rapidly as the latter nor so gradually as the former. When the condition is superadded to a pre-existing hypertrophied condition, it is very difficult to establish a diagnosis. Scirrhous cancer would be characterized by a feeling of unexceptional hardness in examination per rectum, while medullary cancer would reveal an irregularity in the enlargement and softened spots, of greater or less extent, in various places. The pelvic and inguinal glands in cancer become enlarged and take on the character of this disease. Of course the existence of the disease in other situations will lend a suspicion to its probable propagation here. The records show that cancer is not propagated from the bladder to the prostate, but the reverse order has been seen and reported, as also secondary cancer in the prostate following the primary condition in the rectum. Finally, after a sufficient length of time, the cancerous cachexia marks the presence of this dire disease. The hemorrhage which occurs with cancer of the prostate is free and arterial in character, and generally comes on during urination, although not necessarily. The urine is purulent, bloody, full of débris, and very offensive in character. The disease tends toward a fatal issue in from one to five years.

What is the treatment?

The *treatment* consists in an employment of such rational and symptomatic measures as are required in inflammatory conditions of the prostate, aiming at relieving the bladder from over-distension and the prostate from any unnecessary work by the use of the catheter, purifying the urine as much as possible by washing the bladder, and the use of alkalines and anodynes in sufficient quantity to render the patient comfortable.

PROSTATIC CONCRETIONS AND CALCULI.

What are prostatic concretions?

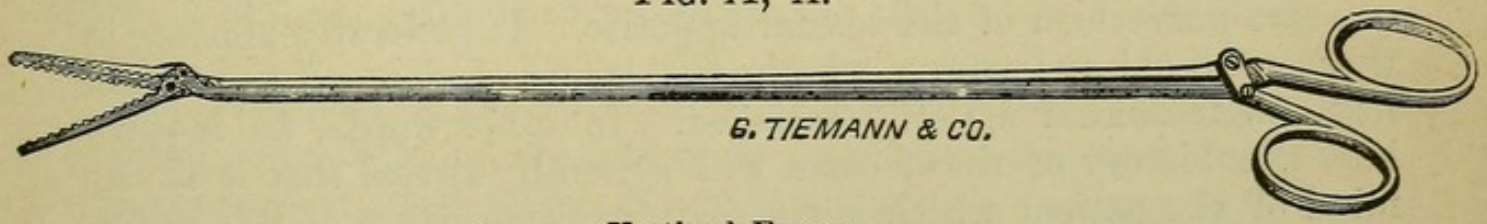
They resemble in character concretions found in the salivary glands or biliary ducts, and, while they cannot properly be called calculi, they may form a nidus around which the calculus may form. They occupy the ducts and follicles of the prostate, and in

their growth impinge upon the neighboring substance and sometimes attain the size of a pea. They are not of urinary formation, but are derived from the retained secretions of obstructed ducts or small abscess foci which have undergone resolution, when they form the nuclei for prostatic stones. They become sources of deposit for earthy phosphates, by which they may go on indefinitely increasing in size and assuming various shapes. They then constitute prostatic *calculi*, which if they continue to increase in size may produce many of the symptoms already mentioned as a result of prostatic obstruction, and sometimes may be felt by the passage of an instrument into the bladder. The natural sequence of these concretions when they exist in a sufficient degree to cause irritation is the formation of abscesses, as the result of which they may discharge externally. They may ulcerate through the rectum or into the urethra.

What is the treatment for the concretions and calculi?

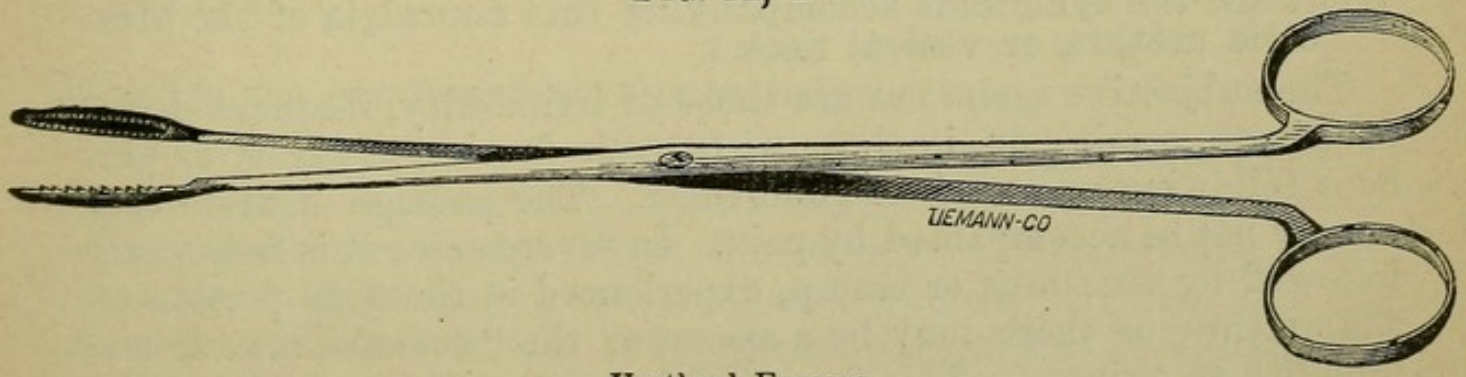
If they be of sufficient size to cause a great deal of irritation, and perhaps obstruction to the urinary flow, they may possibly be removed by an urethral forceps (see Figs. 11, A, and 11, B), but if their

FIG. 11, A.



Urethral Forceps.

FIG. 11, B.



Urethral Forceps.

existence be established beyond doubt, the best method is to cut through the perineum and remove the foreign bodies in this manner. If they can be more prominently felt by examination per

rectum, it may be advisable to make an incision through this region and remove them all here. In all cases where they exist it is well to search the bladder for stone, as the two conditions are apt to coexist.

PROSTATIC NEURALGIA.

What is neuralgia of the prostatic urethra? and where is it situated?

Neuralgia of the prostate is a functional disorder, largely of a neurotic character, and situated in the prostatic sinus, around the seminal ducts, and affecting also the neck of the bladder.

What are the causes of this disorder?

Its *causes* are those which are derived from inordinate, unnatural, and unsatiated sexual appetite, the result of which causes tends to congestion and irritation of this affected area. Besides the causes named of this neurotic condition, we have the rheumatic and gouty diatheses and any of the different conditions which involve a sympathetic or structural change of the tissues around this region—namely, inflammation, stricture, hypertrophy of the prostate, hemorrhoids, worms, etc. This affection rarely occurs as an idiopathic condition. It is always accompanied by some adjacent inflammation or some perversion of the sexual appetite. It generally appears in those men, old and young, who have a strong desire and yet cannot have their sexual appetite satisfied. In other words, an inquiry into the history of these cases will generally reveal that it is the mind of the patient which is the main exciting cause of this unfortunate condition.

What are the symptoms accompanying this neuralgia of the prostatic urethra or vesical neck?

The subjective *symptoms* are those of irritability, frequent desire to urinate, coming on, in those with erotic fancies, suddenly or perhaps following an attack of gonorrhœa. The passage of urine may or may not be accompanied by pain. In severe cases it is frequently followed by tenesmus or cramp, experienced in the deep portion of the urethra, or there may be a spasm of the "cut-off" muscle and inability to urinate. This frequent desire to urinate rarely affects the patient at night. Unless rendered wakeful by some other worriment, he generally spends a night of sound sleep, and it is only during the day or during *wakeful* hours of the night, when his mind is free to act, that this symptom especially reveals itself. When prop-

erly preoccupied by healthful amusement, or even when under the partial influence of liquor, the mind of the patient is taken from this portion of his body and the symptom of frequent urination is not present. The spirits are usually depressed and the patient more or less hypochondriacal. If the urine contains any deposit, it consists of amorphous phosphates, and crystals of oxalate of lime are not uncommonly present. The erections may be unnaturally frequent or abnormally absent, and there may be more or less heat and tenderness around the region of the external genitals. Other neurotic conditions may coexist with it, such as spasmodic stricture, irritable "cut-off" muscle, and nocturnal incontinence. Exploration of the urethra with a blunt steel instrument will generally find the whole canal in an hypersensitive condition and spasm at the "cut-off" muscle: as the sound enters the prostatic region a peculiar feeling of nausea and faintness may be experienced, accompanied by an exaggerated desire to urinate or an entire absence of this sensation. This exploration is apt to be followed by the passage from the urethra of a small amount of blood. Subsequently, however, this procedure generally results in a certain amount of relief to the patient. There is no end to the varied number of neurotic conditions which may coexist with this trouble, and from this coexistence it may be said that no organ or function of the body is exempt.

The *diagnosis* of the affection may generally be based upon the extreme sensibility of the prostatic urethra and vesical neck, and the absence of those physical conditions which indicate the existence of cystitis or the different forms of prostatitis. Where these affections coexist it is not difficult to distinguish the neuralgic element.

What is the treatment of this malady?

There is hardly any condition or affection of the genito-urinary system which requires such careful deliberation and offers such a scope for effective study as does this malady. The general *hygienic treatment* is important, such as liberal outdoor exercise and all those practices which tend to invigorate the general bodily health, such as cold bathing, early rising, and the like, and if possible inducing the natural physiological exercise of the genital organs—namely, marriage. Alkalines may be indicated, or possibly a mineral acid if there be a tendency to excessive phosphates, and a general avoidance of excesses, with an endeavor to preoccupy the

mind—which is an important element in the causation of this affection—by interesting and regular work. In regard to local measures there is nothing so effective as the occasional introduction of a blunt, smooth steel instrument at intervals depending upon the effect of each application. If cystitis or prostatitis coexists, this procedure will tend more to irritate than to relieve. Where there is a morbid sensibility in these parts, the gentle and equable pressure of the instrument seems to favorably affect the irritated muscles and the overloaded vessels. Finally, instillations of nitrate-of-silver solutions find an efficacy in some cases.

DISEASES OF THE BLADDER.

What is the position and general anatomy of the male bladder?

It lies between the rectum and the pubic bone when flaccid, and when distended rises up into the hypogastrium. It is covered above and on the sides by the peritoneum. This latter is reflected from the symphysis pubis on to the upper surface and base of the bladder, and from here to the rectum. When the bladder is in its flaccid state there lies a fold of the peritoneum between it and the rectum; but during distension they are in relation with each other. As also in front, a full bladder renders a surface of several inches above the pubis uncovered by peritoneum. This is an important point to be familiar with when the question of puncturing the bladder for aspiration arises. The muscular coat of the bladder is composed of two separate layers of fibres—an external, which runs longitudinally, and an internal, with a general circular direction at the neck of the bladder; these latter, increasing in density, have acquired the name of the sphincter vesicæ. The mucous membrane of the bladder is covered by pavement epithelium and is of a pale salmon hue. The neck of the bladder is that portion encircled by the so-called sphincter, and includes the base of the prostate. The trigone is a triangular space with its base upward toward the openings of the ureters, where there is a muscular ridge joining them, by which it is limited, and its apex downward toward the neck of the bladder. The "bas-fond" lies posterior to the trigone in middle life, when it only exists, and in old age during distension it lies on a lower plane than the trigone. The urachus is the remains of an embryonic prolongation to the umbilicus, which normally after birth is impervious.

What anomalies and deformities of the bladder occur?

Sacculi of various dimensions; sometimes as large or larger than the bladder itself, being herniæ of the mucous coat through the other tissues of the bladder, and are therefore without a muscular coat. Partial partitions entering into the bladder have been reported. The bladder is sometimes unnaturally small and rarely entirely wanting, under which circumstances the ureters open into the urethra or into the rectum. More than one bladder has existed in one individual. Exstrophy of the bladder is a deformity, the result of an arrest of development in the median line of the abdomen, and exists in different degrees. There may be an absence of the lower front wall of the abdomen and of the bladder, the pubic bones being separated and the posterior wall of the bladder being pushed forward between them. Inguinal hernia, complete or incomplete, may be present on both sides. This condition may be more or less modified, and when complete is generally accompanied by epispadias.

The *treatment* involves a plastic operation, the nature of which must vary with each case.

Does hernia of the bladder occur?

A dislocation of this organ may exist which may be rarely congenital, but comes on generally late in life as the result of overdistension or violence. It may or may not be accompanied by a portion of the intestines, and it appears in the various localities through which the gut is liable to protrude.

The *diagnosis* is made by the passage of a catheter into the bladder and reduction of its diameter by diminution of the contents.

The *treatment* is to retain it in place by means of a truss, if it be reducible; otherwise the tumor must be furnished with support. Strangulation would require an operation for its relief. An operation may also be performed with a view of affording radical relief.

Does hypertrophy of the bladder occur, and if so, when?

It occurs as an accompaniment of the hypertrophied prostate or any other condition which produces obstruction or impediment to the flow of urine.

Is atrophy of the bladder sometimes met with?

In debilitated and broken-down subjects a weakened, soft, and

thin bladder may exist; so much so that it predisposes to rupture when roughly dealt with.

What other causes combine to produce rupture of the bladder?

Ulceration, over-distension, and external violence.

What are the symptoms of this condition?

Sudden pain following a fall or an injury while the bladder has been distended; rapid collapse, during which the patient may die from shock; or may partially recover from this; soon to be followed by acute peritonitis. Desire to urinate is a frequent and constant symptom at the time and following the accident. It is apt to be impossible to satisfy this desire. If the catheter be passed the urine is very apt to be tinged with blood, but may come away clear.

What is the treatment?

If the diagnosis be established, suprapubic cystotomy is the surgical means to adopt, and a laparotomy should also be done if a rent in the peritoneum be suspected or if the bladder is seriously torn. If the diagnosis is uncertain, but reasonably sure, an exploratory operation is indicated.

What is incontinence of urine?

Incontinence is where the urine, in part or in whole, passes away involuntarily as a result of paralysis of the "cut-off" and sphincter muscles. It is therefore a symptom of other conditions, like retention. In an adult the dribbling of urine which sometimes occurs with enlarged prostate and other conditions means retention, as a rule, the result of over-distension, and occurs as an "overflow." Where the incontinence is not the result of an overflow, but is a true incontinence, it is caused by paralysis of the cut-off and sphincter muscles; inability of the bladder to distend on account of concentrated hypertrophy; or by a defective development in a portion of the prostate, tending to allow a small quantity of the urine to dribble away without producing distension of the bladder. Occurring in children, "nocturnal incontinence" is an involuntary flow of urine, often from force of habit and improper training. It generally passes away without treatment, but sometimes continues until the child is old enough to appreciate its infirmity without being able to overcome it. Such children are not necessarily nervous or choreic. Belladonna pushed to physiological

effects is sometimes useful in the treatment. Blistering of the perineum has been suggested, as well as different means of sealing the meatus. In cases where a long foreskin has existed, its removal has effected a cure. But even at this advanced age attendance to the general hygiene, assisted by the efforts of the patient, will suffice to effect a cure in time.

CYSTITIS.

What diseases of the bladder have we to consider?

The different forms of cystitis, acute and chronic, interstitial cystitis and pericystitis.

What is pericystitis?

Inflammation of the connective tissue surrounding the bladder. It may result from an extension of inflammation, but is generally caused by extravasation of urine or excessive violence. It generally tends toward a point of suppuration.

What is interstitial cystitis?

Inflammation of the walls of the bladder, generally an extension of a severe inflammation of the mucous membrane. In this condition the bladder slowly contracts, and its walls thicken very decidedly. Abscesses may form, and the cavity become so small as to hold only a trivial amount of urine, thus producing incontinence. It is not curable.

What are the causes of acute cystitis?

Traumatic causes; rough treatment or neglect during a chronic inflammation; extension of inflammation, gonorrhœa, or prostatitis. It also occurs in the course of a neuralgia of the neck and the prostatic sinus.

What are the symptoms?

Frequent desire to urinate night and day, the response to which does not bring relief; pain in the perineum and above the pubis, perhaps running down to the end of the penis; pain in the back and down the thighs. The pain is possibly increased during urination and at the end of the act. The urine contains more or less pus, and if the inflammation be severe destructive sloughy shreds will be found and decomposition will be present in variable degrees. The urine may be first acid, but soon becomes alkaline. Under the microscope the triple and amorphous phosphates are found in

abundance, blood and pus free, and, in clumps, epithelial débris, bacteria, etc. Febrile symptoms may be more or less severe, varying in different cases. When it occurs during the course of a gonorrhœa, it generally does not appear until after the third week, when inflammation has travelled backward, and is generally confined to the neck of the bladder. It may come simply from an extension of the inflammation or be produced by excessive exercise or over-indulgence in drink. The symptoms during this form of cystitis may be very mild or may indicate a very high degree of irritability and disturbance. The urethral discharge becomes lessened and may disappear, to return again when the bladder symptoms subside. It varies in duration from a few days to as many weeks.

How can acute prostatitis be distinguished from this malady?

By examination per rectum, which reveals the tense, swollen, and throbbing prostate.

What drug taken internally in excess may produce cystitis?

Cantharides. This condition is a strangury, being a congestion of the vessels about the neck. The *symptoms* are those of tenesmus, and constant erections from erotic feelings may also be present.

What is the treatment of acute cystitis?

It resembles the treatment of prostatitis—rest, alkalines, and an anodyne in sufficient quantity to allay pain. The local application of heat may aid, and in the case of gonorrhœal cystitis a deep injection into the membranous urethra of a few drops of solution of nitrate of silver, running up in strength from 1 to 48 grains to the ounce, at increasing intervals. This often produces a strangely beneficial effect. Of course when any cause can be discovered, such as the use of irritating drugs, as cantharides, turpentine, or cubebs, they should be immediately dispensed with, or if any foreign body exists its removal should be effected.

What is the most frequent affection of the bladder?

Chronic inflammation or catarrh.

What are the causes of this condition?

The *causes* are mostly of a mechanical character, such as obstruction in the prostatic or other portions of the urethra, stone in the bladder, or tumors, or any of the conditions which would modify its normal position or interfere with its natural function. This chronic catarrh may also be reflex from disease of the kidney.

What are the symptoms of chronic cystitis?

An increased desire to urinate of a much less degree than in acute cystitis. The urine is cloudy. Pain accompanies the urinary act, varying in degree and character in different cases. These cases of chronic cystitis show different grades of symptoms, resembling more or less those of the acute trouble, being liable under certain causes to be lighted up into an acute stage, so that the symptoms vary in degree anywhere from a mild chronic case to all the signs of an acute inflammation. Pus exists in the urine, free and in shreds, more or less mingled with triple phosphates and blood.

What is the treatment of chronic cystitis?

Investigation as to the cause upon which it depends and removal of the same, if possible, which procedure will result in a cure of the disease. Where there exists a cause which cannot be removed, the treatment is simply symptomatic. For the acute outbreaks on top of the chronic trouble the same course should be pursued as in the ordinary acute form of the disease. The urine should be rendered alkaline, and such other treatment as laid down for ordinary acute cystitis be employed.

What operation is sometimes employed for the purpose of benefiting a bladder suffering from chronic cystitis?

Perineal cystotomy, which is accomplished by a median incision in the perineum and by the tying in of a fair-sized perineal rubber tube, which is left in place to effect continuous drainage of the inflamed organ. Washing out of the bladder after this operation is a necessary point in the treatment of these cases, and the solutions to be used for this treatment are the same as in the acute form, adding, perhaps, the use of nitrate of silver in solution from ½ grain to 3 grains to a pint of water.

ATONY AND PARALYSIS.

What is atony of the bladder?

It is a muscular debility or lack of tone, distinguished from paralysis, which is referable to the nerve-centres, while atony is entirely a local malady. A physiological atony comes on with age in the muscular tissue of this organ as well as in the other portions of the body. It is the gradual fatigue, the wavering strength, which as age advances shows the loss of its former snap. This pathological condition of atony, however, comes on from causes

which put upon the bladder too much strain, and has no necessary relation to the age of the individual. A mild form of atony may be caused by an irregularity in responding to the calls of nature, necessitated perhaps by occupation or by the lack of conveniences, which circumstances gradually lead to an impairment of the expulsive power of the bladder—a condition which is the result of continually over-stretched detrusor urinæ muscles.

What is the cause of the atony which accompanies the hypertrophied prostate?

It is caused by the continual congestion of the hypertrophied bladder as a result of the obstacle to venous return made by enlargement of the prostate, added to which is the distension to which the bladder is subjected from its inability to entirely empty itself.

What are the symptoms of this condition?

In its complete form, where there is a total loss of power, the disabled organ allows itself to be filled to overflow, and we have a characteristic dribbling from the penis, which is notably seen in cases of tight stricture and prostatic hypertrophy. The amount that the bladder will hold in these cases of "stagnation" varies in different cases. The maximum amount having been reached, any excess causes the patient to have the ordinary inclination to urinate. Percussion over the pubis will reveal an overloaded and distended bladder. The most conclusive test, however, is the use of the catheter, which when introduced into the bladder allows the outward flow of the urine, and the latter in coming has not the normal strength and force of stream given it by the contraction of the bladder, but drops from the end of the instrument with the force of gravity alone.

What is the treatment of atony?

The first object is relief to the overstretched muscle by the use of the catheter to withdraw the urine at ordinary intervals, after which cold injections may be employed for the purpose of giving tone to the organ, and, if the condition be of a neurotic nature, by enjoining the patient to pass his urine at regular intervals whether he feels the desire for it or not. The same benefit may be obtained by applying cold externally to the hypogastrium or perineum. Very often cold injections are of doubtful utility, as the introduction of too much fluid would distend the organ unnecessarily, and if cystitis exists with this affection, the cold is not apt to benefit it. If the

condition is the result of an obstruction, it is often accompanied by hypertrophy of the muscular walls of the bladder, and therefore so long as the obstruction exists there is probably little benefit to be obtained by the use of these measures; but when the affection occurs in youth and middle age, depending upon a neurotic element, with a paralysis of the detrusor muscles, it is amenable to treatment. In such cases the employment of electricity may be added as a useful adjuvant for its relief. One electrode is carried into the bladder and another into the rectum or over the hypogastrium.

What are the causes of paralysis of the bladder?

It generally exists with diseases of the central nervous system. It may occur in febrile affections complicated by cerebral or spinal affections, when, however, it is apt to be only temporary.

What are the symptoms of paralysis of the bladder?

If the disease exists as a concomitant of some nervous affection and comes on gradually, affecting only the detrusor muscles of the bladder, there is a gradually diminishing force to the flow of the urine and a lack of power to entirely evacuate the organ. If incontinence accompanies this form of the disease, it is not true incontinence, but is due to the overflow which comes from an overdistended bladder, and therefore appears late in the disease, when the evacuating power is entirely gone. In these cases the urine smells foul, is thick, and is full of mucus and pus. If paralysis affects the sphincter of the bladder—which is rare—true incontinence will occur.

What is the treatment of this condition?

The most satisfactory *treatment* is the use of the catheter at regular intervals, and the bladder washed if cystitis exists, as it is very apt to. The same care is to be used in the management of these cases in the withdrawal of the entire quantity of urine, as in cases of obstructive retention of the urine. It is better to be wary about evacuating with a catheter the bladder which has long been unable to evacuate itself.

MORBID GROWTHS.

What morbid deposits and growths involve and grow from the bladder-walls?

Tubercle, benign and malignant tumors.

What is the etiology of tubercle as it affects the bladder-walls?

It occurs in connection with tuberculosis of other parts, frequently pulmonary; sometimes tuberculous ulcerations in the intestinal track; notably occurs with a similar affection of the kidney or prostate, and sometimes with tuberculosis of the testicle and cord.

How is this affection diagnosed?

The *symptoms* are those of chronic cystitis, varying in nature and degree according to the situation of the tubercular deposit. Unless an exploratory instrument can detect the ulcerated nodules and inflammatory thickening of the bladder, instrumental examination is negative.

The *diagnosis* of this disease must be mainly settled upon the exclusion of other affections, and its coexistence with tubercular involvement of a neighboring organ or elsewhere. Examination per rectum sometimes reveals the characteristic lumpy feeling of a tubercular vesicula seminalis and the thickened, nodular, indurated vas deferens. This or the existence elsewhere of the same disease will of course make the diagnosis probable.

What is the treatment?

The *treatment* is constitutional, and the same as when tuberculosis affects the lungs or other parts. It is also symptomatic, varying according to the amount of cystitis accompanying it and of the pain which it produces.

What forms of benign tumors invade the bladder-wall or grow with an attachment from it?

Fibrous Tumors.—They appear only rarely, but occasionally single or multiple, growing from the bladder-walls or in the connective tissues. *Cysts* are also rare, but they occasionally appear here. They may be simple cysts or dermoids, when they may contain bone, teeth, hair, etc.

Papilloma may also appear in the bladder as perfectly benign growths or coming from a cancerous base. They consist of villous prolongations, resembling in their appearance certain kinds of seaweed, and they may occur in a flattened form on the entire surface of the bladder, or as a large growth, the size of an orange and supported only by a single pedicle. There is nothing cancerous about these tumors *per se*, and they never lead to secondary cancerous deposits.

What forms of cancer are encountered in the bladder?

The scirrhous and epitheliomatous are the most common forms. Other varieties which have been seen are the encephaloid and colloid, etc. The malignant forms of tumor more commonly affect the bladder than the benign, and are more often an extension of the disease from elsewhere.

What are the symptoms which accompany growths of the bladder?

There is not a great deal of difference in the *symptoms* accompanying the malignant and benign tumors of the bladder. There is generally a certain amount of cystitis, varying according to the position and extent of the tumors, and a certain amount of obstruction, due to the position of the growths. They are accompanied by pain and tenesmus, and there is a history of constant oozing or intermittent hemorrhage from the bladder. Instrumental examination usually makes the symptoms worse.

In determining the presence of tumors in the bladder, with what other affections may they be confounded?

Tuberculosis, stone in the bladder, and prostatic outgrowths.

Cancer of the bladder is more easily distinguished than other tumors. The subjective symptoms are more severe, the pain being generally in the back and the thighs, as well as in the perineal region and over the bladder. The bleeding is apt to be intermittent, the hemorrhage appearing suddenly and profusely, coming in clots or fluid. Between these outbursts there is apt to be more or less hæmaturia. In scirrhous cancer the hardness can be felt through the rectum. Finally, the cachexia and the existence of the disease elsewhere are important points to be taken into consideration. Various conjectures may be made and reliable conclusions arrived at by the use of the searcher and the lithotrite, but the latest progress in cystoscopy has a more encouraging outlook, and the cystoscope now claims in practised hands to be able to arrive at conclusions with a greater rapidity and a greater certainty than has ever before been done by other means; and it seems as though in the hands of some these claims have been substantiated.

CYSTOSCOPY.

What is cystoscopy?

Cystoscopy is a practical science involving the use of an instrument termed the "cystoscope," which affords us a means of illu-

minating the bladder and allowing the practised eye to determine what we have hitherto been compelled to detect by the touch of instruments and the examination of the urine. That there is a wide scope of valuable knowledge opening out for the future of the cystoscopist there is no doubt, as has been already shown by the results obtained by those who in the past have made cystoscopy a careful and special study; therefore to those who wish to become astute diagnosticians in genito-urinary diseases it is specially commended.

What does the cystoscope consist of?

Briefly, it is made up of a metallic tube with an elbow at the lower end leading to a beak. The shaft of this instrument is about 7 to 8 inches long, and the beak less than an inch. The beak contains a small electric lamp, and the upper end, which is called the ocular portion, contains a switch which controls the electric light, and during use the eye is placed at the ocular end in order to view the interior of the bladder, which it does through a small prism situated in the beak above the electric light.

What special uses are claimed for the cystoscope in diagnosis?

In the bladder it is said to furnish the means of affording a differential diagnosis between the various forms of catarrh of the bladder, to discover ulcerations and demonstrate diverticula, and to reveal the presence of foreign bodies, notably stones, whether encysted or not, or tumors, the presence of which can be discovered early in their career. With reference to kidney diseases it has been used to eliminate vesical trouble, thus locating the lesions in the kidney, and possibly distinguishing which kidney is the affected organ. Also the urine as it exudes from the ureters may be inspected, and its clear, purulent, or bloody character determined. It may also be seen whether both kidneys are doing the work or only one, and the amount of work each is apparently doing.

That the practice of cystoscopy requires ability, experience, and patience there is no doubt, and it in many cases becomes impracticable, sometimes on account of the field being obscured by an admixture of blood, caused directly by the irritation of the instrument. There has been devised an "irrigating cystoscope," by means of which the field may be kept more clear by constant irrigation. In spite, however, of any of the obstacles now existing in the use of cystoscopy, it is even at present a powerful aid to diagnosis, involves a harm-

less examination, and often takes the place of some necessarily more serious operative exploratory procedure. If in its present immature development cystoscopy affords such valuable service, we may look forward with well-founded hope for a much wider field of profitable research in the future.

STONE IN THE BLADDER.

What are the source and origin of stone in the bladder?

A great number of the stones found in the bladder are of renal origin or have as their nuclei a calculus which has been derived from the kidney. Other stones are formed primarily within the bladder, and may have as their nuclei some foreign body, or may form as a natural result of the obstruction to the passage and consequent retention of urine in the bladder.

What are the different constituents which go to form a urinary calculus?

It may be formed of the natural saline elements of the urine, which are deposited in different cases as the salts of uric acid or the phosphates, or of deposits which are not constituents of the normal urine, but separated from the blood by the kidneys in certain conditions. Oxalate of lime is the most frequent constituent representing this type, although cystine and other more rare abnormal constituents of the urine may occasionally enter into the formation of calculus. The most frequent forms of calculi which are ordinarily met with are the uric-acid, the phosphatic, and the oxalate-of-lime or mulberry calculus. These different forms may enter into the composition of the same stone, which may have, for example, an oxalate-of-lime nucleus surrounded by urates, and finally encrusted with phosphates, or the latter may alternate in layers with the urates; such a stone on section giving the appearance of concentric layers.

What are the conditions of occurrence of stone in the bladder?

Stone is more commonly met with in advanced life, say after fifty. It is next frequently met with in early youth, and less frequently in middle age. It is far more frequent in males than in females, and is generally more frequently met with in cold than in warm climates. In certain portions of the same country it would seem to exist in greater frequency than in others, while in certain places there is a greater prominence of one kind of calculus than

another. There also seems to be a greater prevalence amongst those leading a sedentary life than among the working and active laborers and mechanics.

What is probably the most common form of urinary calculus?

Uric acid.

What is the general course of its formation?

It is generally derived from a pre-existing "gravel," which may exist as a persistent "brick-dust" deposit (excess of urates), or from a conglomeration of uric-acid crystals passed in masses from the kidney, which may vary in size from a small crumb to the size of a pea. The bladder may expel the calculus through the urethra before it has reached a size too large to be passed; but if this does not occur, the stone increases in bulk by the deposit on its surface of more urates or phosphates, and may in the course of time become a very formidable affair.

What is the course of formation of a phosphatic calculus?

A phosphatic calculus is not apt to be formed in the kidney, and is most commonly a concomitant or the result of pre-existing bladder disease. Any cause which produces an obstruction to the bladder or interferes with the natural emptying of its contents may be indirectly the cause of a urinary calculus, and therefore the phosphatic stone or deposits from decomposed urine is most frequent in the aged, whereas the uric acid is generally found in the young. The former is soft and alkaline, the latter is hard and acid. *The oxalate-of-lime calculus* forms in the kidney first, like the uric-acid stone. It is the hardest in structure, and more difficult to remove than any other on account of its hardness and its rough and uneven surface.

What conditions are necessary for the formation of a urinary calculus?

(1) A diathesis involving a predisposition to the excessive deposit of certain normal or abnormal urinary constituents, which is influenced by diet, habits, etc.; or (2) an interference with the natural passage of the urine, involving decomposition and deposit of phosphatic material; (3) the existence of a colloid or cement material for the agglutination of the calcareous material. This may be formed by the mucus and pus furnished in kidney or bladder disease.

What is the general shape of urinary calculi?

They are generally oval or rounded with flat surfaces. The surface may be smooth, but is generally rough, notably in the case of oxalate-of-lime calculi.

What is the general size?

They may be any size, from a small renal calculus upward. One the size of a hickory-nut may be called small. Anything above an inch in diameter would be considered large. They vary in weight according to size, and may weigh anywhere from a few grains up to fifty ounces or possibly more. They may be single or multiple.

How is a stone properly examined chemically?

It should first be sawed through the centre in equal halves, so as to display the concentric layers, which must be separately tested. It must then be examined for its organic and inorganic constituents. If it consists largely of organic material, it may be determined by burning a small portion in the Bunsen burner, by which it will be almost entirely consumed. If, then, this be determined and the organic material be *uric acid*, its presence will be detected by dissolving a small portion of the powder in dilute nitric acid upon a porcelain dish, dry over a spirit lamp, and then leave it to cool. This will leave a yellowish-red sediment, and by waving a glass rod moistened with ammonia close to the sediment a beautiful purple-red will develop. This is the murexid test. If it be *urate of ammonia*, it will be dissolved by boiling some of the powder in water, and if it be boiled with liquor potassæ the fumes of ammonia are given off, and a rod moistened in acetic acid will produce white fumes. If this test fails and the calculus is still deemed organic and not inorganic, xanthine may be discovered by dissolving the powder in dilute nitric acid and drying slowly with a spirit lamp in a porcelain dish. This leaves a bright-yellow color which is not changed by ammonia, but becomes reddish-yellow on the application of a drop of liquor potassæ. If the organic material be cystine, in burning the powder on a platinum-foil wire disagreeable sulphurous odors will be emitted, and the same powder in alkaline solution allowed to evaporate will show characteristic crystals. If, however, in burning a portion of the calculus a considerable residue remains, it is composed largely of inorganic constituents or of the organic salts, such as urate of potash, sodium, lime, or magnesium, and the oxalate, carbonate, or phosphate of lime or the ammonio-magnesium

phosphate. The murexid test, if applied to the powder before burning, shows the presence of uric acid, but the presence of a substantial residue after the heating proves the existence of uric acid in combination with an earthy base. If the murexid test fails on the powder, it may be oxalate of lime, and to determine this a portion of it should be put upon a piece of charcoal and treated with the blowpipe. At first the red heat blackens it, and later whitens it, when it becomes a carbonate of lime, which dissolves in dilute acids with effervescence. White heat reduces the powder to caustic lime, which is insoluble in the dilute acids with effervescence. Oxalate of lime before treated with the blowpipe is unaffected by acetic acid, and it dissolves in mineral acids without effervescence.

To distinguish the remaining substances, dissolve some of the powder in hydrochloric acid. It either effervesces or *not*. If it does, it is either carbonate of lime or magnesium. If it does not effervesce, it is either oxalate of lime or phosphates.

What are the symptoms of stone in the bladder?

Frequency of micturition, relatively greater by day than at night, increased by exercise, pain at the end of the penis and at its under surface, generally felt during the act of urination and after it is finished. The condition of the urine is generally striking. It is almost always a condition of cloudy urine, loaded with pus and mucus, and perhaps with a certain amount of calcareous deposit or gravel, and almost invariably the patient will give a history of having passed blood some time during the course of his symptoms. If this latter symptom exists more or less constantly, it is increased by exercise.

What is the proper manner of examining a patient with suspected stone in the bladder?

A short curved steel instrument should be adopted, imitating the curve of the instrument of Thompson, as shown in Fig. 10. Any ordinarily curved sound or catheter will not suffice always to detect the presence of the stone. This instrument is possessed of a short curve, as a result of which, when introduced into the bladder, it can be easily rotated from side to side, and the inside of the bladder be carefully searched in a systematic manner by its means. In the hands of an experienced operator it is not only possible to determine the presence of a stone by this instrument, but also ap-

proximately the size and its consistency. The general characteristics of the different stones should be borne in mind. The phosphatic is soft, the uric-acid hard, the mulberry calculus rough and uneven. It is difficult to distinguish in the bladder between a mulberry and a uric-acid calculus. However, the different symptoms accompanying regularly the different kinds of stone will aid in determining the nature of a given stone. That removal of an existing stone is the only course of treatment to be pursued there is no doubt; the only question which arises is the choice of the means for its extraction.

What are the different operative procedures advised for the ordinary treatment of stone in the bladder?

Lithotomy, lithotrity, and litholapaxy (simply rapid lithotrity).

What is lithotomy?

Lithotomy is, briefly, the operation of cutting for stone in the bladder—an operation which was performed in the Middle Ages, and which probably has existed ever since surgery first attempted to offer any means of relief to suffering humanity.

What is lithotrity?

Lithotrity is that procedure by means of which a stone in the bladder is crushed and the fragments removed by means of a washing-tube passed through the urethra.

What is to guide us in the choice of operation for this condition?

No invariable rule may be laid down. It simply may be said that statistics show that the female tolerates the cutting operation better than the male, and the child much better than the adult. Since the advent of litholapaxy there has been very little doubt as to the choice of operation for the removal of stone in those whose symptoms are entirely derived from this one source: in those who have also an hypertrophied and interfering prostatic enlargement, where removal of a stone may only partially allay the symptoms, the recently increased practice of the superpubic cutting operation has brought this procedure forward as an important consideration in the choice of a treatment for urinary calculi. In general terms it may be said that litholapaxy is the operation to be resorted to in the majority of cases, the exceptions being possibly in

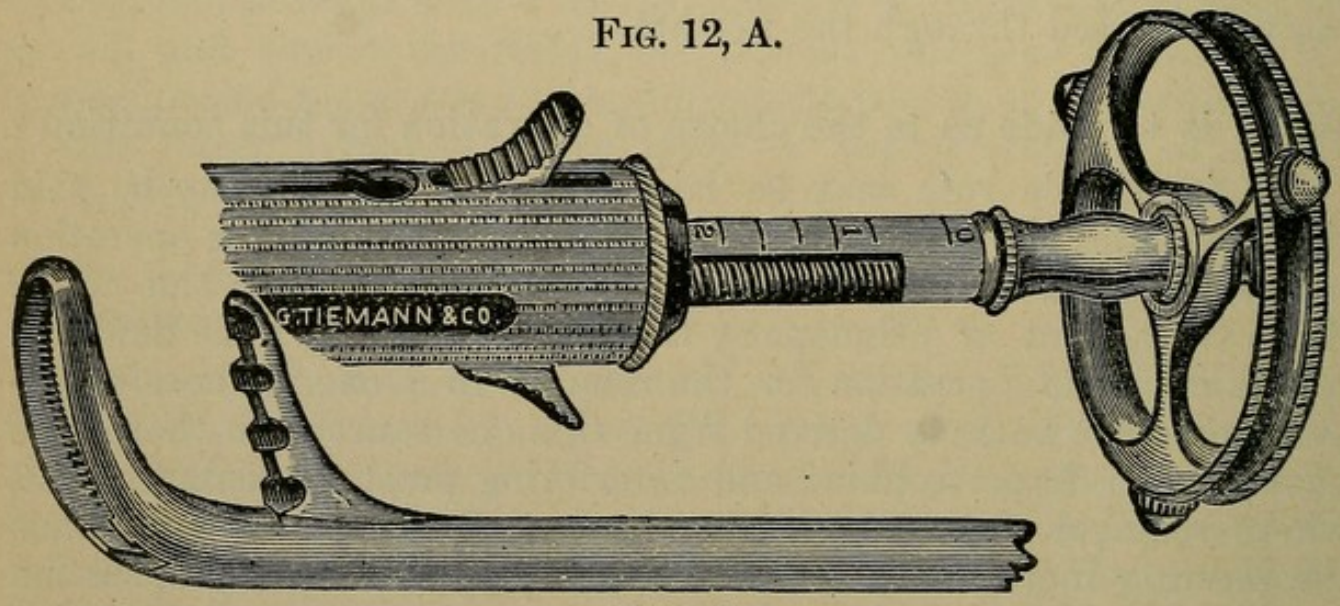
extreme youth, in cases where the stone is too hard to be crushed, and in those cases where an enlarged prostate coexists with the stone, where it may be deemed more expedient to adopt an operation which will also allow of the removal of a portion of the offending prostate.

What instruments are essential for the proper performance of the operation of lithotrity?

First the lithotrite or crusher, and second, the evacuator or apparatus used for washing out the crushed fragments of the stone. The lithotrite of the present day consists of two blades curved at about the same degree as the searcher, one of which fits within the other, so that when closed the appearance of having one blade only is given, and when open it allows the stone to be taken within the grasp of the two blades. The larger blade is called the male blade, and the one which fits within the other the female blade. Crushing is effected by a rack and pinion at the other end of the instrument, and a button is on the side of the instrument, so that when turned in one direction the blades are entirely controlled by a screw movement, and when turned in the other direction it releases the shaft of the instrument, and the blades may be opened and shut by moving the shaft in or out. Figs. 12, A, B, and C.

There are several kinds of evacuating or washing instruments: probably the most useful one is the latest device of Bigelow. It

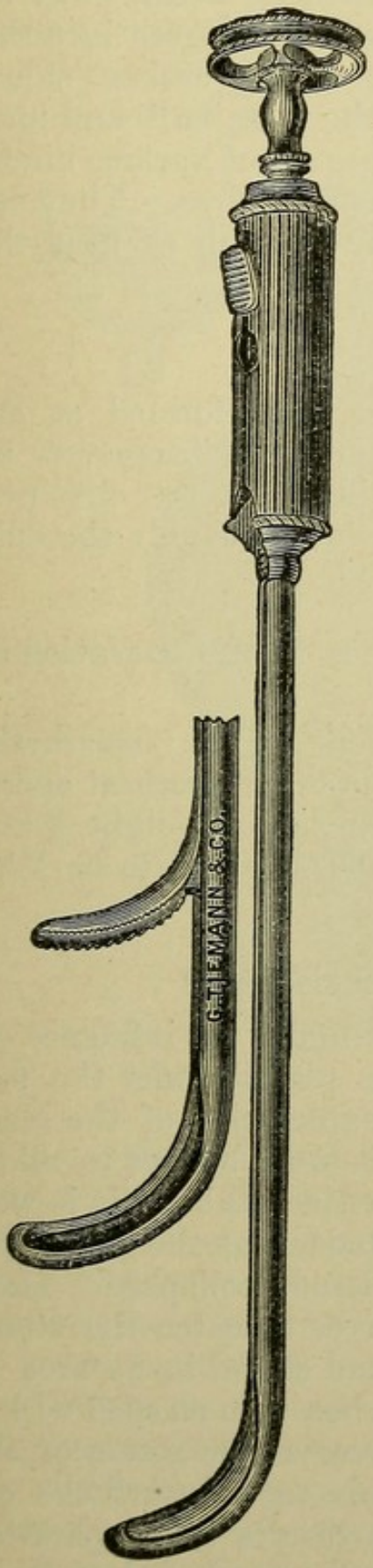
FIG. 12, A.



Lithotrite.

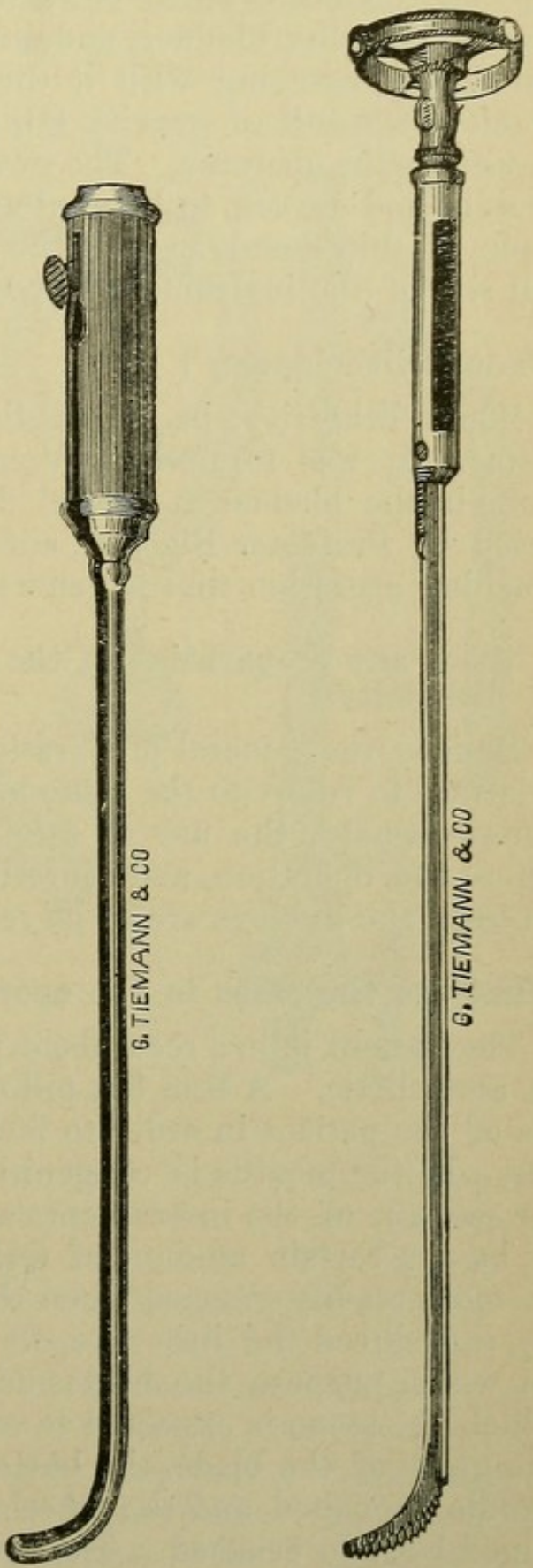
consists of a rubber bag for suction, underneath which is a hollow glass bulb, so that when the washer is attached to a steel tube which

FIG. 12, B.



Lithotrite.

FIG. 12, C.



Lithotrite Separated.

has been introduced into the bladder, by a gentle and regular pressure on the bulb, which is filled with water, the contents may be thrown into the bladder, and in turn sucked back again into the instrument, carrying with it the fragments of the broken stone, which as a result of gravity fall down into the glass bulb and may be seen by the operator. The evacuating tubes are of various kinds, straight and curved, to be used as the occasion requires. They are made of thin metal, so that the calibre may take up as near the full size of the instrument as possible.

What is litholapaxy?

Rapid lithotrity, in which the operation is performed at *one sitting*. It was formerly customary to remove the fragments of stone in the bladder at several different sittings. It was first proposed by Professor Bigelow, and since then it is probably the only crushing operation that is generally employed.

Is there any preparation of the patient prior to the operation of lithotrity?

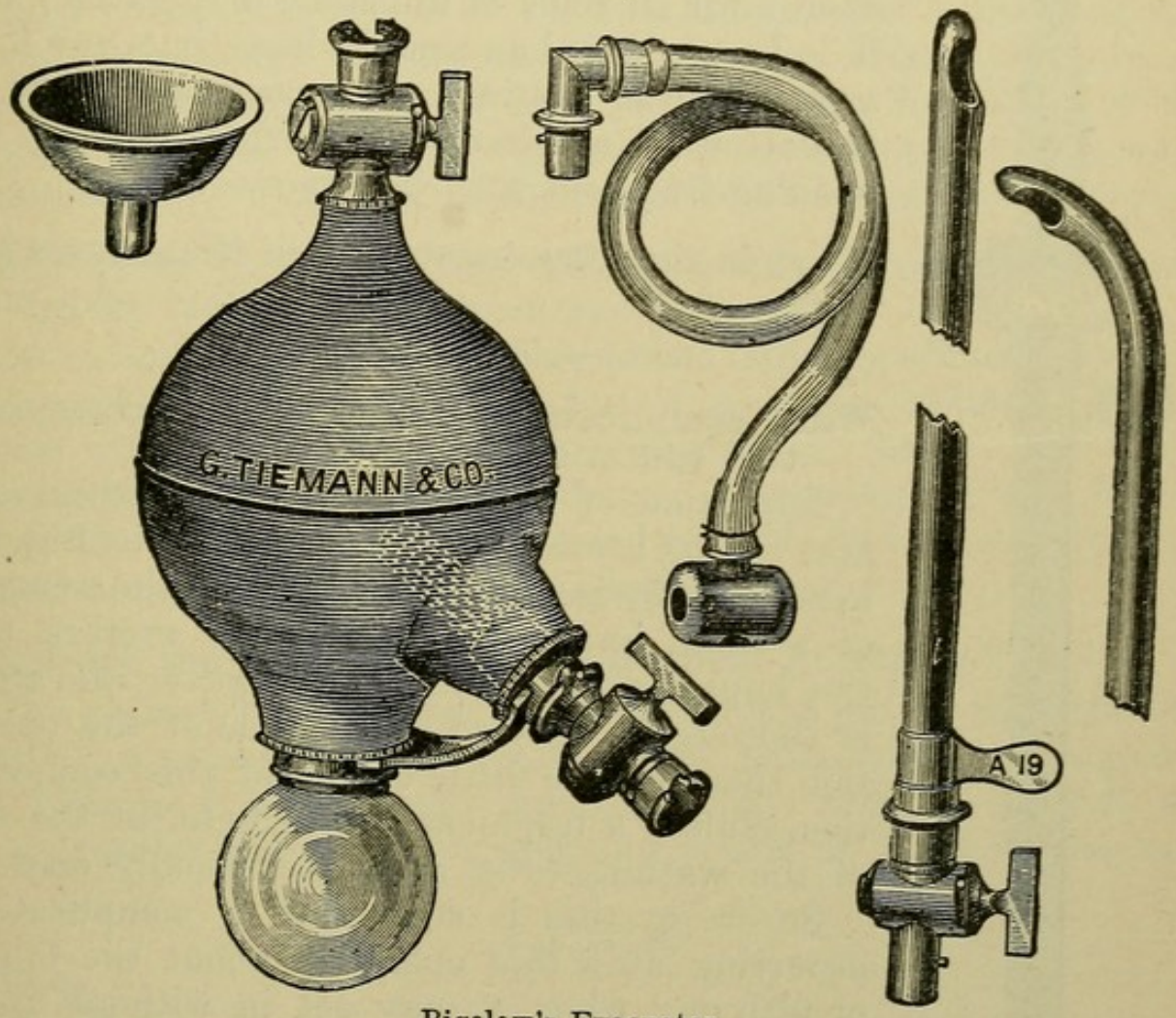
Besides the general preparation of a patient for the anæsthetic, it is well to resort to the same measures as in other urethral operations—namely, the use of salol twenty-four to forty-eight hours before the operation, and diuretin twelve hours before, to be kept up until the kidneys are to be relied upon.

What are the steps in the operation of litholapaxy?

The patient is in a recumbent posture and under the influence of an anæsthetic. A firm flat pillow should be placed under the pelvis of the patient in order to facilitate the exploration of the bladder. If the meatus is congenitally small, it must be cut to allow the passage of the instruments and a proper-sized tube. It is well to have a certain amount of fluid in the bladder, as the stone can be more readily grasped when the bladder is not collapsed. Having introduced the lithotrite, we first endeavor to catch the stone, for which purpose the blades are opened and closed in an area in which the stone is expected to exist; and when it is clasped within the grasp of the blade, the button which reverses the action of the handle is pushed and the wheel at the end is turned until the engaged body is crushed. The first crushing results in a separation of the stone into several different pieces, each of which has to be partly crushed, until the fragments are presumably small enough

to be washed out through the evacuating tube. After a certain amount of crushing has been done the instrument is removed and a washing-tube introduced, and all fragments which are small enough

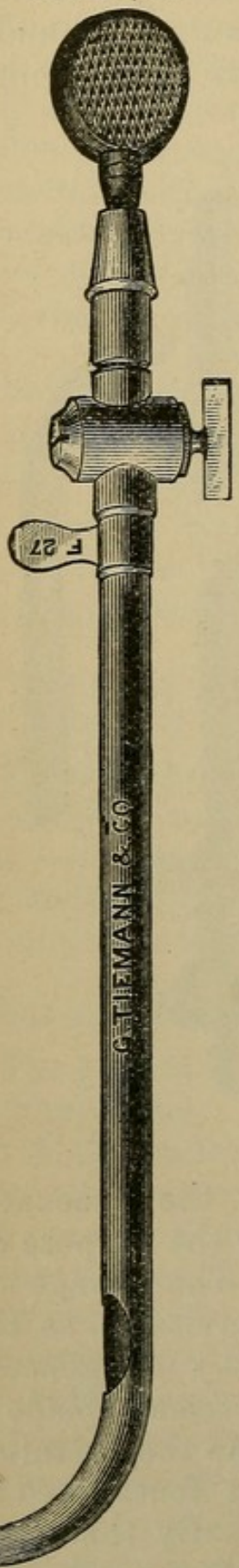
FIG. 13, A.



Bigelow's Evacuator.

to pass through its lumen are washed out by the evacuator (Fig. 13, A). The lithotrite is again resorted to for the purpose of catching and crushing the remaining fragments. The change of lithotrites from one kind to another is deemed advisable, as the circumstances may require. (See Fig. 12, A, B, C.) In general, an instrument with heavy blades and fenestrated female blade is used in the start when the stone is at all hard. As the operation progresses a lighter instrument may be used, either fenestrated or one which has a spoon-shaped female blade inside. By this latter instrument a more thorough pulverization of the fragments may be effected. As the operation draws to a close and there is doubt as to the existence of further fragments, the washing apparatus

FIG. 13, B.



Evacuating Tube.

should be introduced: then, having an assistant place his ear over the abdomen, by causing a sharp action of the evacuator the click of fragments, if there be any, may be heard by him. In this manner the operation may be persistently pursued until all trace of the stone is removed; but if it has occupied an unduly long time, and it is undesirable to continue the anæsthetic, it is well to wait until another time, when a possibly remaining fragment may be removed.

What is the after-treatment in these cases?

The after-treatment is simply that of a mild cystitis, and is palliative.

What complications are likely to accompany this operation?

Impaction of a fragment in the urethral orifice. Long urethral forceps, as shown in Fig. 11, have been devised for the purpose of the removal of a small impacted stone in the urethra and the impacted fragments. If, however, the stone is thoroughly crushed at the time of the operation there will be little danger of this complication, unless a fragment gets caught in the eye of the washing-tube, as it occasionally does.

Severe cystitis is sometimes a complication, occurring after this operation about the fourth or fifth day, when it may set in without apparent notice or reason. To lessen the liability of its occurrence perfect quiet in the recumbent position should be strictly enjoined. Urethral fever may also occur as a result of the impression made by this operation. Its occurrence is probably best avoided by the use of diuretin and careful antisepsis. Bleeding, though sometimes occurring, is infrequently of a troublesome nature, and therefore does not require treatment.

What is the condition of the patient after the removal of stone in the bladder?

In the majority of cases there is a freedom from all symptoms

and an immunity from reappearance of the calculus; but there are a certain number of cases in whom the stone reappears, and in those in whom this condition recurs there is either an existing diathesis (a strong tendency to the production of uric acid), or, from the presence of an hypertrophied prostate, there is an abnormal evacuating power of the bladder, and the consequent continual retention of decomposed and alkaline urine reproduces the conditions which produced and increased the formation of the original calculus. If proper means are not adopted to remove or counteract these conditions, there will be a new calcareous deposit.

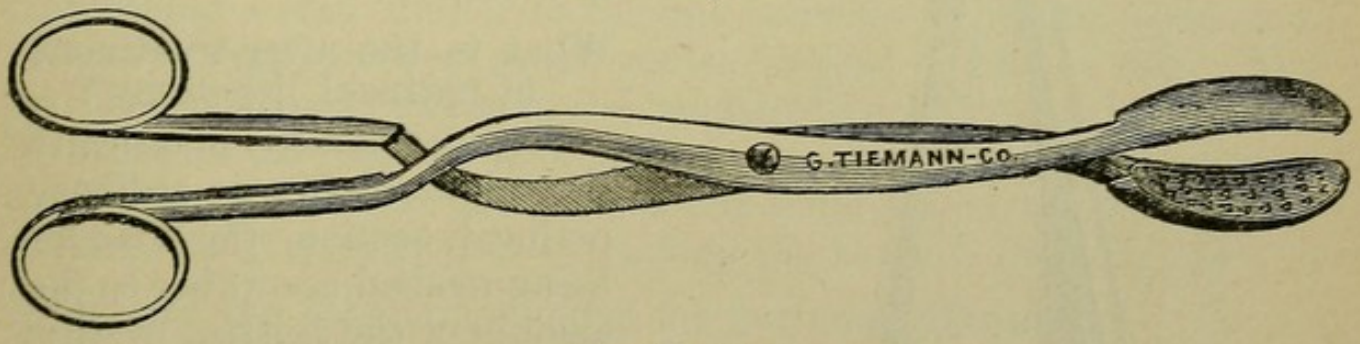
What other method is resorted to for the extirpation of stone in the bladder?

Lithotomy or the cutting operation. Of the perineal operations there are principally two, the lateral and the median. All the others are simply modifications of either of these. The "high operation," or suprapubic lithotomy, is opening of the bladder above the pubis for this purpose, and is conducted practically in the same manner as in performing a prostatectomy.

What are the steps in a lateral perineal lithotomy?

The patient having been anæsthetized and put in the lithotomy position, a good-sized staff is introduced, possessing a wide groove. An incision is made about one-third of an inch to the left side of the raphé and about an inch and a half in front of the anus.

FIG. 14, A.

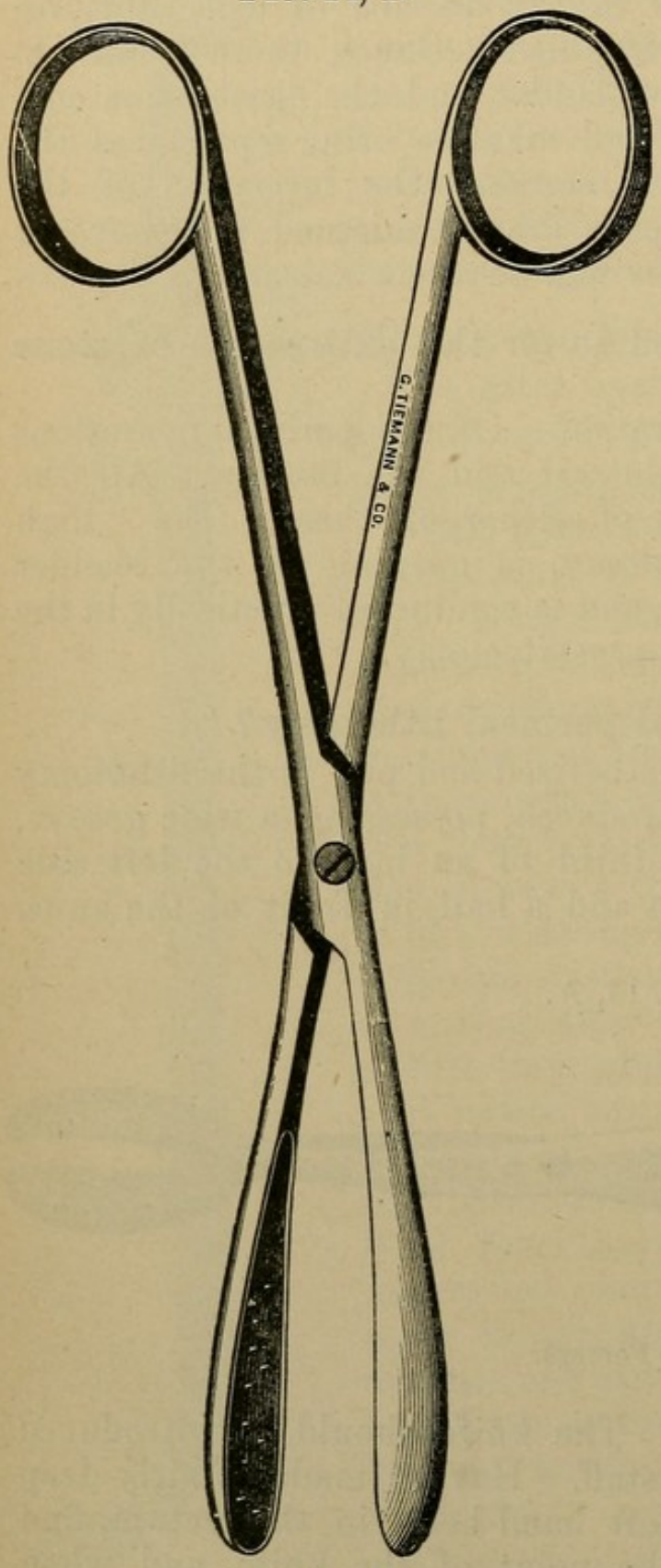


Stone Forceps.

and carried obliquely outward. The knife should be introduced steadily in the direction of the staff. Having made a fairly deep wound, the index finger of the left hand being in the rectum, find the groove of the staff with the point of the knife, and when found run the instrument steadily on in contact with the staff, dividing a portion of the prostate. Cut in an outward direction,

and keep the point of the instrument continually in the groove. After reaching the bladder a pair of stone forceps (see Figs. 14, A, and 14, B) are introduced, and the stone seized in its shortest diameter. Extraction should be slow. After removing the stone the bladder should be searched for the possible existence of another stone. If the stone be encysted or fixed, it takes a good deal of care and work to remove it. If it be deeply encysted, it may be impossible.

FIG. 14, B.



Stone Forceps.

The stone extracted should be examined for facets denoting contact with another stone or stones. If it be found to be smooth and rounded, there is probably no other present.

Does hemorrhage often occur during the operation?

Yes, but it is rarely profuse. If it is severe, it is well to use a tent, such as is used in perineal section.

What is the after-treatment of perineal lithotomy?

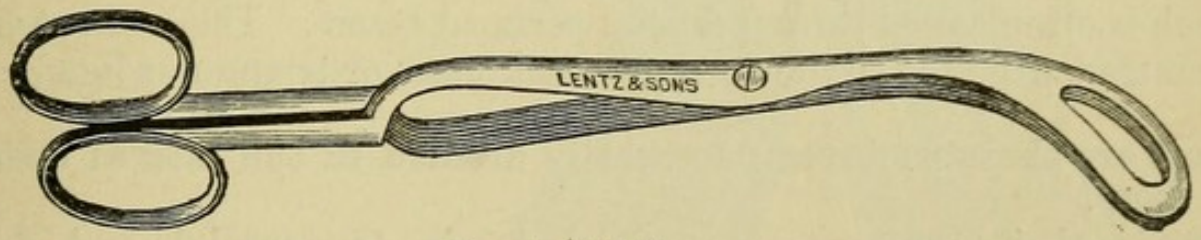
The treatment is practically the same as after an ordinary perineal section, the bladder being washed according to the amount of the existing cystitis or the presence of blood in the urine.

What is the bilateral operation?

Suitable for large stones, it differs from the lateral in having a semilunar external incision across the raphé about one inch in

front of the anus, dividing the skin, cellular tissue, and some fibres of the sphincter; and when this wound is opened the muscular fibres which attach the bulb of the urethra down to the rectum are divided and an opening made through the membranous urethra. At this point an instrument termed the double lithotome caché is

FIG. 15.



Fenestrated Forceps.

introduced. Its point, being placed in the groove of the staff, is guided into the bladder, the staff withdrawn, and the hidden blades of the lithotome protrude. The instrument is then withdrawn, and the stone is extracted as in the lateral operation.

How is the median operation classically distinguished?

It is known as the Marian operation.

What is its special indication?

It is adaptable for small stones and in children where the crushing operation is not deemed advisable.

How does the operation differ from the lateral?

The steps in the operation are practically the same, the instrument being a staff similar to the one used in the lateral operation, except having a groove in the centre instead of on the side. The primary incision is made in the median line of the perineum, and the bladder is reached in a manner similar to external perineal urethrotomy. Where the prostrate is enlarged curved forceps are required to overreach it in extracting the stone. (See Fig. 15.)

What are the other operations for perineal lithotomy?

They are only modifications of the median operation, and differ from it in the prostatic incisions, which are made on one or both sides.

What is the anatomy of the perineum, as important to know in the performance of perineal lithotomy?

It relates particularly to those structures contained in the triangle bounded on either side by the bony wings of the pubis and

ischium, and a line drawn in front of the anus which connects these two sides of the triangle and represents its base.

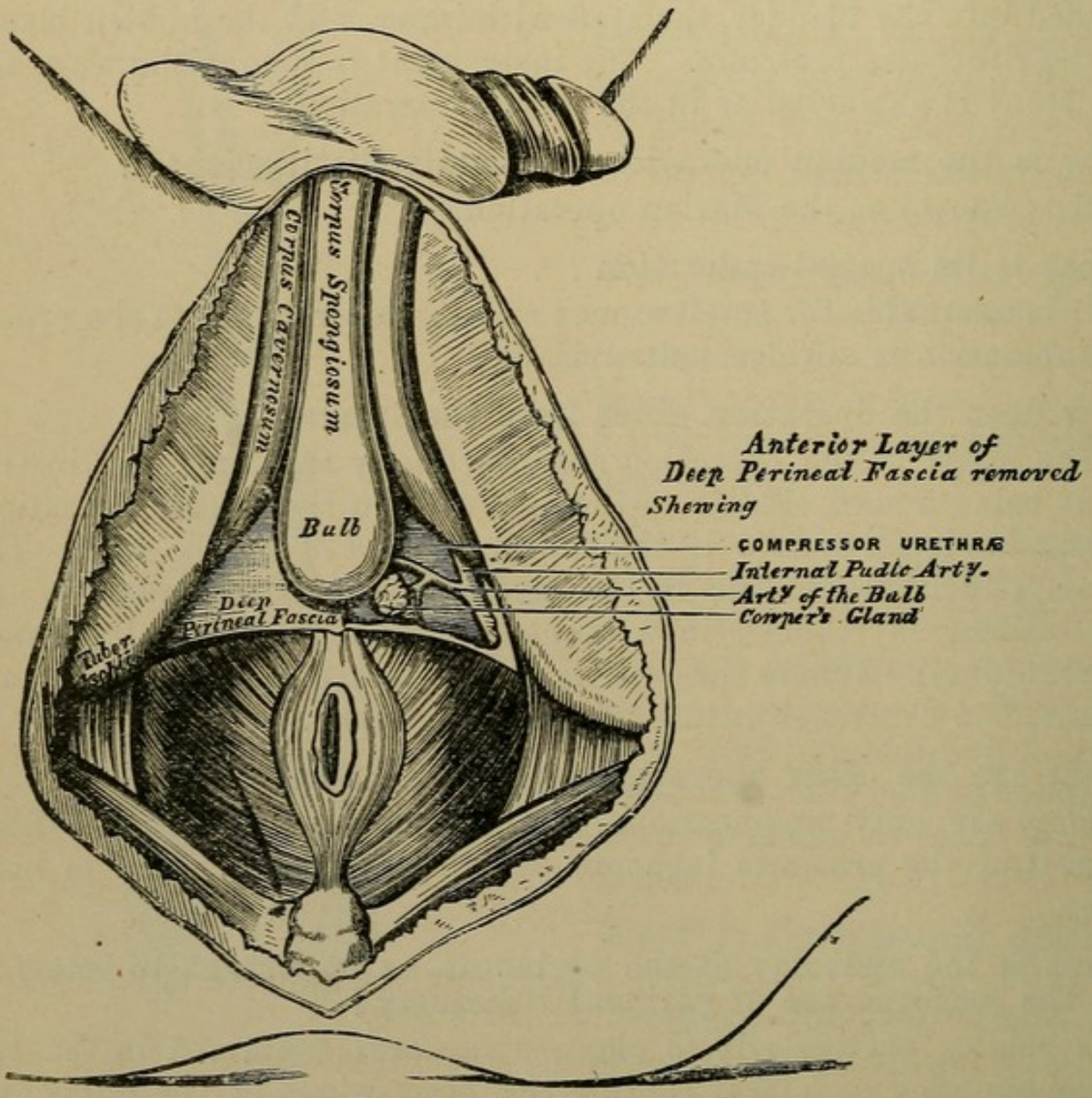
What are the coverings of this space?

Integument, superficial fascia, which corresponds to the superficial fascia elsewhere in the body, spoken of here as the superficial layer of the superficial fascia, the deep layer of the superficial fascia, which is often called the superficial perineal fascia. These are named in contradistinction to the deep perineal fascia or triangular ligament.

What are the structures necessarily divided in the lateral operation?

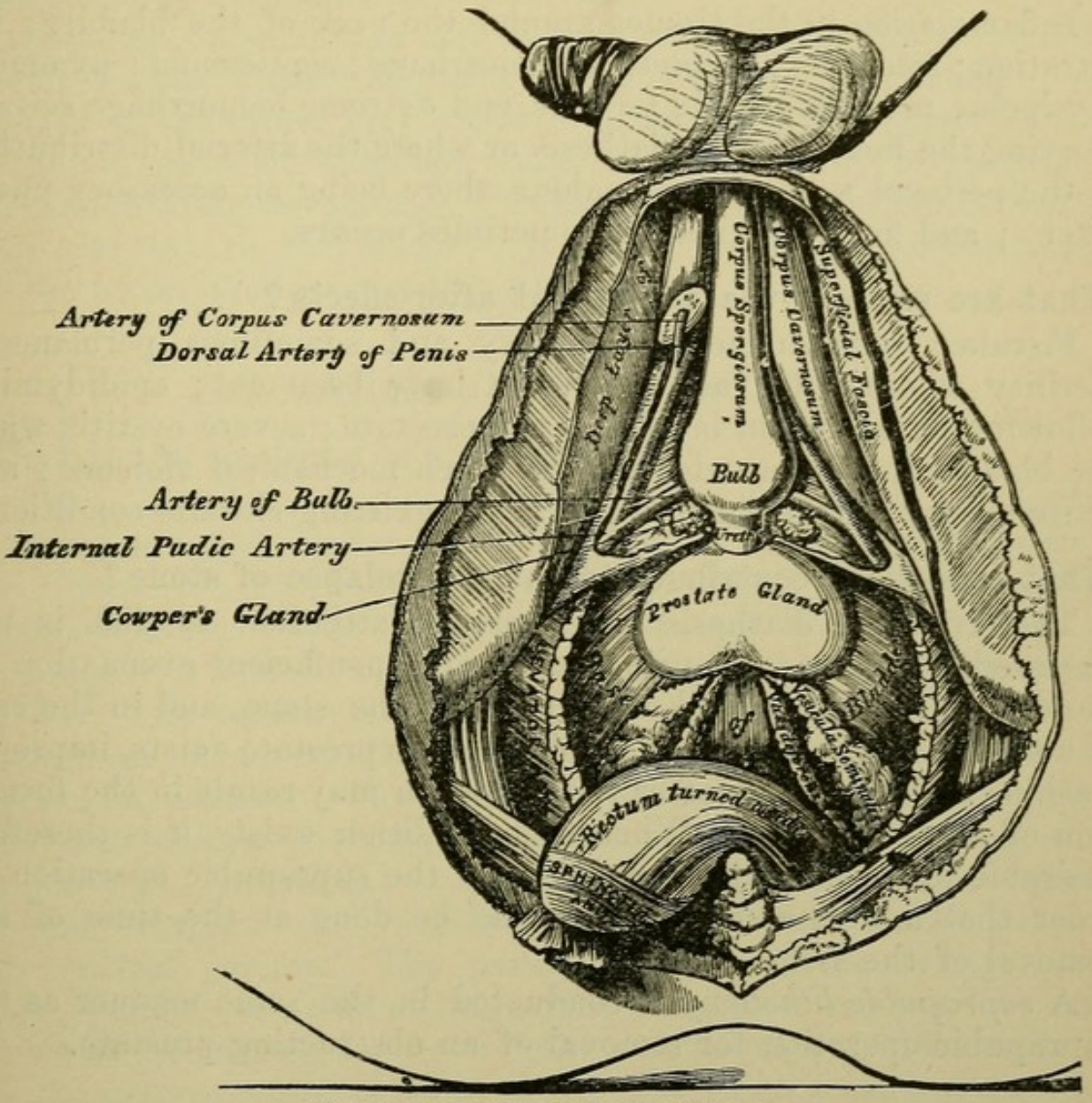
Perineal integument, superficial fascia (superficial and deep

FIG. 16, A.



Deep Perineal Fascia (Gray).

FIG. 16, B.



Viscera at Outlet of Pelvis (Gray).

layers), superficial vessels and nerves (inferior hemorrhoidal), the posterior portion of the accelerator urinæ muscle; superficial perineal vessels and nerves; the transverse perineal muscle and the artery; the two layers of the deep perineal fascia; perhaps the anterior edge of the levator ani; the membranous urethra and its muscular covering; the compressor urethræ; the prostatic urethra, including a part of the neck of the bladder and a portion of the prostate.

What are the structures to be avoided?

In front, the bulb and its artery; behind and toward the median line, the rectum; externally, the pudic artery.

What are the complications of perineal lithotomy?

Inflammation in the tissues around the neck of the bladder; infiltration; retention; secondary hemorrhage; septicæmia; pyæmia; erysipelas, more unusually tetanus, and extreme hemorrhage accompanying the hemorrhagic diathesis or where the arterial distribution in the perineal space is anomalous, there being an accessory pudic artery; and finally peritonitis sometimes occurs.

What are some of the unpleasant after-effects?

Fistulæ; incontinence, temporary and sometimes permanent; sterility where both vasa deferentia have been cut; epididymitis following an operation involving the prostate; severe cystitis when the bladder has been subjected to much mechanical violence; and acute kidney outbreaks on top of a pre-existing chronic condition.

What conditions contribute to cause a relapse of stone?

The uric-acid diathesis when proper attention to diet is not observed in the case of uric-acid stone; insufficient evacuation of the débris, leaving behind a fragment of the stone, and in the case of a phosphatic stone, where an obstructive prostate exists, improper washing of the bladder after the operation may result in the formation of another stone. When this condition exists, it is therefore desirable to consider the expediency of the suprapubic operation, in order that a prostatectomy may also be done at the time of the removal of the stone.

A *suprapubic lithotomy* is conducted in the same manner as the suprapubic operation for removal of an obstructing prostate.

DISEASES OF THE URETERS.

Give the anatomy and function of the ureters.

They are excretory ducts of the kidneys, and run behind the peritoneum from the pelvis of the kidney over the brim of the bony pelvis to the base of the bladder on either side, lined internally by a mucous membrane surrounded by unstriped muscular fibres, longitudinal and circular, bound together by connective tissue.

Name the anomalies of the ureter.

Double and triple ureter, which may exist the entire length of the canal; ureter on one side only or ending on one side in a blind extremity, in which case the kidney atrophies.

Describe the affections of the ureter.

Granular inflammation may ascend to the ureter from the bladder or descend from the pelvis of the kidney. Distension of one portion of the ureter may occur from pressure of a tumor or from an enlargement of a kidney-stone. Stricture may be caused by a calculus after its passage. Tuberculous and cancerous diseases may also involve the ureter. Anything which causes obstruction of the ureter produces hydronephrosis.

DISEASES OF THE KIDNEY.

What is the anatomy of the kidney?

There are normally two kidneys, one on either side, situated in the lumbar region, high up, extending nearly to the crest of the ilium on either side of the spinal column, shaped like the so-called "kidney bean," with its convexity turned inward. They are enveloped in a dense fibrous capsule or envelope and surrounded by fat. The healthy kidney weighs from 4 to 6 ounces. In its anatomical structure the kidney is divided into a cortical and pyramidal portion. The cortical is the external and secreting portion, and contains the convoluted uriniferous tubes and Malpighian bodies. The pyramidal or medullary portion is formed by converging straight tubes, which unite with the convoluted tubes in the cortical portion. The pyramids dip into the cavity of the kidney, called the sinus, where they terminate in "papillæ," each of which is surrounded by a little cup-like cavity, the calyx, and all the calyces unite to form the *pelvis*, which communicates with the ureter.

ANOMALIES.

There is sometimes only one, occasionally two, three, or more. They are sometimes united above, resembling a horseshoe in shape. A loosely-connected kidney may become displaced in the abdomen and freely movable, forming the so-called floating kidney, the result of undue exercise or in females tight lacing, or it may be displaced into the cavity of the bony pelvis.

In what different ways do affections of the kidneys show themselves?

By subjective symptoms, such as pain, constant and intermittent, localized in the kidney region, running down the ureters, up the back, and down the thighs; pain on pressure in the kidney

region; by external local evidences felt on examination, such as enlargements and displacements; by evidences shown by impairment of the urinary function; and by an abnormal condition of the urine.

RENAL CALCULUS.

Where may renal calculus originate?

In the uriniferous tubes or in one of the calyces of the kidneys or in the pelvis. They may be dislodged from this situation and pass into the bladder, causing the symptoms of urinary calculi during their course, or they may remain and enlarge in their original site, where they may or may not give rise to symptoms, and are not to be discovered until after death.

What are the most common forms of renal calculus?

Uric acid first, and next oxalate of lime. Other renal calculi found are the carbonate and phosphate of lime, the ammonio-magnesium-phosphate, cystine, xanthine, and the mixed urates, any of which may form the starting focus or nucleus of a stone or may be its sole constituents.

What is the etiology of renal calculi?

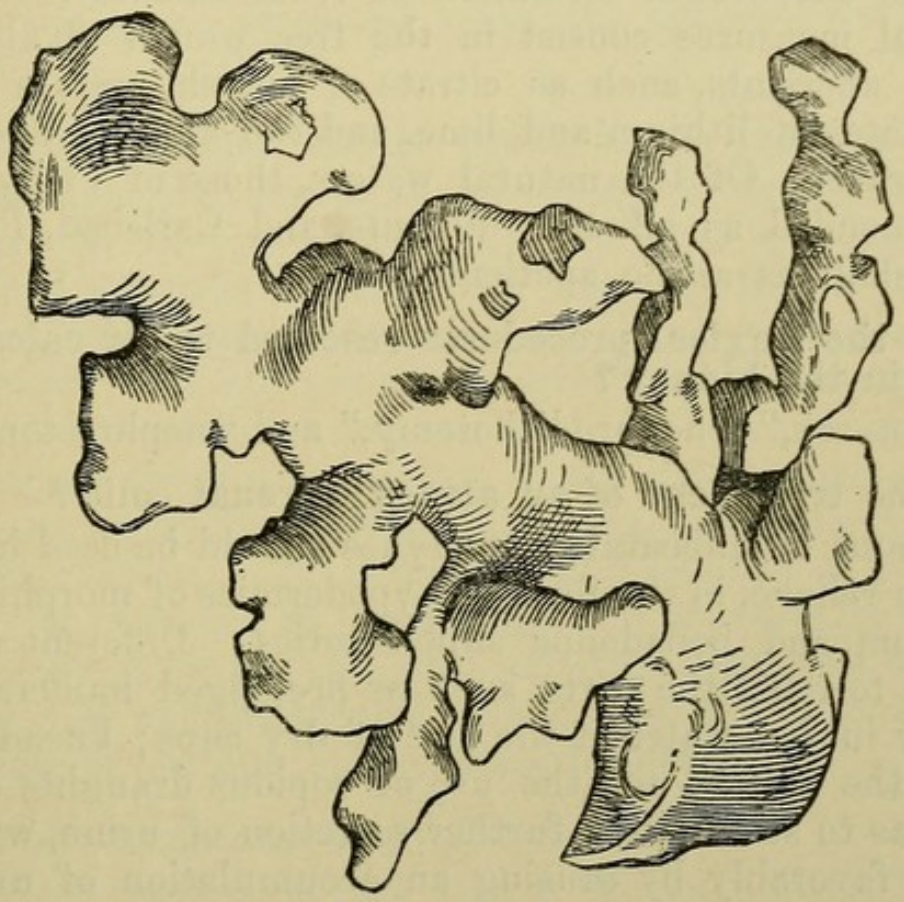
They are the deposit of excess of normal or abnormal constituents of the urine. They may develop in any period of life, and affect both kidneys or only one; they may be single or multiple in one or both kidneys. There are numerous variations in size and shape, from that of a pea, smooth and round, to the picture presented in Fig. 17 of a conglomeration of kidney-stone extracted by Dr. Keyes.

What are the symptoms accompanying renal calculi?

The *symptoms* depend largely upon the position in which the calculus or calculi are lodged, and upon the size: one stone may be large and rough and may remain in an unoffending condition, lodged in one of the calyces, without giving rise to any outward manifestations of disease, being the cause of only slight chronic interstitial inflammation. A very small stone lodged in one of the uriniferous tubes may excite acute inflammation. Stones situated in the pelvis, lodged over the opening of the ureter, may lead to chronic inflammation and dilatation, or pyelitis or nephritis, and abscess involving a portion or the whole of the kidney structure. Those symptoms which accompany stone in the kidney with variable severity are lumbar pain, increased on exercise; some blad-

der irritability; pus, mucus, or albumin found in the urine in moderate or marked quantities, and blood, sometimes in large quantities, for periods of several days, at other times entirely ab-

FIG. 17.



Renal Calculus.

sent; added to which the patient may from time to time pass gravel or calcareous material.

What is the so-called renal colic?

Renal colic is caused by the passage of a calculus large enough to stretch unduly the tissues of the ureter. It comes on suddenly and subsides suddenly, and has a variable duration, from periods of an hour or less to several days. The position of the pain is in the bladder, the groin, down the thigh, and in the testicles. The attack is sometimes preceded by a chill with rigor, and accompanied by retching and vomiting. Sometimes fainting and severe collapse occur. During a renal colic the stone need not be passed down the ureter, but may be displaced back into the pelvis of the kidney, only to be the cause later of a recurring attack.

What is the treatment of renal calculus?

If the disposition to renal calculi has been established, the *treatment* is dietetic. Digestive articles of diet taken moderately should be advised and rational measures to aid assimilation observed. It is not necessary to abstain from animal food, but excess in this encourages formation of renal calculus.

Medicinal measures consist in the free use of alkaline drinks and saline aperients, such as citrate of potash, acetate of potash, the carbonates of lithium and lime, and the Epsom, Rochelle, and Glauber's salts. Of the natural waters, those of Vichy and Ems are recommended as alkaline diluents, and Carlsbad, Pullna, and Friedreichshall as saline aperients.

What are the surgical procedures resorted to for calcareous deposits in the kidney?

"Nephrotomy," "nephro-lithotomy," and "nephrectomy."

What is the treatment of an attack of renal colic?

If the pains be unbearable, anodynes should be used in sufficient quantity to relieve, in the form of hypodermics of morphine or morphine, opium and belladonna suppositories. Different means are resorted to to relax the parts, such as prolonged immersion of the whole body in hot water or the use of dry cups; kneading of the course of the ureter; and the use of copious draughts of mineral waters, so as to stimulate a further secretion of urine, which sometimes acts favorably by causing an accumulation of urine and a pressure upon the stone from behind.

PYELITIS (PYONEPHROSIS).

What is pyelitis?

Inflammation of the pelvis and calyces of the kidney. It is most frequently met in its chronic form, and is susceptible to acute outbreaks.

What does obstruction of the urine lead to in this condition?

Pyonephrosis, or a collection of pus and blood with precipitated phosphates and urates accumulated at the expense of the kidney structure in a greater or less amount, occupying the dilated pelvis and calyces.

What different courses may pyonephrosis assume?

It may remain within the kidney pelvis and steadily enlarge, so that by continual dilatation it may be closely mapped out externally

as a tumor in the kidney region. It may ulcerate through the pelvis and form a *perinephritic* abscess, or it may point externally and form a fistulous tract, which generally is permanent.

Is pyelitis apt to be unilateral or bilateral?

It is more often double, but if it depends upon a cause affecting one side only, as an impacted stone, the opposite kidney may be healthy.

What are the principal causes which act to produce pyelitis?

(1) Prolonged obstruction to the passage of urine, caused by inflammation chronic and acute, particularly of gonorrhœal origin, stricture, and prostatic hypertrophy. It may be a subacute affection, mild in character, with occasional acute outbreaks. This is most common with strictures and prostatic hypertrophy, and is caused by the continual damming back of the urine upon the kidneys, causing a chronic congestion of the mucous membrane, or it may start as an acute condition from an extension upward of a gonorrhœal cystitis. (2) Renal calculus retained in the pelvis of the kidney or impacted in the ureter. (3) Tubercular disease, the deposit of new growths, and local irritation, instances of which are turpentine and extremely acid urine. Pyelitis also occurs as a complication of various febrile disturbances.

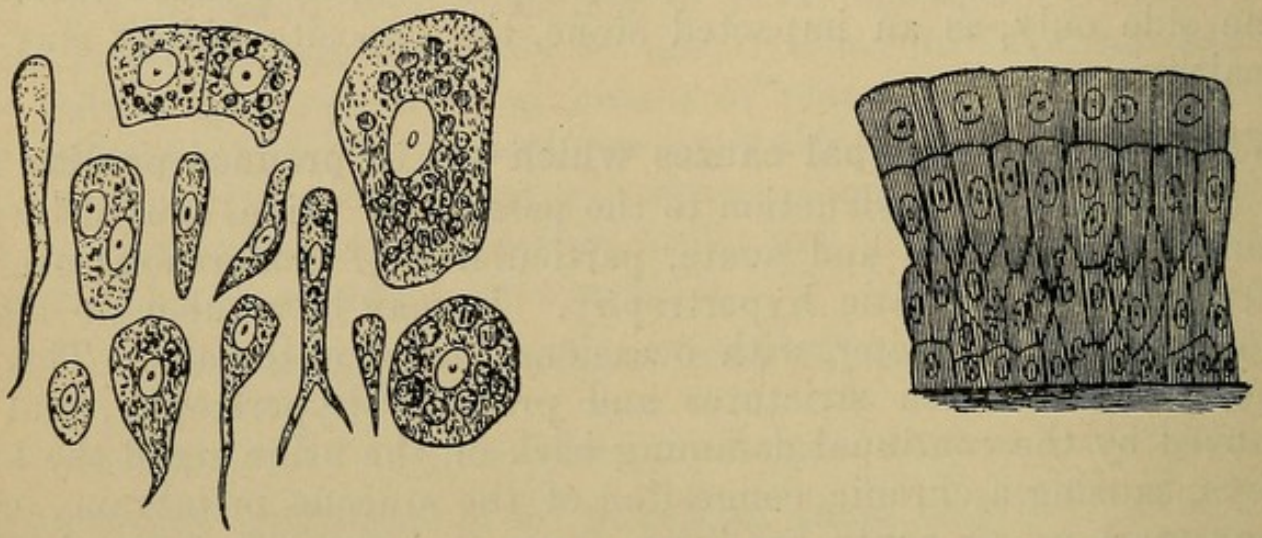
What are the symptoms of pyelitis?

Pain in the back over the region of the kidney, deep-seated, which may descend down the course of the ureter on either side, usually increased on pressure, sometimes dull and sometimes sharp and darting. *An examination of the urine* reveals a trace of albumin, red blood-corpuscles, mucus, and the characteristic unaltered spindle-shaped, irregular epithelial cells which line the pelvis of the kidney.

As the disease advances these cells diminish in number and the pus-cells increase. In chronic pyelitis, when the pus in the urine becomes very abundant, it gives it a turbid appearance when passed, and when allowed to settle precipitates into a characteristic waxy-looking deposit with a cupped surface. Chills occur of variable duration, accompanied by more or less fever. They often resemble the various types of malarial fever. Exercise increases the pain and amount of pus in the urine. There is a frequency of micturition accompanying pyelitis, of reflex origin, and this symptom sometimes leads to the fallacy of mistaking the disease for bladder

trouble. As the disease advances the patient shows its effect by general constitutional disturbances, debility, etc. As the pus accumulates the kidney becomes dilated, and an enlargement may be

FIG. 18.



Epithelium from the Pelvis of the Kidneys (Kölliker).

mapped out or deep fluctuation is distinguished. If ulceration through the pelvis occurs, *perinephritic abscess* sets in. The existence of this latter condition, it should be remembered, does not necessarily imply kidney disease; it may be derived from other causes, such as over-exertion of the muscles around this region, cold, etc.

What is the prognosis of pyelitis?

Such cases as depend upon a stricture or enlarged prostate, after the relief of these conditions usually subside and remain well. When dependent upon cancerous or tuberculous deposits the outlook is hopeless; not so, however, where hydatids or calculi are the offending causes, which may be removed by surgical interference instead of working externally. Pyelitis may consolidate into a cheesy mass and give no further trouble, as one kidney does the work. Double pyelitis is always serious.

What is the treatment?

When dependent upon obstructive and inflammatory diseases lower down in the urinary track the *treatment* is removal of cause, and comprises entirely measures suitable for these existing troubles. Occurring during the course of febrile disturbances, the principal malady must receive increased attention and nursing, and care

should be taken that the urine does not become too concentrated and acid. The general treatment is antiphlogistic—cups over the kidneys, diluent draughts, and anodynes pro re nata. If kidney-stone is suspected, the operation of nephro-lithotomy commends itself, unless palliative and hygienic measures are preferred. This is also the case when a pyonephrosis with enlargement of the kidney exists to the extent of being marked out externally, when either the course of promoting the general hygiene of the patient should be pursued, hoping that the kidney may atrophy and desiccate, or the operation of opening and draining or removing the kidney must be resorted to. Before proceeding to this operation the presence of pus may be made a certainty by the use of the aspirator.

SURGICAL KIDNEY.

What is this condition?

It occurs both as an acute and a chronic process, the result of disease of the urethra, prostate, or bladder, or of instrumentation or operation upon the genito-urinary tract.

Acute surgical kidney usually appears after a surgical operation or after some instrumental manœuvres, and is the result of a severe impression made upon the sympathetic nervous system, causing the absorption of septic material, as in the case of emptying a paretic bladder which for many months and years has been accustomed to the presence and pressure of a certain amount of urine. The unexpected impression may induce an absorption of the septic material of a decomposing and putrid urine, or the sepsis may be introduced by the admission of air or by unclean instruments during an operation. The pathological condition is multiple abscess-foci spread throughout the kidney.

The *chronic* morbid condition which may be included under the name of surgical kidney is excited by the various obstructive and inflammatory conditions of the bladder, prostate, and urethra, such as stricture, prostatic hypertrophy, chronic cystitis, etc., all of which mechanically obstruct the urine and interfere with the renal circulation, producing chronic interstitial nephritis, suppurative nephritis, or pyonephritis, propagated by absorption or through the agency of the nerves or by an extension of inflammation.

What are the symptoms?

In the acute form they begin with a rigor or some slight chills; the temperature rises at night to from 101° to 103° F. There

may be a partial suppression of the urine, or the urine may be passed in normal or increased quantities, containing mucus and pus in varying amounts, with hyaline or pus casts. The patient suffers from anorexia, is weak and depressed, and has a hot offensive breath and a loaded tongue. The more chronic forms of surgical kidney result from obstruction to the flow of urine of long standing.

The symptoms show a gradually diminishing specific gravity in the urine, denoting a deficiency in the amount of urea which is eliminated—a copious admixture of pus with the urine, which when allowed to stand settles in the bottom of a glass in a hard-looking, clearly-defined mass. The amount of albumin in the urine is generally very large—anywhere from 1 to 3 per cent. by weight. As the disease advances the skin has a scaly and muddy appearance. The intelligence and memory become affected, and the patient toward the end passes gradually into a comatose condition.

What is the treatment?

In the first place, *preventive treatment* is of most importance, the greatest amount of care being observed in the employment of instruments in the genito-urinary apparatus with regard to their cleanliness, etc., and discretion in the withdrawal of the urine from a bladder which has suffered a long time from retention. The cause of the obstruction to the urine, if one exists, should be removed if possible, and in the case of prostatic enlargement, where an operation is deemed inexpedient, a careful and proper introduction of the patient into the catheter life and the cleansing of his bladder is the proper course to pursue. Salol and diuretin have their indications and can be used to advantage. Such rational measures which direct a proper attendance to the bowels and the observance of bodily warmth by proper clothing have their importance and weight.

TUBERCULOSIS OF THE KIDNEY.

How does tubercle affect the kidney?

First as miliary tuberculosis, which appears as minute nodules scattered throughout the kidney, developing simultaneously here with the same condition in other organs, and presenting the appearance of gray granulations in the tissues between the uriniferous

tubes, where they crowd together. They appear also on the surface as white dots, and are apt to be found at the same time in the vesiculæ seminales and the prostate. Later on, cheesy degenerations may follow, extending from the papillæ through the submucous tissue of the pelvis; the kidney becomes enlarged and uneven on the surface by the infiltration of this cheesy degeneration toward the cortex. Sometimes these cheesy nodules break down, soften, and ulcerate through the mucous membrane of the pelvis, forming cavities from which the matter is discharged, leaving the kidneys with ulcerated walls and a large part of the structure without any renal tissue.

What are the symptoms of kidney tuberculosis?

Miliary tubercle produces no symptoms necessarily which are referable to the kidney. When cheesy degeneration occurs, there may be at first no constitutional evidence of its presence. As the disease advances there is pain in the lumbar region, with tenderness on pressure. The urine may be normal or excessive in quantity, containing albumin, sometimes blood, pus, and minute cheesy masses, and broken-down renal tissue later on. Vesical irritation is a prominent and sometimes most distressing symptom. The disease may drag along for many years, or if suppuration occurs uræmic symptoms often forewarn a fatal issue.

What is the treatment?

The *treatment* is constitutional, and consists in the use of cod-liver oil, maltine, and nutritious diet. If the kidney is broken down into an abscess-cavity and a tumor marked out in the loin, an external incision and possibly extirpation of the kidney may be expedient. It is important to discover whether the disease is limited to one side. Careful examination externally *should* assist in deciding this question, together with different devices which have been recommended by several authorities.

TUMORS OF THE KIDNEY.

What benign morbid growths appear within the kidney?

The adenoma, the cavernous angeioma, the rhabdo-myoma, the fibroma, villous papilloma, syphilitic gummata, and various cysts. These last are hard to detect and difficult to distinguish during life. The *treatment* is ordinarily palliative—operative when the case requires.

CANCER OF THE KIDNEY.

Which is the more common form of this disease, primary or secondary?

Secondary—apt to be preceded by disease of the testicle, liver, stomach, the breast, or uterus. The medullary is the most frequent form.

What are the symptoms?

The presence of a tumor is almost invariably felt in the lumbar region, and when large enough to exert much pressure causes radiating pain. Sarcoma and myosarcoma sometimes occur in the kidney. The former sometimes attains a formidable size; the latter is apt to be congenital in origin.

CYSTS OF THE KIDNEY.

Simple cysts occur in the kidney in a very slight degree or as complete cystic degeneration, which may be either a congenital or an acquired condition. The latter form is a very serious affection, and is always fatal. Hydatids are sometimes found in the kidney by the surgeon. They generally occur on one side, growing at the expense of the kidney substance, and acquiring a large size before bursting, sometimes into the pelvis of the kidney or into the intestines: they may take the course of abscess-formation, or the echinococci may die and the cyst become a calcareous mass.

What symptoms occur during the growth of the cyst?

None generally appear until the cyst is large enough to be seen and felt in the kidney region. The examination of the urine may reveal the presence of the characteristic vesicles or hooklets, and percussion or palpation may reveal fremitus, that symptom peculiar to the hydatid cyst, but it is rarely distinguished. When a cyst becomes ruptured and the vesicles are discharged, they pass out through the urethra for a rather long period, during which the cyst is discharging. Sometimes the large ones cause retention of urine, and they may cause irritation in the bladder and cystitis. If no vesicles are found, the disease will be confounded generally with hydronephrosis.

The *prognosis* of this disease will depend upon the situation in which the cyst discharges itself. If it discharge through the natural outlet, the tendency is toward recovery, and if inflammation occur or if it discharge elsewhere, the prognosis is rendered more grave.

What is the treatment?

There is no *treatment* especially applicable to this condition. If the cyst becomes large enough to be felt in the lumbar region and does not burst, the treatment is operative and consists of nephrotomy. After the cyst has been opened the sides are stitched to the external incision.

HYDRONEPHROSIS.

What does this condition consist of?

Dilatation by the accumulation of urine in the pelvis and calyces of the kidney, with atrophy of the renal substances, the result of a mechanical obstruction to the urinary outflow, which obstruction is generally situated in the ureter. The distension in some cases reaches to such an extent that the irregularly distended kidney may be mapped out as a tumor, which may be felt in front as high as the lower margins of the ribs, and behind may be readily felt in the loin. In females it may rarely attain such a size as to be confounded with an ovarian cyst.

What are the causes?

Mechanical obstruction to the urinary flow, which obstruction may be incomplete and increase. It may be stricture of the urethra, growths of the bladder or uterus in the female, etc. The distension from these causes is not so great as from the more frequent causes which exist in the obstruction of the ureter, calculus impaction, a growth in the bladder which impinges upon the orifice of the ureter, folds in the mucous membrane of, and twists in, this canal.

What are the symptoms?

No *symptoms* may be noticed until the distension is sufficient to be distinguished by a tumor in the lumbar region, which is generally irregular or lobulated, and may fluctuate. Where the obstruction to the urinary flow is incomplete, there may be a sudden diminution in the size of the tumor, at which time there is a discharge from the bladder of a large quantity of urine, which contains pus and mucus, and perhaps blood. The symptoms which accompany it in the advancement of its growth are referable to the pressure which it produces. There may be a great deal of pain, and constipation may be caused by pressure upon the colon. If the cause be a calculus, the latter may become dislodged, and the

cyst discharge its contents and not refill again. Rupture of the sac is rare, but has occurred, in which case the urine may extravasate into the peritoneal cavity and septic peritonitis result.

With what may this condition be confounded in diagnosis?

Pyonephritis, perinephritic abscess, and less commonly with hydatid cysts and ovarian cysts. Perinephritic abscess does not produce a tumor which is movable and circumscribed, and with it there is apt to be œdema and redness of the skin, which is rare in hydronephrosis unless the tumor be of a considerable size.

Pyonephrosis is only differentiated from hydronephrosis by the existence of chills and rigors, and the latter may be transformed into the former by a suppuration taking place in the sac.

Ovarian cysts may be excluded by the relation of the colon to the growth, it being behind an ovarian, but in front of a renal, tumor. The examination by the rectum and vagina will also aid in excluding an ovarian tumor. This sign is not invariable, as when a renal tumor acquires a large size the colon may get behind, and rarely an intestinal fold has been found in front of, an ovarian cyst.

What is the treatment?

If the cause be decided upon, and it is found to be a temporary obstruction, aspiration should be resorted to. If a twist in the ureter is the cause, kneading the abdomen may be successful in undoing it. Care should be taken, however, not to rupture the tumor by unduly severe manipulation. If, on the other hand, the obstruction appears permanent, nephrotomy should be employed and continual drainage kept up, unless the obstruction can be removed, or if it spontaneously disappears later on, the remaining fistulæ may be allowed to close.

SYPHILIS OF THE KIDNEY.

How does it show itself?

As amyloid degeneration, interstitial chronic inflammation, circumscribed cirrhosis, sometimes fatty degeneration, also as circumscribed, gummatous nodules alone or combined with any of the above appearances. The vessels of the kidney may also be affected by syphilitic atheroma. The albuminuria which sometimes appears in the early stages of syphilis is thought by some to be due to mercury, but appears in cases where this remedy has not been

used. The iodides may certainly be the sole cause of albumin in the urine. The treatment of syphilis of the kidney is constitutional.

NEPHRORRAPHY AND NEPHROTOMY.

What are the various operations which the surgeon is called upon to perform for the surgical relief of kidney affections?

Nephrorraphy, nephrotomy, nephro-lithotomy, and nephrectomy.

In *nephrorraphy* the incision is made parallel to the last rib, about 1 inch below it and 4 inches in length, reaching down to the kidney fat. The fatty tissues are torn asunder for the purpose of reaching the fibrous capsule, which is opened and sewed to the edges of the wound by sutures of catgut.

In *nephrotomy* an incision is made similar to that for lumbar colotomy, and is oblique from behind forward, from 3 to 4 inches long, commencing at the outer edge of the erector spinæ muscle. The first cut is a deep free-hand incision, dividing the deep fascia and muscular tissues, when it will reveal the quadratus lumborum muscle, which also should be divided if in the way. The deep lumbar tissue being now reached, an opening through this will reveal the kidney fat, which is torn through and separated in order to discover a cyst, abscess, etc. If such be the case, an incision is made and drainage effected by sewing the walls of the sac to the sides of the wound, and drainage-tubes are introduced.

Nephro-lithotomy is simply the above operation for the removal of renal calculus, which should always be searched for by the introduction of the finger to the pelvis, as it often enters into the causation of many of the surgical affections of the kidney.

NEPHRECTOMY.

What does this operation consist of?

Extirpation of the kidney.

How many kinds of nephrectomy are there?

Two—lumbar and abdominal. The latter procedure was formerly looked upon as being full of danger, it being necessary to open the peritoneal cavity, and the former was preferred for the absence of this objection and on account of the easy manner in which the wound could be drained in the recumbent position. At the present day, when antiseptic surgery is attended with such marked success, there are many who favor the abdominal section under its

precautions, on account of the ease with which the kidney may be extirpated through an anterior wound, and the facility which both organs can be manipulated and examined by this procedure. There is no doubt about the advisability of the lumbar operation where it is not certain that extirpation of the kidney will be necessary, slight disease or involvement only being expected, and for nephro-lithotomy and where exploration is called for, on account of rupture or severe wounds which have resisted ordinary measures and drainage.

Lumbar Nephrectomy.—An incision about 4 inches long is made in an oblique direction downward and forward between the ribs and the crest of the ilium, within about an inch from the twelfth rib, freely down to the fatty covering of the kidney, through which the fibrous capsule is reached. The organ may be readily separated from the surrounding structures without opening the capsule, unless inflammatory adhesions exist. If this operation is done, as is sometimes the case, after a previous nephrotomy, it will be necessary to remove the kidney out of its adherent capsule. If there is not enough room with the first incision, a cross cut may be made for this purpose. The vessels of the kidney are ligated by a heavy silk ligature in one loop, the ureter being also secured by the same means. After the kidney is drawn out through the wound, a second ligature is passed around the entire pedicle, and between this and the other two the kidney is severed from its attachments. All bleeding points should be carefully stopped by the use of the clamp and ligature. The wound is then drained by a drainage-tube, and the opening closed by interrupted sutures and dressed antiseptically. It is generally necessary to leave the drainage-tube in for five or six days, making it shorter at each dressing.

In *abdominal nephrectomy* the kidney is reached by an abdominal incision, which is generally made along the outer border of the rectus muscle.

ABNORMALITIES OF THE URINE.

What are the different affections to which are referable an excess of the normal or the presence of abnormal constituents in the urine?

Oxaluria, phosphaturia, and the uric-acid diathesis.

How does oxaluria show itself in the urine?

By the presence of octahedral crystals of oxalate of lime and the dumb-bell-shaped crystals.

What does their presence indicate?

They generally appear in nervous subjects, and accompany disordered digestion, impaired or ungratified sexual appetite, excessive venery, or any continuous mental strain. They are sometimes accidental, the result of the abundant use of rhubarb and tomatoes as food. Such patients as suffer from spermatorrhœa and find it out, or those who read quack pamphlets and are led to believe that they are suffering from sexual ailments, are favorable subjects for the development of this malady.

What is the treatment?

The mineral acids, sulphate of strychnine, etc. may be given by way of tonics and for the improvement of the digestion. The real treatment is hygienic, and consists in regulating the functions, out-door exercise, etc., with an endeavor to counteract the neurotic element.

What is the condition in phosphaturia?

The urine is unnaturally alkaline or neutral, pale in color, of light specific gravity, and of copious flow; it has a tendency to decompose rapidly on standing. Phosphatic urine deposits the excess of phosphate, which occasions a great deal of worry in one who is continually investigating the character of his urine, it being taken for seminal fluid, in which belief he is encouraged by the unscrupulous.

Upon what does phosphatic urine depend?

It is generally referable to a nervous tendency or some excess or overstrain, which reacts upon a nervous system, such as the undue use of tobacco, excessive venery, and various mental strains. It is often associated with impaired digestive function, and is mostly confined to youth.

What are the symptoms?

The *symptoms* which accompany this condition are those of general malaise, lack of energy, imperfect digestion, despondency, etc.

What is the treatment?

To remove, if possible, the cause, establish a habit of regular living, whip up the energy, and improve the general morale. As the malady is one which is dependent upon the sympathetic nervous system, measures which are directed toward this system for relief are most liable to attain success. Change of air and of surroundings, and stimulating an active interest in some direction,

would appear to be a rational means to pursue. The mineral acids and bitter tonics are quite applicable by way of medication.

What are the causes of over-acidity of the urine?

Rheumatic or uric-acid diathesis. The free use of wines and liquors, especially the malt liquors and the sweet wines, which tend to produce the uric-acid crystals, are the source of irritation during the passage of the urine.

What are the effects on the urinary tract caused by over-acidity of the urine?

It may produce irritation of the neck of the bladder, or urethritis. It may deposit, and under certain conditions produce, a uric-acid calculus somewhere in the urinary tract, or it may be the sole cause of nephralgia.

What is the treatment?

The *treatment* consists in properly regulating the diet to counteract the acid secretion of the urine, which may be favored by the use of a light animal diet, the free use of the mild spring waters, such as Poland, etc., to filter through the kidneys, but not the alkaline waters, which do not tend to better this condition; out-door exercise and regularity of living, and perhaps the employment of a mineral acid.

DISEASES OF THE TESTICLE.

What is the general anatomy of the testicles?

Each one is suspended within the scrotum by the spermatic cord on either side. The left testicle hangs slightly lower than the right. Both are surrounded and enveloped by certain coverings, which enclose each one separately in its own envelope. The most adjacent coverings are the tunica vaginalis and albuginea. The tunica vaginalis is a serous sac which invests the whole testicle except at the attachment of the epididymis. It covers the epididymis externally, and is reflected for a short distance up the cord. This sac, which was originally derived from the peritoneum at the time of the descent of the testicle, although it ordinarily after birth severs its connection with the peritoneal cavity and is entirely cut off from it, sometimes has the opening remaining pervious, and thus leads to congenital hernia.

The tunica albuginea constitutes a fibrous investment for the

testicle, and from it fibrous prolongations or trabeculæ extend into the substance of the organ to form compartments for the reception of the coils of the seminiferous tubes. These tubes, which constitute the glandular construction of the testicle, are formed into cones and divided by the fibrous partitions of the tunica albuginea. These seminiferous tubes anastomose freely, and are lined by cells which are active in the formation of the spermatozoa. The epididymis is situated on the posterior and upper portion of the testicle, and is partly composed of convoluted ducts, which combine in their efferent course from the tubes to form this body. The upper part of the epididymis is called the globus major, and in the central portion is the canal into which all the ducts empty. This canal is convoluted to a greater extent at the lower end, where it forms the globus minor or tail of the epididymis. Here the excretory duct of the testicle commences—namely, the vas deferens, which contributes to the formation of the spermatic cord, passes through the inguinal canal, over the pubic bone, into the pelvis to the base of the bladder, where it joins with the duct of the seminal vesicle, forming the ejaculatory duct, and opens in the prostatic sinus.

What are the anomalies affecting the testicles?

Absence of one or both testicles.

Where is the testicle formed in the embryo?

In the abdominal cavity, behind the peritoneum; at the end of the ninth month of fœtal life it has usually passed into the scrotum. When, however, the scrotum is empty on one or both sides, the testicle should be searched for in the inguinal canal, through which it descends before birth, or at some point out of its normal course, where it has been arrested. The testicle, although it descends normally, sometimes during the first week after birth, may be retained for variable periods and descend anywhere from birth to the age of puberty, and even later periods have been known. An individual with both testicles retained may enjoy the full vigor of his sexual capacity and yet be sterile. In regard to this, however, a microscopic examination must decide any question. The testicle retained in an abnormal position is liable to cause pain, either as a result of disease from gonorrhœal inflammation, etc., or as a simple result of pressure.

What is the treatment of retained testicle?

Operations are resorted to for the relief of this condition, and may meet with success. Sometimes the testicle can be manipulated outside of the external ring in early life, and by being retained here allowed to develop in the ordinary manner. Although the testicle is more exposed in this position, the chances of a hernia developing and becoming strangulated are lessened. If the testicle is in the inguinal canal, and cannot be manipulated out of the ring, it must either be left alone in its first position or an operation performed for its relief and an attempt made to place it in the scrotum. If the cord be too short to allow this measure, castration may be resorted to.

Is the testicle sometimes displaced during life?

The testicle is sometimes dislocated, either by sudden muscular action, when it has been drawn up into the inguinal canal, or by traumatism.

What may cause atrophy of the testicle?

Atrophy may come on after an inflammation. Orchitis, when it complicates mumps or anything, such as a morbid growth, which acts to interfere with the vascular supply of the organ, may cause this condition.

HÆMATOCELE.

What is hæmatocele?

An effusion of blood into the sheath of the testicle (the tunica vaginalis) or into a hydrocele, a pre-existing cyst of the testicle or of the cord. It is of traumatic origin. It either comes on after an injury to the scrotum, which suddenly swells and becomes darkly discolored, or, in the case where hydrocele has already existed, as a result of some violence or operative procedure, when the sac becomes swollen and painful.

What is the treatment?

Rest in a recumbent position, support to the testicle, with cold lotions, and after the acute symptoms have subsided the patient may be allowed to go around with proper support and a certain amount of pressure applied to the affected portion for a time, during which the blood becomes gradually absorbed. Suppuration may take place, in which case a free incision becomes necessary, and proper drainage should be established.

HYDROCELE.

What is hydrocele?

Hydrocele is an accumulation of serous fluid within the sac of the tunica vaginalis. It may be an acute or a chronic condition, congenital or acquired. Encysted hydrocele is a cyst connected with the testicle or cord. The ordinary form of hydrocele is the collection of fluid in the tunica vaginalis and connected with the testicle. This condition may coexist with an encysted hydrocele, which may be of the testicle proper, the epididymis, the spermatic cord, or may complicate a congenital hernia, then often called congenital hydrocele.

What is acute hydrocele?

It is simply an inflammatory effusion of fluid coming on with inflammation of the testicle. It is usually reabsorbed without treatment. It occurs sometimes after the evacuation of a chronic hydrocele, which is treated by stimulating injections.

What is chronic hydrocele?

Here the effusion takes place slowly, causing a gradual swelling, the appearance of which is generally the first thing which calls its attention to the patient, as there is apt to be no pain connected with it. The amount of fluid tends to increase indefinitely, causing the growth in some cases to reach a very extensive size.

What are the symptoms of hydrocele?

The existence of an irregular swelling in the scrotum, larger below than above, having generally a more or less translucent appearance, and which cannot be reduced by pressure toward the inguinal region. It fluctuates and is tense. Percussion of the mass gives a flat note. By holding the tumor between the eye and a light when it is made very tense, the translucency will become very apparent, and the diagnosis between this and a hernia be readily established. The latter condition is generally largest above, and commences from the external ring and grows downward, is doughy in feeling, and percussion over the gut will render a tympanitic note. If the diagnosis cannot be established otherwise, an exploratory puncture must be made. This symptom of translucency is sometimes clouded in cases of old hydrocele, where the sac has become thickened and fibrous by continued distension, or when the fluid contents is not transparent on account of the admixture of blood or pus.

What are the causes of hydrocele?

Anything which continually interferes with the proper circulation of the blood in the testicle may act as a cause for hydrocele; injuries and strains may induce its formation.

What is the general nature of the fluid contained in hydrocele?

It is generally serous and of a yellow color. It may be blood-stained as the result of an injury or inflammation, it may be sero-purulent in broken-down subjects, or suppuration may take place.

What is the treatment of hydrocele?

The *treatment* aims at radical or only temporary relief of this condition. The latter is obtained by a simple puncture of the hydrocele sac and withdrawal of the fluid, which procedure has to be repeated at each subsequent refilling of the sac.

How is the tapping operation effected?

While the patient is in an upright position the hydrocele is manipulated and the position of the testicle ascertained. It is usually situated behind and somewhat below the centre, although it is sometimes found in front. The swelling is then grasped and made tense by encircling the scrotum firmly above it. An oiled canula and trocar is then introduced at about the centre of the hydrocele obliquely upward and with a rapid puncture. The trocar being withdrawn, the canula is introduced up to the hilt. Tapping may be also done by the use of an aspirator and needle. This procedure is generally a simple one, and accompanied by no other untoward symptoms than that the patient may occasionally feel somewhat faint during the operation.

How is the radical cure of hydrocele effected?

The tapping operation sometimes is radical, and there is no return of fluid. This is probably caused by a certain amount of absorptive inflammation which produces a closure of the sac. The same result was formerly aimed at by the introduction after tapping of a tent or seton. In children a radical cure may sometimes be effected by external irritation, by means of manipulation, or by stimulating applications, but in the adult the means most abundantly practised at the present day for the radical cure consist either in the injection of the sac or in its entire excision by a cutting operation.

In what cases of hydrocele is the injection treatment applicable?

In all cases except where the walls of the sac are intensely thickened and where its contents are bloody or sero-purulent.

What substances are employed for this injection treatment?

Iodine, carbolic acid, solutions of alum or of sulphate of zinc, and chloride of zinc. The best method is the use of carbolic acid. It is best always to endeavor to produce a cure by tapping alone first, before resorting to injection. If the tumor be extremely large, it is well to reduce its size by one or two tappings before the injection; also, if there be blood in the fluid removed, it is well to delay the injection until a future tapping reveals clear fluid. In adopting the injection method for the cure of hydrocele the following course is pursued: The needle of a syringe containing the fluid to be injected is detached and introduced into the hydrocele. Then the aspirating needle is introduced and the contents of the hydrocele drawn off to the last drop, after which the aspirator is withdrawn, and the injection fluid is introduced through the first needle, the point of which you are certain is in the sac, as it has been introduced before the hydrocele was emptied. The tincture of iodine is introduced, 1 to 3 parts of water to a drachm or two drachms. The following prescription has been recommended:

℞. Iodi., ʒij;
Potas. iod., ʒss;
Sps. vini rect., ℥ss.—M.

A drachm or two of this is used at a time. The injection of carbolic acid has advantages over all other methods, in that it is more speedy, causes less pain, and is accompanied with less danger, and is therefore to be recommended before any other method for the radical treatment of this condition. The steps in the operation are as have already been described, and after the fluid is withdrawn from 40 minims to ½ drachm of pure deliquesced carbolic acid, according to the size of the hydrocele, is injected, following which the needle is withdrawn and the sac gently manipulated to ensure contact of the acid with the entire surface of the serous membrane. The radical cure of hydrocele by incision under antiseptic precautions becomes necessary where the sac is unduly thickened and where the contents remain continuously bloody or sero-purulent, or in cases where the injection operation fails. It is a more formidable operation; may be accompanied by a great deal of shock and loss of blood, and is

therefore not to be resorted to except under the above circumstances or unless the injection method have failed. The operation must be done under the most rigid antisepsis. An incision about 2 inches long is made through the different layers of the scrotum down to the tunica vaginalis, before opening which all bleeding points are stopped. The incision is then continued, throughout its whole length, through the walls of the sac, which, if found very thick, should be removed; otherwise the serous membrane is sewed by numerous stitches all around to the edges of the wound, which is then sutured, drained, and dressed antiseptically.

What is the cause of congenital hydrocele?

It results from the existence of an open canal between the peritoneum and the tunica vaginalis; this canal normally becomes obliterated after the descent of the testicle, forming a fibrous cord.

How is it distinguished?

We have a tumor in the scrotum, which appears soon after birth, runs up into the inguinal canal, gives an impulse on coughing, flatness on percussion, is reducible, feels soft, and is translucent. It must be differentiated from a hernia, which need not appear soon after birth, but comes at any time, gives a resonant note on percussion, and when reduced returns to the peritoneal cavity suddenly, and generally with a gurgling sound; it has a doughy feel and is never translucent. Hydrocele may, however, be complicated by a hernia.

What is the treatment?

Congenital hydrocele should never be injected. The aim should be to obliterate the neck of the sac by the application of a well-fitting truss. After this has been accomplished the fluid will generally become absorbed after a couple of months. If this fails to take place, it may be treated as a simple hydrocele by injection or incision.

Is congenital hydrocele found in adults?

Only rarely. An old hernial sac, the neck of which has become obliterated by the wearing of a truss or by being plugged by omental tissue, may fill with fluid, and thus form a hydrocele of the hernial sac. The existence of this condition can be established by history alone. It should be treated operatively in the manner adopted for the radical cure of hernia.

SPERMATOCELE.

What is spermatocele?

An accumulation of fluid containing spermatic elements in the tunica vaginalis, or it is a cyst situated within or arising from the testicle. It is apt to coexist with hydrocele, and the existence of spermatic elements in the hydrocele fluid is explained as having resulted from puncture of a spermatocele which impinges so much upon the hydrocele as to become obscured by it, or from rupture into the tunica vaginalis early in its growth, having pre-existed as a cyst.

What are the symptoms of spermatocele?

When coexisting with hydrocele and jutting into the sac of the latter there are no *symptoms* which distinguish it. When it exists alone, there is a sensation of uneasiness akin to pain experienced at the head of the epididymis, which often passes unnoticed by many until a little tumor is found by the patient by accident This tumor, when discovered early, seems to be nothing but a thickening around the region of the top of the testicle, but goes on increasing, sometimes so slowly that its growth is not noticed by the patient. It continues, however, to increase indefinitely. As it increases the walls are tense and fluctuation is made out with difficulty. Its position at the top of the testicle is kept, and it tends to become heart-shaped, with the notch above. It is generally translucent, but the fluid may be somewhat milky or dark-colored, which is discovered upon tapping, while the microscope reveals the presence of the spermatic elements, some lively and vibratile, while others are more or less decomposed. By their presence alone the diagnosis can be positively established. The patient is apt to be hypochondriacal and have various notions as to loss of sexual power and animal vigor.

What is the treatment?

The *treatment* should always be by injection or incision, as after tapping a spermatocele will invariably refill.

HYDROCELE OF THE SPERMATIC CORD.

In what different forms does hydrocele of the spermatic cord appear?

Either diffuse or encysted. When diffuse the loose connective tissue surrounding it becomes infiltrated, resembling an œdema. It is a rare condition.

What are the symptoms?

The existence of a tumor of a cylindrical shape in the inguinal region which does not extend down into the tunica vaginalis proper. It is apt to be confounded with an omental hernia in this situation, but the latter condition gives an impulse on coughing, and when reduced in the recumbent position will remain up, while the diffuse hydrocele, although very often *apparently* reducible, rapidly returns when left alone. If the hernia be irreducible the diagnosis is more difficult.

What is the treatment of diffuse hydrocele?

Small punctures may be made at the lower portion of the swelling and repeated at short intervals. Large incisions are more serious, only called for as an exploratory procedure when the diagnosis is uncertain.

What is an encysted hydrocele of the cord?

Cysts are formed at different points along the remains of the peritoneal process, which has not become completely occluded; or cysts develop in the connective tissue surrounding the cord. There may be one large cyst or several small ones strung together.

The *treatment* for a large encysted hydrocele is injection, whereas for a number of small ones which connect an incision is necessary.

ORCHITIS.

What is inflammation of the testicle proper called?

Orchitis.

Does it occur as a distinct affection and unassociated with inflammation of the epididymis?

Inflammation of the body of the testicle, its secreting structure, is generally unattended, when it occurs primarily, with epididymitis, but this latter affection may secondarily be accompanied by an extension of the inflammation to the body of the testicle, or if the cause be an injury they may both be affected simultaneously.

What are the causes of inflammation of the secreting structure of the testicle, or true orchitis?

This affection is uncommon. It complicates mumps ("metastatic orchitis"), when it generally comes on at about the end of the first week, usually affecting only one testicle.. Orchitis as a result of injury tends to suppurate and result in gangrene or be

followed by atrophy of the organ. The mild and subacute form of this malady comes on sometimes in those suffering from chronic urethral and prostatic diseases, and it occurs occasionally spontaneously without any assignable cause.

What are the symptoms?

In severer cases it is often preceded by slight chills and fever, anorexia, etc. There is a gradual enlargement in the testicle, accompanied by a great deal of pain, according to the extent of the swelling. It is very sensitive to pressure. The pain continues for several days, when it either commences to slightly decline or entirely ceases, which latter condition points toward gangrene. The shape of the testicle is ovoid, and the testicle itself is hard and indurated; the epididymis cannot be made out, and the scrotum is often red and œdematous. When suppuration intervenes it is generally preceded by a chill, after which the enlargement rapidly increases and becomes soft.

The suppuration points toward the surface, and if the pus be allowed to escape atrophy of the remaining structure takes place, or perhaps suppuration in another portion. Sometimes a fistula remains, which may be surrounded by sprouting granulations, preventing proper drainage of the pus-cavity, causing either softening and pus-formation or leading to general decline of health. If the abscess-formation of an orchitis does not come to the surface, the symptoms may continue for a long period, while the softening gradually becomes contracted to an indurated mass and solidifies, the function of the testicle being destroyed if this process be extensive. Such a testicle is apt to be the seat of chronic difficulty.

What is the treatment?

The *prognosis* is grave, and energetic measures must be resorted to to prevent destruction of the testicle. Rest in the recumbent position with a support of the organ is essential. If the case be seen early, antiphlogistic measures should be adopted: the application of leeches around the abdominal ring or incisions into the large scrotal veins, with a relaxation of the parts by hot douching or sitz-bath, tobacco poultices constantly applied, with the testicle supported and the bowels kept well drained. If these measures fail to abate the inflammation, and suppuration or gangrene is suspected, incision should be resorted to without delay, making the endeavor to freely drain the affected organ. If a fistula be left, it may be opened by a deepening incision and the track be

scraped and treated with stimulating dressings. If a fungus or hernia of the testicle appears, it may be either tied off or cauterized, or, if no other disease remains, be replaced and the edges of the wound brought together and sewed. In old cases the disease may be so extensive, the testicle indurated and containing fistulæ and fungi, that extirpation is often advisable; especially in debilitated subjects it is advisable to remove a source of unhealthy absorption which causes a continual wearing on the system.

EPIDIDYMITIS.

What are the causes of epididymitis?

Inflammation of the urethra is the most common cause, or any undue irritation or congestion of the urethra may be responsible for it, as prolonged sexual excitement, instrumental examinations, etc. The most common cause of an epididymitis is gonorrhœal inflammation and its results, such as stricture, prostatitis, etc., in which class of cases inflammation existing around the prostatic sinus near the ejaculatory ducts travels down the mucous membrane to the epididymis. That the resulting epididymitis is an extension of inflammation, and not a reflex irritation, seems to be borne out by the fact that it generally occurs in the later periods of a gonorrhœa, unless instrumental interference has been resorted to, and not during the early stages, when the inflammation has not reached the deep urethra. That epididymitis is a result of reflex irritation is claimed by some, but this probable fallacy has been made from the fact that inflammation will travel so rapidly through the vas deferens as to leave no trace of its course and reveal no symptoms except in the epididymis. In all cases of epididymitis from whatever cause it probably can be safely assumed that there exists a congestion or latent inflammation in the region of the prostatic sinus.

What are the symptoms?

They may be acute or subacute at the onset. A previous attack is apt to ensure a mild subsequent one. At first a feeling of uneasiness is referred to the testicle, running up the cord and felt in the back, with a certain amount of tension in the groin, which is generally spoken of. Sometimes a chill and febrile affections share in the manifestations, but these are not as frequent as in orchitis. Within a short time, probably a few hours, there is a pronounced pain felt in the testicle, which rapidly increases in size, varying according to the acuteness of the case and in different individuals.

Examination reveals the tension and heat of the testicle, and especially the hotness of the epididymis. In the mild cases the changes are for the most part entirely confined to the epididymis, but in severe acute attacks the symptoms, being all aggravated, occur with greater rapidity and are more intense. A periorchitis intervenes, resembling an inflammatory œdema. Fluid may occur in the tunica vaginalis of a serous or sero-sanguinolent character, causing its distension and increasing the pain. The scrotal tissues may also become inflamed and œdematous, and with such surrounding swelling and inflammation the epididymis will be very difficult to map out. The cord also takes part in the inflammation, and becomes swollen and hard, even to the extent of becoming strangulated, which gives rise to characteristic symptoms—namely, the localized pain at the point of strangulation, great prostration, vomiting, etc. The disease advances for several days, and the symptoms intensify as the swelling increases. After remaining stationary for a few days, it begins to decline and the intensity of the symptoms to diminish. The intense pain is generally the first symptom to subside, and it becomes quite bearable while in the recumbent posture, even when the organ is still greatly enlarged. With the disappearance of the pain whatever febrile symptoms accompany the inflammation also subside.

The *course* of the disease has a natural limit of about two weeks, while relapses are easily brought on by carelessness and neglect. The hardness in the epididymis, however, remains for a long time after the above period, and disappears slowly, for months and even years. In some cases it never entirely disappears. Suppuration is rare, although it occurs in epididymitis. Atrophy does not occur unless the secreting substance of the testicle is also involved by inflammation as a true orchitis instead of by an inflammatory œdema. The inflammation which is left behind disappears from the head first, and last from the tail.

How is epididymitis distinguished from orchitis?

Epididymitis is a common affection, having as its origin urethral inflammation or irritation. Orchitis is rare, caused by injury or the mumps, sometimes gout or cold. The pain in the former is more bearable, except where strangulation of the cord exists: it is modified in the recumbent position and by support, while in the latter it is excruciating, even when the swelling is not very great, and position does not modify it. The swelling of the former varies, being oval

or roundish, and sometimes irregular. Of the latter it is oval. In the former the epididymis is indurated and tender, and except during the most acute stage may be mapped out, while in the latter it is not distinguishable at all. In the former the body of the testicle may be normal or sometimes sensitive and hard, but not to so marked a degree as in orchitis. In the former there is always fluid in the tunica vaginalis, rarely in the latter. In epididymitis constitutional symptoms are slight, and it terminates in resolution, leaving slight thickening in the epididymis, generally in the tail; in the latter constitutional symptoms are more marked; it terminates in resolution, but is more subject to abscess, gangrene, chronic hardness, or atrophy.

Does sterility sometimes occur after epididymitis?

Yes, when both testicles have been attacked, and the remaining induration is sufficient to obliterate the communication of the canal of the epididymis with the secreting portion of the testicle. This may be more readily effected in the tail than in the head of the epididymis, as in the former situation there exists only one convoluted tube, while in the latter there are several. It is in the tail that induration is most frequently of a permanent nature. Cases which are sterile on this account retain their full sexual vigor, and the condition becomes only known by examination of the seminal fluid and absence of spermatozoa is detected.

What is the treatment of epididymitis?

The *prophylactic treatment* during the course of a gonorrhœa is to properly support the testicle and to observe such measures as are laid down in the treatment of urethral inflammations to prevent the occurrence of this and other complications, such as abstinence from sexual intercourse, alcoholic stimulants, and all substances which tend to render the urine irritating. When the disease occurs the indications are rest in the recumbent position, with proper support for the inflamed organ, which in mild cases may be sufficient to induce the symptoms to subside. In the more acute cases these measures must be accompanied by local applications of moist heat, as may be afforded by flaxseed and tobacco poultices. These should be applied constantly at short intervals, so as to ensure a continuance of the heat with little interval. In the aggravated cases, where the pain is extreme and the cord perhaps becomes strangulated, ten or fifteen leeches may be applied to the groin with excellent effect, or if the intense pain is referable to the great dis-

tension of the tunica vaginalis, puncture of this sac will be followed by striking relief.

In regard to internal medication rational measures should be adopted, such as the use of laxatives and alkalines, besides which the administration of the tincture of phytolacca decandra, in from 10 to 15 minim doses every three or four hours, has generally the effect of causing a subsidence of the acute symptoms. If this is not successful, anodynes must be resorted to until the acute stage is passed. After this period we have the swelling to cope with, and this is properly dealt with by carefully applied straps, consisting of adhesive plaster, evenly and uniformly placed so as to produce a uniform pressure on the swelling of the affected organ. One application of these straps is sometimes sufficient, but they may soon become loose and be of no service from a reduction of the swelling, and a new set must be applied. During the course of an acute gonorrhœa it is well to stop all other treatment. In a relapsing deep urethritis, however, the instillation of a few drops of a mild solution of nitrate of silver is often very effective in producing a cure.

TUBERCULOUS DISEASE OF THE TESTICLE.

In what different forms does it appear?

Either as a tuberculosis occurring spontaneously in the testicle or as an after-occurrence to previous disease remaining as a degeneration or inflammatory thickening. The latter is a slow, mild inflammation, which is apt to occur during a chronic urethral discharge. The epididymis becomes swollen, nodular, and sensitive. It may take on caseous degeneration. It has been termed pseudo-tubercular epididymitis, but if it becomes advanced and is not arrested the disease resembles in every way the true tubercular disease which comes on without local cause and is not necessarily associated with any urethral disease. The true tubercular testicle occurs in strumous subjects, who are apt to show evidences of the disease elsewhere.

What are the symptoms?

Examination of the testicle reveals enlargement, which is apt to be hard and lumpy behind or throughout the organ. The epididymis is primarily affected by the disease, but the secreting structure becomes involved later. The vas deferens may also be affected by the disease as well as the seminal vesicles. These latter can be felt

by a rectal examination. One or both testicles may be affected, and if this be the case the sexual power is apt to be impaired. The tubercular nodules form around the seminal tubes, which after a variable period break down and form cheesy masses. During the course of the advancement of the disease, which is slow, the skin over the epididymis becomes œdematous and adherent; the small cold abscess, if allowed to discharge, shows a cheesy material. An abscess of this kind which is opened externally is apt to remain permanently fistulous.

What is the treatment?

The *treatment* is constitutional and hygienic, as employed to check tubercular disease elsewhere. Support of the testicle is also necessary. If abscess forms it should be poulticed and opened. An operation performed for the purpose of removing the diseased area should include the epididymis only, except where the rest of the testicle is disorganized, when castration becomes necessary.

SYPHILITIC TESTICLE.

What are the syphilitic affections of the testicle?

Syphilitic epididymitis and syphilitic orchitis. The former appears in the early months of the disease during the period of the early eruptions. It is confined to the epididymis, and mainly to the globus major. It is usually bilateral. It is distinguishable from chronic epididymitis as affecting the head and not the tail, where the latter disease is generally seated, and stands out as a clearly-defined swelling distinct from the testicle. Finally it succumbs to the internal treatment of syphilis. No local measures are required. Syphilitic orchitis appears in two different forms, either as a diffuse interstitial inflammation or as gummy nodules. Diffuse syphilitic orchitis, like interstitial inflammations in other organs, attacks the fibrous structure of the testicle, which increases and proliferates so as to impinge upon the secreting structure and cause atrophy. The organ is greatly enlarged, its tunics become hypertrophied, and fluid collects in the tunica vaginalis. One or both testicles may be affected simultaneously or consecutively. After a time contraction sets in at the expense of the secreting structure, and the organ becomes greatly diminished in size. If the process has only affected a portion of the testicle, the contraction in this portion will cause a depression at the point involved.

The gummatous form of syphilitic testicle may coexist with the

diffuse, and is often spoken of as an aggravation of the disease. It is characterized by the appearance of gummy nodules of variable size, which consist of a collection of cells undergoing fatty degeneration, fastened together by fibrous tissue. They are nourished by a grayish vascular areola, and as they increase in size have a tendency to soften in the centre. They may form near the surface or in the substance of the gland. The epididymis is less apt to be affected, and the vas deferens rarely. The tunica vaginalis is more or less distended with fluid, and the membrane itself is apt to be thickened. The testicle becomes enlarged to a considerable extent when the two forms of disease coexist. The ultimate course of these gummy nodules is to soften, become entirely absorbed, or to calcify, causing complete or only partial atrophy of the testicle, or the integument over those near the surface may become adherent and ulcerate, resulting in a fungus, which consists in a bulging out of the tubular structure of the organ, this being permitted by ulceration of the intervening structures. Syphilitic orchitis generally does not appear until after the third year of syphilis, although occasionally before this period. The growth of the testicle occurs slowly and without pain, unless there be a small amount of new growth along the cord. On examination the testicle will be found to be greatly enlarged, several times its natural size; it may be very smooth and hard, or the body may be irregular and nodular, showing softened spots. If only a portion of the organ be involved, the healthy part will be normally sensitive. A syphilitic testicle is insensible to pressure. The vas deferens is very rarely involved, as well as the scrotal tissues, primarily, so that the hardened lump is freely movable. The tunica vaginalis contains fluid, which is sometimes sufficient to destroy the outline of the testicle, and its removal becomes necessary to make proper examination.

The *prognosis* is good when the disease is put under antisyphilitic treatment, to which it readily succumbs. The gummatous material becomes absorbed and the pressure is taken away from those tubules which have not already been destroyed by the disease.

What is the treatment?

The early form of syphilis of the testicle which appears in the epididymis gets well rapidly under mercury. For the syphilitic orchitis the mixed treatment, mercury and iodide of potash, is more applicable. The later disease appears after the period of chancre the more useful will the iodide be found, or when the disease has

been very destructive and fungus is present, the most rapid effect is to be obtained by pushing rapidly with increasing doses the iodide of potash or soda, resorting to a combination with mercury after considerable effect has been produced. No local treatment is necessary. The fungus should not be cut away, as some healthy tubules may become sacrificed. It may be compressed in place by the use of straps after any constriction of the tissues at its neck has been divided.

TUMORS OF THE TESTICLE.

What tumors are found affecting the testicle and surrounding tissues?

Soft and solid tumors. The soft consist of the regular varieties of cystic tumors, and are either malignant or non-malignant. The former are sarcoma or carcinoma with cystic degeneration; the latter are in many cases dilatations of the secreting structure of the organ which have become separated and surrounded by individual capsules. It is difficult to distinguish always between the malignant and non-malignant cystic tumors of the testicle. Examination of the fluid may reveal the presence of cancer-cells.

The only *treatment* to be advanced is the removal of the affected organ. Dermoid cysts have been found in the scrotum containing skin, hair, bone, teeth, etc.

What solid tumors of the testicle occur?

Sarcoma and lympho-sarcoma and carcinoma of the scirrhous and encephaloid types. The indurated fibrous mass which is often left after inflammation of the testicle sometimes enlarges and forms a *fibrous tumor*. Likewise after a chronic orchitis or other diseases of the testicle calcareous lumps occur. They may be deposited in the epididymis or the vas deferens. These various growths of the testicle call for the operation known as castration, which should be resorted to as early as possible, especially in the case of cancer, before the cord becomes enlarged and the lumbar glands involved.

How is the operation of castration performed?

The patient being anæsthetized, the parts are carefully shaved. An incision is made from the external abdominal ring down to the bottom of the scrotum anteriorly, and the different layers of tissues cut through until the testicle is reached. Bleeding points should be seized as they occur, and the testicle is torn away from its adhesions. The cord is tied by a stout ligature high up, and then cut

below the ligature, having been previously seized and held to prevent its drawing up. The arteries of the cord should be ligated separately with catgut ligatures, when the single ligature around the entire cord may be released. Any tightly adherent skin over the testicle should also be removed in case of malignant disease, and the wound drained and dressed antiseptically.

NEUROSES OF THE TESTICLE.

What neuroses of the testicle commonly present themselves?

Irritable testicle and neuralgia of the testicle. The latter is more or less an aggravation of the former, being deeply seated. The former is caused by sexual excesses in the young who stimulate their sexual appetites in a pernicious manner, and who are unable to give vent to them in the natural way.

The *treatment* is hygienic, and in debilitated subjects the use of tonics, etc. Unstimulating diet should be adopted, and the removal of the exciting cause, if possible, effected. These diseases are sometimes accompanied by neuralgia of the prostatic urethra, which should be treated accordingly.

Neuralgia of the testicle varies in severity. The pain is not so superficial as in irritable testicle, and it may be so severe as to cause retraction and reflex symptoms, such as vomiting, irritability of the bladder, etc. The cause of this condition is difficult to settle upon. In a general way there is apt to exist a predisposition in the sexual temperament, when it may be due to the same causes as produce neuralgia elsewhere, such as malaria, syphilis, etc. It may follow injury or orchitis, and sometimes is referable to an affection of the deep urethra or some other part of the genito-urinary tract. The pain is sometimes constant, at other times intermittent. It is of an acute, lancinating character.

What is the treatment?

If any cause can be discovered elsewhere in the genito-urinary tract, it should, of course, be removed. The *treatment* may be sedative, in the use of belladonna or aconite externally or the use of cold douching or ice-bag constantly applied. The most rational method of treatment is hygienic, which means that if the sexual appetite cannot be kept within bounds and controlled unsatisfied, marriage is the essential antidote.

IMPOTENCE.

What maladies involve the genital function?

I. Certain neuroses which are merely functional, such as false impotence, nocturnal emissions, etc.; II. *True impotence* and *sterility*.

What is impotence?

A lack of power to properly perform the sexual act. It does not imply a defect in the semen, which is sterility. We have two forms of impotence, one of which comes under the head of a neurosis, *false impotence*, and the other, *true impotence*, depends upon the physical development of the parts.

What are the conditions which may produce true impotence?

Abnormalities of the penis; minute and extreme size of, absence of; extreme epispadias and hypospadias; superabundant prepuce with tight orifice; growths around or about the penis; elephantiasis; curves of the penis, the after-effects of injuries; swellings in the surrounding parts, such as hydrocele, hernia; stricture of the urethra, which interferes with the proper ejaculation of the semen; or ejaculation of the semen backward into the bladder, caused by the faulty direction of the ejaculatory ducts. It sometimes comes on after the operation for stricture by external urethrotomy. It may also be symptomatic of certain diseases, when it is only temporary, as the sexual power returns with removal of the disease. As such causes may be named the acute febrile diseases, various cachexia, syphilitic testicle, severe varicocele, spermatorrhœa, etc., and also general corpulency. All of the above-named causes produce "organic impotence," in which, while there may be a natural ejaculation of semen, there is a failure to properly introduce the penis or deposit the semen in the upper part of the vagina. They do not involve sterility, as the other genital organs may be perfectly normal: the fact that the semen can be deposited at all within the vagina means that impregnation may take place.

The *treatment* of true impotence involves the removal of the cause producing the physical disability, be it deformity or disease.

Upon what does false impotence depend?

This condition is psychical, and depends more or less upon the mind or nervous temperament of the patient. It may be due to nervousness, moral perversion, or it may be a weakness with irritability of the prostatic urethra. These different forms of false

impotence are referable to different causes, and have different ways of thrusting themselves upon the unhappy patient. The simplest form is found in nervous individuals who are perhaps candidates for marriage, and at the arrival of the moment for consummation they are either unable to get an erection, or erection exists and ejaculation has taken place before the act can be accomplished. This form is simply a lack of confidence, and is readily overcome by the patient, who, in spite of what may have occurred, continues to act naturally in endeavoring to accomplish his end.

Almost the same condition may be produced in those who have masturbated excessively in early youth, or who have had gonorrhœa which has been accompanied by a chronic cystitis or prostatitis. This condition, is again produced by a moral perversion in those who have masturbated excessively or have been dissipated in early youth, who when married find themselves incapable of performing their conjugal duties, and yet the thought of immoral means stimulates their desires or they are fully competent to accomplish them with prostitutes. A species of this form of impotence has been described as relative impotence, where the individual has a sexual aversion except to certain women. It is unfortunate when it exists toward the patient's own wife, and is often one of the evil effects of the "marriage de convenance."

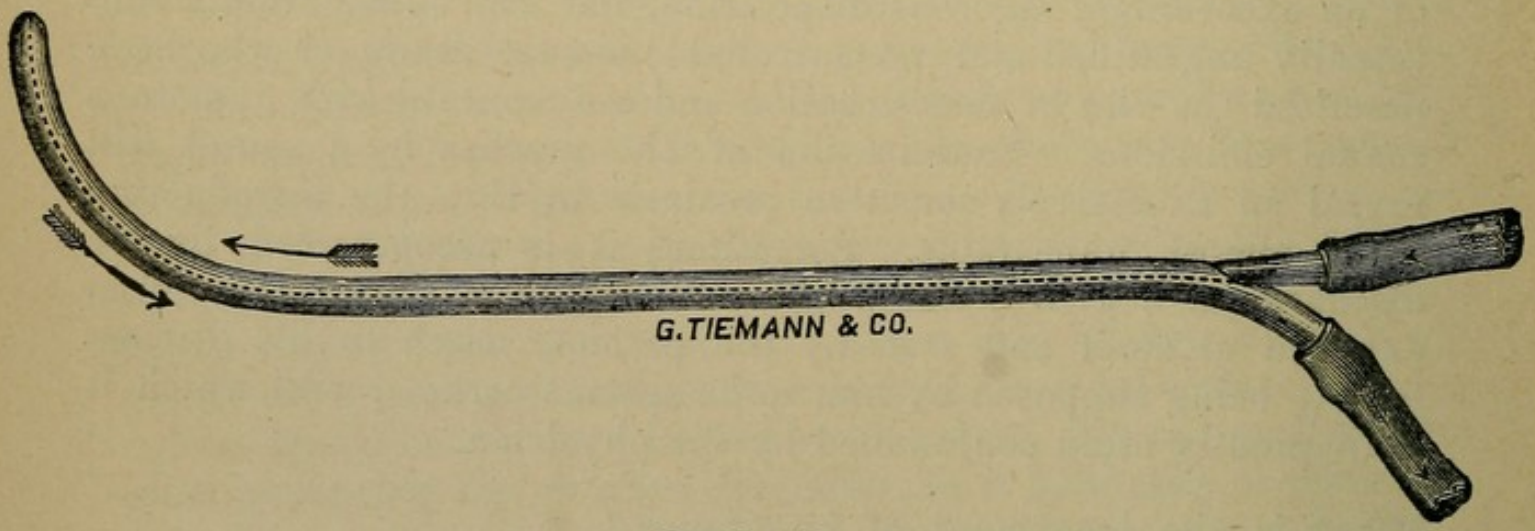
Impotence due to excessive irritability shows itself in an inability to obtain erection at the proper time or in erection accompanied by premature ejaculation. This form is found in those who are possessed of an exceedingly amorous disposition, and who suffer from a continually ungratified and uncontrollable sexual desire, or who have practised the vice of masturbation and are troubled with numerous sexual emissions. Examination of the urethra by a sound will reveal an excessively sensitive prostatic urethra, the introduction being almost unbearable. Sometimes it is accompanied by the discharge of a glairy, starch-like material from the urethra, often expelled at stool and seen by the patient, much to his discomfort, it being supposed by him to be spermatorrhœa, with which it is frequently often confounded by the physician.

What is the treatment of impotence?

The *treatment* of this malady varies according to the form in which it presents itself. As the organic impotence requires a removal of the physical obstacle which produces it or the treatment of the disease or cachexia which has preceded it, so that form

which is largely due to an extreme irritability around the prostatic sinus requires a certain amount of deep urethral medication. Those causes of impotence which are included under the head of "functional" which the physician has to deal with are either entirely psychical in their character in neurotic subjects or are the result of weakness which is due to an excessive irritability, having been occasioned by past excesses and indulgences. Into both forms there is sure to enter a neurotic element, and in both forms there is apt to be *some* local congestion, at least. The milder of these psychical cases get well of themselves when the causes upon which they depend disappear or are removed. Time alone is the most powerful and effective means which can be brought into service for the benefit of these cases. When they come within the notice of the physician, it requires a delicate tact and a most careful judgment, not to say patience, to treat them with any degree of creditable success. It requires the full tact of the physician and the co-operation of the patient, and in order to obtain the patient's co-operation the physician must be sure of his confidence. As already stated, these cases are largely psychical, and have a decided neurotic element in their causation; hence those who are not prepared to receive them and to bear with them as such might better refuse to deal with them on the start. In general, the observation of hygiene is important. Out-door exercise in the country, cold bath-

FIG. 19.



Psychrophor.

ing, and tonics are useful. The use of such aphrodisiacs as cantharides, damiana, and phosphorus should be resorted to as the case may require. The local treatment is important, and should consist

in the passage of cold metallic sounds, full size, which are allowed to remain from five to ten minutes, or the cold sound called the "psychrophor," which provides for the continual passage of cold water through its interior, having a closed end at its lower extremity and two arms externally. Astringent applications are also used with good effect, such as glycero-tannin and instillations of nitrate-of-silver solutions. Finally, electricity has its adaptation in those cases where there is a lax condition of the muscular fibres surrounding the bulb of the urethra, allowing a dribbling of the semen at the end of the sexual act instead of producing a proper ejaculation. In its use one pole may be put in the rectum and the other placed on the raphé of the perineum. A faradic current should be adopted.

ANOMALIES AFFECTING THE SEMEN.

What is sterility?

Sterility implies an affection of the seminal fluid, an entire absence or lack of the vital elements.

What are the causes?

Degeneration or atrophy of both testicles.

What is aspermia?

Absence of semen. It is either congenital or acquired. In the latter form both ejaculatory ducts become occluded, the result generally of disease of the prostate. There occurs occasionally a temporary aspermia with an apparently normal sexual apparatus. It may last a few weeks or months. It occurs in nervous individuals or in those who are not of a nervous temperament but who are suffering from the effects of venereal excesses. These same causes which may contribute to make a man impotent may produce aspermia.

The condition termed *polyspermia*, which consists in a considerable increase in the amount of semen, rarely occurs. The condition called *oligospermia*, denoting a small quantity of semen, occurs in advanced age after inflammation of the testicles and prostate, which only partially occludes the orifice of the ducts.

What is complete absence of the spermatozoa called?

Azoospermia. It may be either congenital or acquired. The congenital condition implies anomalies of the testicle or cord. The

acquired form generally follow inflammation of the testicle and cord.

What is the treatment of sterility?

Sterility in the male does not, as a rule, present a very favorable prognosis, as removal of the cause is not apt to be practicable. If the semen is blood-tainted or mixed with pus, disease of the prostatic urethra or neck of the bladder may be suspected, and in such cases a 5 per cent. solution of nitrate of silver by means of a deep urethral syringe, 5 to 10 minims at a time, can probably be used with best effect.

NOCTURNAL EMISSIONS.

What are the causes of emissions?

They occur in moderation, and naturally as a result of over-distended seminal vesicles, after the period of puberty or in married individuals who are temporarily separated from their wives. They occur with unnatural frequency in those who have over-stimulated their sexual desire by continual masturbation and excessive venery, so as to promote a continued distension in the seminal vesicles.

What is the treatment of frequent "pollution"?

Nocturnal emissions which only occur two or three times weekly may be more or less disregarded, so far as treatment is concerned, and if the thoughts of the individual be properly directed they will probably disappear of themselves. Where they occur several times nightly and for a considerable period, the mode of *treatment* to be adopted should be first directed toward the general health of the patient, and such hygienic measures as cold bathing, early rising, regular muscular exercise to produce a natural fatigue and ensure unbroken rest are particularly indicated. Lying on the back with a full bladder seems to favor erection and lead to emissions. The suggestion of tying a knotted towel in the small of the back to prevent this position is useful. Bromide of potash and lupulin have been used by way of internal medication, besides the mineral and bitter tonics, as the condition of the individual may call for. Mechanical measures have been devised to prevent pollutions, but they are of questionable value, and have a tendency to keep the mind of the patient upon his malady, which is apt to be of a neurotic nature. When examination reveals an

irritable condition of the prostatic urethra, deep injections of nitrate of silver may prove serviceable.

Does pollution occur during the day?

Yes, though more rarely than at night, and generally in individuals suffering from prostatic irritability or in those who allow their minds to dwell upon amorous subjects. The sight of certain women will occasion ejaculation.

The *treatment* is by cold sounds and astringent applications to the prostatic urethra. A long foreskin should be removed if present.

SPERMATORRHŒA.

What is spermatorrhœa?

Spermatorrhœa is an unnatural escape of seminal fluid without orgasm or sexual intercourse at various times during the day, generally induced by muscular effort, notably at stool.

What are the causes?

It results from excessive masturbation and venereal excesses generally, but any continual nervous strain upon the overtaxed nervous temperament may produce the condition, or any inflammatory trouble leading to congestion and irritation of the prostatic sinus and seminal vesicles. Deposits in the urine generally and mucous discharges from the urethra are made use of by quacks to represent this malady. The most common affection liable to be confounded with it by the patient is false impotence, accompanied by a discharge of mucilaginous prostatic fluid resembling in appearance the semen, and more frequently expelled during defecation. The presence of spermatozoa settles the diagnosis.

What are the general symptoms accompanying true spermatorrhœa?

The individual is generally a neurotic subject, has a soft drooping look to the eye, complains of a feeling of weight in the prostatic region, has dyspepsia, and is generally distressed about his sexual apparatus. The sexual appetite is apt to be excessive, feeble, or perverted. Such patients tend to grow thin, poorly nourished, and hypochondriacal. There is another class of spermatorrhœics who have the disease and do not know it, and whose minds are not troubled with the idea of impotence of the congenital apparatus at all. In the gravest cases the symptoms continue to grow worse, the testicles become small and flabby and sensitive, and the veins large and

full. The semen becomes less and grows thin and free from spermatozoa. Finally, the patient becomes entirely impotent and loses the power of erection.

What is the treatment?

Some cases get well without any *treatment*, and others fail to be cured in spite of all measures. Hygienic means generally should be adopted—measures employed to preoccupy the mind of the individual and improve his general health, with the endeavor to impress upon him that it is not the discharge of semen which produces the damage, so much as the moral effect it has upon his nervous constitution. The best local measure to be adopted is the use of solutions of nitrate of silver of increasing strength injected into the deep urethra at intervals of a week, starting with 1 grain to the ounce and doubling the strength at every sitting up to 48 grains to the ounce or a 10 per cent. solution, which will probably produce the maximum effect to be gotten by these local means. Failing in this, there is nothing further to do but to advise the patient to possess his soul in patience and trust that Nature will accomplish the cure which other means have failed to do.

VARICOCELE.

What is varicocele?

As its name implies, it consists of a varicose condition of the plexus of veins within the scrotum called the pampiniform plexus and the veins of the spermatic cord. It is a malady of frequent occurrence, and is said to exist in some degree in 10 per cent. of the males of the human race. It is only when accompanied by impressive symptoms that it is called to the notice of the physician.

On which side is it most frequently met with?

Almost invariably on the left side. Double varicocele often occurs; single varicocele of the right side is infrequent.

What are the causes of this condition?

The chief *cause* is found in the interference with, or abuse of, or obstruction to the proper exercise of, the physiological function of the sexual apparatus: chiefly is it seen in those who have erotic fancies and amorous temperaments, who encourage rather than curb their appetite, which is compelled to remain ungratified, and in those who keep a turgescence of the veins of the scrotum

by venereal excesses or the practice of masturbation. The slight varicocele which is found in young unmarried men is only a temporary affair, and disappears when the physiological function is allowed the proper exercise. The causes of varicocele occurring more frequently on the left side are that the testicle hangs lower on this side, and the fact that the left vein empties at a right angle into the renal vein and is behind the sigmoid flexure of the colon, which is so apt to be distended with fæcal matter.

Acute varicocele occurs as a result of constant straining effort. It may last for several weeks, and disappear or be left as a permanent enlargement.

What are the symptoms accompanying varicocele?

As it comes on slowly, it is only discovered by accident, generally when it has assumed a good size. Pain is one of the *symptoms* which accompany it, and is of variable character, and by no means depends upon the size of the varicocele. A very large varicocele may be attended by no pain, while a very small one may be the source of a great deal of difficulty, the pain running up the back and down the thighs. The mass in the scrotum feels soft and worm-like. Atrophy of the testicles occurs, although seldom as a result of interference with the circulation after varicocele has existed for a considerable time. The testicle is apt to be more or less sensitive to pressure with this condition of varicocele. The only other symptoms attending it are those which relate to the mental and neurotic condition of the patient, resulting from causes which have led to the formation of the condition, and amount to general hypochondria. In the recumbent position the swelling of varicocele generally disappears or may be readily reduced, and if sufficiently strong pressure be then made over the external abdominal ring and the standing posture assumed, the varicocele will not return until the pressure be removed.

What is the treatment of varicocele?

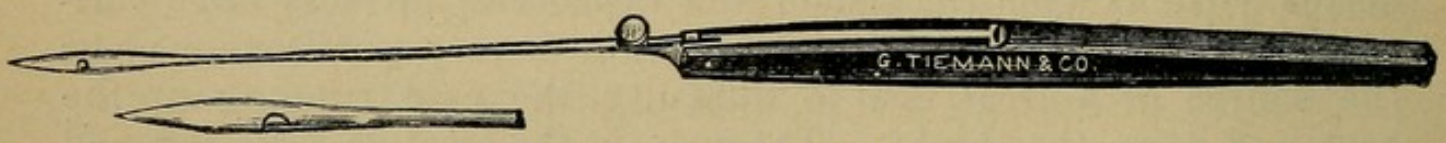
If a varicocele is accompanied by no symptoms, whether it be small or even a fair size, occurring in a healthy and sensible individual, there is no reason to adopt any mode of treatment except support by a properly-fitting suspensory bandage. Occurring in young bachelors and unmarried men who suffer from ungratified sexual desire, marriage is the antidote; otherwise the proper treatment of this disorder consists either in wearing continually a suspensory bandage or in an operation for its radical cure. The sus-

pensory bandage will sometimes be sufficient to relieve symptoms and will give the patient a degree of comfort which he had not before experienced; but in those individuals whose condition is that of hypochondriasis, and whose minds are continually reverting to their sexual apparatus, the moral effect alone of an operation may be conducive to considerable benefit.

What operations are employed for the radical cure of varicocele?

There have been a great number of operations devised for the cure of this condition, some of which entail a cutting procedure. In the author's opinion the most effective operation, the most satisfactory and most free from disagreeable complications, and the most rapid of cure, is the subcutaneous ligation of the veins, an operation with a special needle, both of which, the operation and the needle, have been perfected by Dr. Edward L. Keyes.

FIG. 20.



Needle for Operation on Varicocele.

Describe the steps in the operation.

The patient is made to stand up beside a bed or table, and the varicocele is mapped out by the operator, one or two, and perhaps three, main trunks being selected for ligation. The parts are made thoroughly aseptic with a 1 : 1000 solution of bichloride of mercury. The same number of needles as there are veins to be ligated are threaded with heavy twisted silk, which has been previously carefully prepared. The scrotum is seized between the thumb and index finger, and the vas deferens is held well toward the opposite side. The different punctures are made with the needles between the veins and the vas deferens, carrying one end of the silk through to the opposite side. The silk is then taken out of the eye of the needle, the eye of which is opened from the handle, and the needle pulled back to its point of entrance, and is then made to worm itself between the dartos and the veins, and to emerge at the same opening as made before, posteriorly. The end of the silk is reinserted in the eye and pulled back completely through the anterior opening. By holding the two ends of the silk firmly in one hand the cellular tissues are pulled away from the loop posteriorly with the other. All hairs around the opening

made by the puncture are removed, and the silk is tied forcibly in a triple knot cut short and allowed to sink into the scrotum. This procedure is repeated with each ligation. The patient is allowed to lie down after the first punctures have been made, as following this it is only necessary to run the needle close to the dartos, irrespective of the position of the veins. The parts should be thoroughly washed again with the bichloride solution, and the scrotum supported in a suitable bandage. The pain directly after the operation is not generally severe, but gradually increases in the first twenty-four hours or so, as does also the swelling. Examination will reveal the formation of clots above the ligatures, which rapidly become firm and hard. The patient may go about as soon as the pain has sufficiently left to permit his doing so with comfort. This is generally at the end of four or five days. The cure of the varicocele, if this operation be properly performed, is beyond doubt. The silk ligature remains in place indefinitely, becoming encapsulated, and eventually absorbed. In one or two instances it has gradually found its way to the surface and been extracted, in which instances cure of the varicocele has been as usual. Ablation of the scrotum may be called for if considerably redundant, in which case ligation and excision of the larger veins may be more properly performed by the cutting operation, although the subcutaneous ligation may be first resorted to, and at a later day ablation of the scrotum, if desired.

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