tion, and, rarely, be protracted in course and clinically indistinguishable from true gonorrhœa. The microscope shows no gonococci.

Symptoms.—As a matter of convenience in description, the course of gonorrhœa is here studied in successive stages; these stages are not, however, always definite in duration or sharply defined one from the other.

1. *Stage of Incubation.*—At the time of infection the virus is conveyed to the sound membrane in a very small quantity—too small to cause immediately a perceptible irritation—and it is not until the gonococci have developed and multiplied that they or their products, or both, produce a visible disturbance in their new habitat. The time required for this development varies from one to fourteen days, but in fully two-thirds of all cases it is from five to seven days. This wide variation is undoubtedly due in part to the degree of virulence of the particular virus, to the character of the soil upon which it is implanted, and to other circumstances attending its inoculation; but the characteristics of the individual also play an important part. A highly sensitive man, and, in particular, one who is fearing and carefully watching for the result of an exposure, will detect the earliest slight symptoms, which would pass unnoticed by the average man; while among the careless and uncleanly the discharge may become pronounced before attention is directed to it.

When unmistakable symptoms appear before the third day, careful inquiry will usually elicit a history of more or less recent gonorrhœa from which the patient has really never fully recovered, though he may have supposed himself well. The case is then one of bastard

gonorrhœa. In simple urethritis the period of incubation is wanting or is of only a few hours' duration.

2. *Beginning or Prodromal Stage.*—The stage of incubation may be said to end, and the prodromal stage to begin, when the patient first notices, especially on urinating, a slight teasing, pricking, tickling, or uneasy sensation at the meatus urinarius. On examination the lips of the meatus may be slightly red, or, if the patient has not urinated for some time, they may be slightly stuck together by a drop of viscid mucus resembling in appearance the white of an egg. Without the aid of the microscope this fluid cannot be distinguished from the mucus secreted by the urethra and prostate during sexual excitement; the redness is no more than could come from accidental chafing or friction of the parts with the clothing; and in the majority of cases the diagnosis must be withheld for a day or two until the beginning of the active or increasing stage. If an early diagnosis is important, a drop of mucus should be squeezed out of the urethra and be examined for gonococci. If they are found, the diagnosis is established at once; but failure to find them will not warrant the exclusion of gonorrhœa until several slides have been examined on successive days.

3. *Increasing Stage.*—The itching or other sensation at the meatus now becomes one of slight burning or smarting on urinating, and gradually increases in severity. The secretion increases in quantity until it is sufficient to slightly stain the linen, and becomes thicker and opaque. The microscope shows pus-cells which increase in number each day. The lips of the meatus become more sensitive, red, swollen, and everted, and as the disease progresses the entire glans and prepuce may

gradually share in the inflammatory process. In an untreated case these symptoms gradually increase in severity for from eight to fifteen days after the beginning of this stage.

The discharge becomes purulent, at first milky, and then thicker and creamy in consistence. It grows darker in color until of a greenish yellow, the tint being due to the presence of a small amount of blood. If the mucous membrane becomes cracked, the blood may appear in the discharge in streaks, or there may be considerable hemorrhage. The discharge is often excessive; sometimes several drops appear at the meatus, and fall, if not wiped away, during the few moments occupied by the physician in examining the patient, to whom this constant dripping is a source of inconvenience and frequently of great mental distress.

The pain on urinating, which at first was slight, increases and may become agonizing in severity, causing the patient to retain his urine as long as possible. Often, when he does urinate he is afraid to permit the urine to pass in a full stream, since this would stretch the swollen and sensitive mucous membrane and thus cause more pain. Then, too, the calibre of the urethra is smaller than normal, in consequence of the thickening of its mucous membrane, and the stream of urine is thus diminished in diameter, divided, twisted, forked, and frequently interrupted. The urine may come only in drops, or there may be complete retention. This last is rare except in the case of an individual who had a stricture previous to his present attack. The pain, at first located near the meatus, now extends along the entire pendulous portion of the urethra, though it is usually most intense near the meatus, the fossa navicularis, or at the root of the penis. It is not limited to the time of urination, but is more or less constant, and it often radiates from the penis to the testicles, cord, perineum, groins, thighs, and back. There is also in these regions a feeling of weight and tension.

During this stage there is usually more or less sexual irritation, with painful erections and with seminal emissions which may be mixed with blood. The inflamed and thickened mucous membrane of the urethra is not capable of distention, and, moreover, the inflammation may extend to a part or all of the corpus spongiosum, filling up the meshes of its structure with plastic lymph and rendering them also incapable of distending to meet the demands of the elongated corpora cavernosa during erection. These two bodies above, which usually escape the inflammation, become distended with blood, elongated, and pull upon the inflamed and sensitive but now inelastic tissues of the urethra and the corpus spongiosum. The result is a torturing pain and a curving of the penis forward and downward, forming a bow of which the urethra is the taut string. At such a time the lips of the meatus may be seen drawn in, forming a funnel. This is *chordee*, and is especially apt to come on at night under the influence of the warmth of the bed. The sufferer will rise and by the application of heat or cold reduce the chordee, only to have it return when again he is warmed in bed. In this manner his rest at night is broken. Sometimes, becoming desperate, he attempts forcibly to "break" the cord by resting the penis on some hard substance and striking it with his fist. The usual result is sudden hemorrhage, and later the formation of traumatic stricture.

The inflammation, at first limited to the lips of the

meatus, extends until the entire glans is swollen, turgid, red, or even highly inflamed and excoriated. The prepuce becomes œdematous, and balanitis of mild or severe grade may be present. As a result phimosis and paraphimosis are frequent complications. The lymphatics of the penis may become inflamed, and may be felt as hard cords, usually about the size of a knitting-needle, but at times much larger, extending to the symphysis pubis. They are usually painful and sensitive, their course being marked by a red line. Occasionally these firm cords act upon the erect penis as the urethra does in chordee, producing a curvature in various directions. The inflammation of the lymphatics usually readily terminates in resolution and does not often call for serious consideration. The inguinal glands may be involved and become slightly swollen and tender, but suppuration is rare.

Constitutional symptoms are wanting except as they result from loss of sleep and from mental distress. The latter is often excessive, rendering a man totally unfit for his usual vocation.

4. *Stationary Stage.*—With good hygienic management the inflammation, after reaching its height, remains stationary for about a week, though under unfavorable surroundings and in unhealthy individuals this stage may be protracted for several weeks. Usually, at the end of the third week from the first appearance of the discharge the stage of decline begins.

5. *Stage of Decline.*—During this stage the symptoms gradually subside; the discharge grows less, until, at about the end of the fourth or fifth week, it is again represented by only a few drops daily of a sticky mucous discharge, which in the course of another week

or two disappears entirely, and the patient is well except for a sensitive condition of the urethra that will probably persist for some weeks.

The foregoing description applies to an untreated, uncomplicated case of gonorrhœa in an otherwise healthy man, living under good hygienic conditions, who is not subjected to too much physical exertion, who is indulging in no excesses in the way of food, drink, or tobacco, and who avoids all sexual excitement. In such a case the duration of gonorrhœa, from beginning to end, is usually from five to eight weeks; but even in uncomplicated and typical cases the disease varies greatly in its duration and intensity. The increasing stage of the disease, usually about twenty days, may be prolonged for weeks; or after the inflammation has reached its height it may remain stationary for some weeks instead of a few days. Most frequently protracted, however, is the stage of decline. Instead of steadily and uniformly progressing to recovery, the disease may improve for a time and then remain unchanged, or the process may be lighted up afresh and recovery be delayed by a series of relapses.

Frequently, some indiscretion on the part of the patient after he considers himself practically well causes a return of acute symptoms, though they are rarely so severe in type as in the early stages of the disease. Each succeeding relapse is usually less severe than that preceding, but the prolongation of the inflammation increases the natural tendency of the disease to localize itself in a chronic form in the fossa navicularis, in the region of the bulb, or in any part of the urethra that has happened to suffer most severely during the acute process. Thus are left circumscribed areas of granulation or

thickening of tissue which may result in chronic gleet and may finally go on to the formation of stricture.

The disease varies as widely in the intensity of its symptoms as in its duration. In very mild cases there may be, from beginning to end, almost no pain or other evidence of inflammation aside from the discharge, which may nevertheless be profuse. In the majority of skilfully treated cases of gonorrhœa the other symptoms rapidly subside, and the discharge remains the chief, if not the sole, source of trouble to the patient. In very severe cases, on the contrary, the constant and severe pain, increased by great sexual irritation, chordee, bloody seminal emissions, hemorrhages, and discomfort in urination, together with mental distress and loss of sleep, tell forcibly on the general health. If the disease extends to the posterior urethra—as it does in many cases—one or more serious complications (posterior urethritis, epididymitis, prostatitis, vesiculitis, or cystitis) may result.

The causes of this wide variation in the course of gonorrhœa lie partly in the peculiarities of the individual, but largely in his hygenic surroundings. Syphilis, tuberculosis, scrofula, gout, malnutrition from any cause, and great fatigue, all tend to retard the recovery of the disease; while sexual excitement of any kind, the use of tobacco, alcohol, or stimulating foods, and too much or too vigorous physical exertion, as in walking, dancing, or riding, all tend to prolong and increase the severity of the inflammation. If a patient with gonorrhœa acquire a febrile disease, his urethral symptoms usually subside while the fever lasts, but return with the disappearance of the fever. Indigestion, constipation or diarrhœa, and other minor disturbances of the general health, as a common cold, usually delay and aggravate the

course of gonorrhœa. The first attack, particularly of a young man, is, as a rule, the most severe, but it is also most likely to terminate in complete recovery. Successive attacks may be less severe, but they are generally more protracted and obstinate and exhibit greater tendency to become chronic.

The symptoms of *non-infectious urethritis* may be nothing more than a few drops of muco-pus, possibly so small in amount as to cause no more than a slight gluing together of the lips of the meatus. Men of strumous or lithæmic diathesis, and particularly those having a slightly damaged urethra, present these subacute cases after excesses of any kind. From this low type of inflammation there are all gradations to that described as the acute stage of gonorrhœa, though severe cases are rare, and are usually the immediate result of chemical or mechanical violence to the urethra. Too frequently they result from local treatment for imaginary ills. The duration of acute symptoms is brief, varying from a few hours to a few days.

Bastard gonorrhœa is usually subacute, presenting the symptoms found in the declining stage of gonorrhœa. Under simple treatment the urethra thus affected generally returns to its former condition in about ten days or two weeks. If, under the influence of the irritation, the gonococci which may have been lying quiescent in the urethra multiply sufficiently, the inflammation may be more acute in type, slow in reduction, and in no way different from a mild attack of gonorrhœa, except that the inflammation reaches its height more rapidly and the period of incubation is brief.

Pathology.—Our knowledge of the pathology of gonorrhœa is very imperfect, owing to the fact that in

this disease few opportunities are afforded for making histological and post-mortem examinations. Finger gives the following description of the gross appearances: "Urethritis constitutes an inflammation of the mucous membrane and submucous tissue, with all its characteristics, such as redness and swelling and secretion of a mucous, muco-purulent, or purulent discharge. The intensity of the inflammation will vary, and hence the mucous membrane presents different appearances. Sometimes the swelling will be slight and the injection dendritic; sometimes the redness and swelling will be very marked. The glands and follicles always appear to be affected early and intensely. They become swollen; their openings gape in the shape of a funnel. The inflammation also extends to the lumen of the glands, and even the parenchyma takes part in the inflammation and in the production of morbid secretion. If the lumen of the gland or follicle is now occluded by a firm plug of mucus or pus, retention of pus and the formation of cysts result. Desquamation of the epithelium and superficial losses of substance also take place at the mouth of the follicle, and if the process is severe may lead to small ulcerations (clap-ulcers). Deeper ulcers may also develop, perhaps, from the rupture of one or more cysts due to occlusion of the gland-openings. This early and intense implication of the glands explains the obstinacy of clap and its tendency to relapse. The latter is due to the persistence of the process, which has died out on the surface, in one or more glands, where the virus increases and may then be discharged upon the surface; perhaps because the secretion of the virus is increased by local and general irritating influences, such as coitus and excesses *in Baccho.*"

The histological changes have been studied chiefly in gonorrhœal inflammation of the conjunctiva and the rectum; but, reasoning from analogy, it is probable that soon after a secretion containing gonococci is deposited upon the mucous membrane of the urethra, these micro-organisms find their way between the superficial cells to the deeper epithelial elements and to the upper layers of the connective tissue. Here they proliferate, their presence causing an irritation which produces an active hyperæmia with dilatation of the vessels and exudation of serum. The hyperæmia rapidly becomes an inflammation, with the appearance of large numbers of leucocytes and round cells in the tissues. The leucocytes make their way to the surface, carrying with them large numbers of gonococci. This they continue to do throughout the entire course of the disease, until the invading micro-organisms are entirely removed. The round-cell infiltration and other evidences of inflammation now disappear, new epithelial cells take the place of those that have been destroyed and exfoliated, and the process is at an end.

It is not usual for the mucous membrane in all parts of the urethra to recover at once. The inflammation and the gonococci may linger for months or years in one or more glands, in the fossa navicularis, in the cul-de-sac of the bulb, or in some other portion that has happened to suffer more severely than others.

Diagnosis.—*Examination of the Patient.*—No physician will succeed in the treatment of venereal diseases who does not habitually make thorough and careful examinations. With this end in view he should obtain a fairly good knowledge of his patient's general condition and history—the more complete the better—before coming to the consideration of the local trouble. Other-

wise this information will be acquired, if at all, in unsatisfactory and detached fragments, and quite probably so late as to necessitate changes in instructions and treatment already given. This not only is a waste of time, but it leads to confusion in the mind of the patient and does not increase his confidence in his physician. Besides learning the general state of the health, the physician should be informed regarding the habits of eating, drinking, tobacco-usage, sleep, exercise, and all hygienic surroundings. Exact history of any previous venereal diseases should be obtained.

In the local examination thoroughness is imperative. No intelligent practitioner or student of medicine will order treatment for a man on the strength of the statement that he has nothing but a discharge or a "running" from the urethra. Nor is it sufficient merely to look at the discharge. The clothing should be removed, and in the majority of cases the fingers of the examiner should first seek the inguinal region. If he finds indurated, insensitive glands on one or both sides, he will search for the initial lesion of syphilis, which he may find in the form of a urethral chancre or of a sclerosis so trifling that it would pass unnoticed but for the information obtained by the fingers in the groin. If he find a single gland enlarged and sensitive, he will suspect the presence of chancroid, of a lymphangitis, or of some other complication not frequent in gonorrhœa. The fingers will next explore the testicles, where the presence of indurated nodules in the epididymis may tell of previous attacks of gonorrhœa or of syphilis which have been denied by the patient and which call for consideration during the treatment of the present disorder.

Such an examination of the groins and testicles, if

made at the outset, requires but a few seconds, but if left until the fingers are soiled—as they are quite liable to be—in the examination of the penis, these regions may be neglected. The discharge has led the examiner to make a diagnosis of gonorrhœa or urethritis; the patient complains of no pain in the groins or in the testicles, and their exploration calls for the time and trouble involved in an extra washing of the hands. An initial sclerosis, acquired at the same time with the gonorrhœa or independently of it, may thus be overlooked, or the patient may return in a few days with a violent epididymitis which might have been prevented had the evidence of former attacks been noted and proper precautions been taken. If the prepuce be long or in a state of phimosis, the physician will make every effort—cleansing the parts, if necessary—to determine that the discharge comes from the urethra, and not solely from the preputial sac affected with balanitis; it may come from both. He will also, by manipulating the parts, satisfy himself, as far as possible, regarding the nature of any other complications that may be present.

Differential Diagnosis.—A urethral inflammation is probably one of three conditions—gonorrhœa, bastard gonorrhœa, or simple urethritis. The first is the most common, constituting a large majority of all cases; the second is of frequent occurrence; while non-infectious urethritis pure and simple, occurring in a man whose urethra was previously sound, is unusual. It is evident that the diagnosis between bastard gonorrhœa and simple urethritis will often be made with great difficulty. If repeated examinations fail to find gonococci in the discharge, the diagnosis must rest upon the history of the patient. If he has had former urethral discharges,

it is safe to assume that his urethra had never fully recovered from the earlier attacks. In these cases an accurate diagnosis, so far as the immediate treatment is concerned, is not essential, for in either case the discharge usually subsides in a few days under simple treatment; the diagnosis, however, is of importance in the matter of prognosis and in determining the proper course to be pursued in the future.

The average patient can with difficulty wait for the conclusion of the examination before asking to be informed definitely if he has true gonorrhœa or if his discharge results from what is popularly known as "a strain" or from contact with innocent vaginal discharges. In almost the same breath he will probably ask how long a time is required for "curing" him. These questions can often be answered at once, but frequently they call for the exercise of much tact, good judgment, and good sense on the part of the physician. The man who indulges in illegitimate sexual relations with a mistress or with a woman generally supposed to be respectable is loath to believe that he is infected. He is often positive in his declarations that he has not been exposed to a venereal disease. Egotism and ignorance give him faith in a woman he personally knows to be immoral. The man, further, who indulges in promiscuous sexual relations, relying for his safety upon artificial methods and devices for avoiding disease, is slow to realize that his precautions have failed to protect him. Such measures are certain to fail sooner or later.

On the contrary, the young practitioner is inclined to be too incredulous regarding urethral discharges declared to have been innocently acquired, and rarely properly appreciates the fact that a large proportion

(possibly one-third) of the seemingly acute and subacute cases are in reality exacerbations, wrought by some of the causes already discussed, of a pre-existing chronic disease. While in the majority of cases the diagnosis may be made with precision on the first examination, especially if the microscope be used, there are times when the prudent physician will postpone his decision for a few days, and will consider carefully the individuality and surroundings of his patient before answering the questions put to him. His aim must be to relieve the suffering and to protect the innocent.

The diagnosis practically lies between gonorrhœa, bastard gonorrhœa, and a simple urethritis. Their causes, characteristics, and symptoms need but brief review here. For convenience they are set forth in tabular form.

Gonorrhœa.	*Bastard Gonorrhœa.*	*Non-infectious Urethritis.*
History of former attacks not necessary.	The patient has had former attacks.	History of former attacks not necessary.
The patient's general condition has no bearing on the origin of the disease, but may exert a marked influence on its course.	Enfeebled constitution is often a factor in the production of the disease, and frequently exerts a decided influence on its course.	Enfeebled constitution is sometimes the chief factor in the production of the disease, and may even be the sole cause of its continuance.
Urethra may have been sound at the time of infection.	Damaged condition of urethra necessary. Generally evidenced by gluing of lips of meatus in the morning, or by shreds in the urine. Patient may have seen no evidence of disease for months, and believed himself well.	Damaged condition of urethra not necessary, but probably present in many cases.
Cause of disease lies solely in exposure to a gonorrhœal discharge.	Immediate cause usually found in sexual indulgence, with or without other excesses. Occasionally other excesses are alone sufficient.	Cause found in direct mechanical or chemical violence to the urethra, often the result of too energetic treatment. In the cachectic and debilitated, sexual and other excesses may suffice.