colored patches, 2 or 3 mm. in diameter. The disease is commonest in prostitutes.

"Janovsky states that diffuse hyperplastic processes extend out onto the submucosa from the diseased Skene's glands."

2. *Circumscribed Chronic Urethritis.*—"The subjective symptoms of circumscribed urethritis are mostly slight, often amounting to nothing more than an itching or burning sensation. The discharge is thin and contains but few gonococci; when the disease is localized in the glands it is known as *glandular urethritis* (Oberlander). Patches of deeply reddened mucosa are seen for the most part up near the internal and down near the external orifice. In these, particularly along the posterior wall, groups of yellow spots about half a millimetre in diameter are seen surrounded by a reddened area. In a more advanced stage anæmic streaks of scar tissue may be seen, and the tissue resists the passage of the speculum, even tearing when more pressure is made."

Treatment.—During the acute stage, refrain from the use of the endoscope; give demulcent drinks; and keep the patient quiet. As the severity of the inflammation diminishes, and the discharge decreases, examine the urethra, determine the extent of injury to the mucous membrane, and, after cocainization, apply, locally or over the whole canal, pure ichthyol, or silver-nitrate solution (thirty grains to the ounce), every third or fourth day; at the same time applying the same drugs with tampons to the vagina. Inject Skene's ducts with the same solution, or if the inflammation persists, lay them open, and apply iodized phenol to the interior of the gland.

Suburethral Abscess.

"The anterior vaginal wall is the seat of a symmetrically rounded globular swelling, varying in size from a small pea to that of a hen's egg. The abscess cavity is situated in the urethro-vaginal septum, communicating by a tiny opening with the floor of the urethra about one-half to three-quarters of an inch from the meatus externus. The tumor projects into the vagina, is smooth, elastic, and when pressed upon through the vagina, pus is seen to well up into the urethra. It is most frequently met with in married women, during the child-bearing period, who refer to this condition as 'something coming out of the front passage,' and as a source of inconvenience or pain during intercourse. The nature of the enlargement can be readily determined by introducing a fine probe through the urethral opening, disclosing to the finger in the vagina that only the thin wall of the vagina intervenes."

Treatment.—The simplest and most efficient way to eradicate a suburethral abscess is to excise an ellipse of tissue, including the vaginal mucosa, and one-third of the sac wall, and apply thoroughly to the interior of the sac iodized phenol, followed by a drying powder, to prevent excoriation of the adjacent structures.

Hyperæmia of the Bladder.

The normal trigone presents a more brilliant red color than any other portion of the bladder, and during pregnancy is the seat of increased congestion, with a flushing of the capillaries, quite distinct from hemorrhoidal dilatation of the veins. In addition to these forms of congestion, the trigonal region may present a deep rosy red color which extends to and around the ureteral orifices, rarely beyond, shading into the surrounding structures. In other instances, there are small patches adjacent to one or both ureters, the orifices of the latter being puffy and œdematous, and irregular in outline. Kelly suggests that "a mild infection lies at the bottom of some of these cases, and that the affection is in reality a form of trigonitis, but this remains to be proved."

Symptoms.—The inception of this process is usually quite without warning. There is a sense of unrest, with bearing down, burning, or throbbing in the pelvis; the desire to urinate is more or less constant; the act is unsatisfactory, painless, or painful, and is followed by considerable distress. The bladder is tender on palpation, and the symptoms in the main simulate those of cystitis.

Hyperæmia is associated with concentrated urine and with gonorrhœal urethritis, and it is apt to follow catheterization and abdomino-pelvic operations.

Direct inspection through the urethroscope will at once reveal the true condition. The trigone will appear red; at or near the orifices of the ureters there will be patches which are very sensitive to the touch; and at times there will be a few leucocytes in the urine.

Treatment.—Excessive acidity of the urine calls for the use of demulcents and diluents, the avoidance of acid fruits and drinks, the suspension of marital relations; free action of the bowels; and rest. If the irritation does not quickly respond to the foregoing measures, topical applications of silver nitrate (from ten to twenty grains to the ounce) or of ichthyol and glycerin (one drachm of the former to one ounce of the latter) must be made to the inflamed surface, by means of a mop or by instillation, every three or four days.

Cystitis.

In cystitis the inflammation involves one or more coats of the bladder. It is brought on by the introduction of pyogenic organisms into a cavity which has been prepared to receive and entertain them. In other words, in the production of cystitis we must have, first, a predisposing cause to prepare the soil (bladder); and, second, an exciting cause, micro-organisms, to develop thereon.

Predisposing Causes.—"As predisposing causes of cystitis we recognize and describe such injuries, agencies, and influences as are concerned in establishing a *locus minoris resistentiæ* in the tissues of the bladder in which a sufficient number of pathogenic microbes of adequate virulence accumulate to produce those tissue changes which characterize inflammation. The injured tissues or contents of the bladder furnish the necessary nutrient medium in which the microbes grow. All of the predisposing causes do one of two things or both: 1. They effect tissue changes which determine the localization of the microbes from the bladder, adjacent organs, or the general circulation. 2. They furnish a nutrient medium for the growth and multiplication of microbes."

"The most frequent of all predisposing causes of cystitis is retention of urine from any cause. Retention of urine acts in two ways in predisposing the bladder to infection: (1) The retained urine serves as a culture medium for some of the microbes which are known to produce cystitis; (2) the distended bladder wall is subjected to pressure which in itself is a potent predisposing influence."

"It is time that the medical profession should realize the well-known clinical fact that retention of urine is one of the most frequent and potent conditions in increasing the receptivity of the bladder to infection, and that cystitis can be most effectively guarded against by preventing the accumulation of urine in the bladder beyond the physiological limits. Knowing the great susceptibility of the bladder to infection when the urine is retained, it becomes the surgeon's duty to employ aseptic precautions in the evacuation of the organ by catheterization, puncture, or incision" (N. Senn).

Foreign bodies, tumors, and calculi, by obstructing the outflow, and by causing retention, irritation, congestion, ulceration, and hemorrhage, prepare the soil for the proliferation of any micro-organisms which may find lodgment in the bladder. While the presence of foreign bodies, etc., does not indicate actual cystitis, and while they may for years find lodgment in the bladder without giving rise to actual infection, yet it is a well-established fact that they "are productive of symptoms which lead the surgeon frequently to explore its interior by the use of instruments, a method of examination to which the date of infection can be so often traced." Further, we must not overlook the fact that a certain amount of traumatism is necessarily associated with such instrumentation of the bladder and with operations upon that organ.

Compression of the bladder by the pregnant uterus (both before and during labor) and by pelvic and abdominal tumors brings about venous stasis; disease of the kidneys, heart, etc., by obstructing the general circulation, also predisposes the bladder to infection.

Still other pathological conditions render the bladder liable, to an increased degree, to infection. Among them may be mentioned: marked changes either in the quantity of the urine excreted (as in diabetes insipidus and mellitus, in kidney disease, and in hysteria) or in its quality (excessively acid, or, more frequently, abnormally alkaline). Furthermore, the elimination, through the urine, of such drugs as cantharides, turpentine, etc., and the ingestion, for a certain length of time, of stimulating foods and alcoholic beverages, tend to put the mucous membrane of the bladder in a condition favorable for infection.

Exciting Causes.—"The essential or exciting cause of cystitis is invariably the presence and pathogenic action of microbes in the tissues of the bladder, the seat of the inflammation." Pathogenic organisms reach the bladder through the urethra, by the use of instruments, or by direct extension along the surface of the urinary tract. Accurate clinical observations and the results of examination demonstrate that the urine from scarlatina, varicella, typhus, typhoid, septicæmic and pyæmic, and tuberculous patients contains corresponding bacteria, which have been eliminated by healthy kidneys, these organs being themselves uninjured thereby. Suppurative disease of the kidneys, which so often precedes that of the bladder, greatly enhances the danger of infection. Infection may also take place by direct extension from the ureters. Secondary infection may take place from adjacent organs, by rupture of an appendicular, tubal, or pelvic abscess direct into the bladder. On the other hand, infection may take place through migration of the bacillus coli communis, from the intestines, indirectly through the lymphatics. This mode of infection most often results when lesion of the rectal mucous membrane is associated with retention of urine.

Rarely infection takes place through bacteria which are circulating with the blood current and which become lodged in the tissues underneath the mucous membrane, as single or multiple circumscribed foci. This is without doubt the mode of origin of ulcerative cystitis.

Classification of Cystitis.—N. Senn rightly claims that "a rational classification is essential in discussing the etiology, symptomatology, diagnosis, prognosis, and treatment of this disease. The surgeon is no longer content simply to recognize the existence of the disease. To enable him to estimate the gravity of the affection and to adopt an intelligent course of treatment, he must be in possession of accurate knowledge of its real nature, location, and extent. He must know what microbe or microbes have produced the inflammation before he can make a diagnosis that will suggest the necessary therapeutic indications. Mistaken and inaccurate diagnoses are largely responsible for the many shortcomings of our present therapeutic resources. . . . No classification (diagnosis) is complete which does not indicate the anatomical location, the clinical features, pathological characteristics, and bacteriological origin of the disease."

Senn's Classification of Cystitis.—1. *Anatomical.*—(*a*) Pericystitis; (*b*) paracystitis; (*c*) interstitial cystitis; (*d*) endocystitis.

2. *Pathological.*—(*a*) Catarrhal cystitis; (*b*) suppurative cystitis; (*c*) ulcerative cystitis; (*d*) exudative cystitis; (*e*) exfoliative cystitis.

3. *Clinical.*—(*a*) Acute cystitis; (*b*) chronic cystitis.

4. *Bacteriological.*—(*a*) Bacillus coli communis infection; (*b*) saprophytic (mixed) infection; (*c*) staphylococcus infection; (*d*) streptococcus infection; (*e*) streptococcus erysipelatis infection; (*f*) typhoid bacillus infection; (*g*) diplobacillus infection; (*h*) gonococcus infection; (*i*) bacillus of tuberculosis infection.

Clinical Diagnosis.—*Acute Cystitis.*—"That form of inflammation of the bladder in which the symptoms appear suddenly and reach their maximum height in a short time is known as acute cystitis. In this class of cases the infection is intense, the constitutional disturbances are well marked, and the nature of the pathological products in accordance with the acuity of the inflammatory process. One of the best illustrations of what is meant by acute cystitis is furnished by cases of urine retention in which infection occurs by the use of the catheter. The disease is usually initiated by a chill followed by febrile reaction; the urine becomes turbid within twenty-four hours, and in a few days contains large quantities of pus, and ammoniacal decomposition is developed very rapidly. It is not difficult in the majority of cases to establish the existence of acute cystitis, but such a diagnosis no longer satisfies the surgeon who seeks to complete his diagnostic work by investigating the pathological anatomy of the disease and by ascertaining the nature of the infection. Under appropriate treatment an acute cystitis may be under control in a short time, but in the presence of obstructive or visceral lesions the acute symptoms subside in the course of time, when the disease only too often passes into the chronic form."

Chronic Cystitis.—"Chronic inflammation of the bladder is characterized by the absence of acute symptoms, local and general, and the tendency of the disease to persist regardless of the treatment employed. The suppurative form of chronic cystitis is usually complicated by the coexistence of neoplasm, or by the presence of stone or foreign body in the bladder. Cystitis caused by infection from a suppurative affection of the kidneys is also very prone to pursue a chronic course, as the constant irrigation of the bladder with infected pus maintains an uninterrupted source of infection. The best example illustrating the clinical aspects of chronic cystitis is furnished by the *tuberculous variety.* The disease begins insidiously by the appearance of isolated symptoms which point to the bladder as the probable seat of the inflammation. The symptoms gradually increase in number and intensity until the complexus is complete upon which to base a diagnosis of chronic cystitis. The symptoms are often masked by complications which served as predisposing causes or which ensued in consequence of the chronic inflammation. It is in cases of chronic cystitis that an early and correct diagnosis is so seldom made. Renal disease is often mistaken for cystitis, and cystitis for renal disease. It is in such cases that a recourse to all modern diagnostic aids is indispensable for a correct interpretation of the symptoms as they arise. It is well to remember that in the majority of cases of chronic inflammation of the bladder not complicated by obstructive lesions the disease is of a tuberculous nature.

Anatomical Diagnosis.—(*a*) *Pericystitis.*—Inflammation of the adjacent pelvic or abdominal viscera may also involve the peritoneum covering the fundus of the bladder, though more frequently its base and sides are affected. When the inflammation surrounds the vesical ends of the ureters, these are likely to become obstructed by cicatricial contraction of the inflamed tissues.

Dasheux believes that the "irritable bladder" in women is due to localized hyperæmia of the mucous membrane, seen as patches at the base of the bladder, less often at the neck. Congestion of the uterus and adnexa generally stands in a causal relationship to this vesical hyperæmia. Kolischer describes, in connection with such cases, a peculiar form of œdema of the mucous membrane of the bladder observed through the cystoscope; it appears in the form of circumscribed blisters the size of a pea, the rest of the membrane being normal.

This pathological condition is always associated with pelvic exudates, and is most frequently seen in women who are the subjects of salpingitis.

The symptoms which attend this form of vesical irritation are painful urination, tenesmus, and a feeling of weight and pressure over the bladder.

(*b*) *Paracystitis.*—Paracystitis is an inflammation of the subperitoneal connective tissue in that part where the

bladder is extra-peritoneal. At the base of the organ there is a paracystitis, while in front the disease usually appears in the form of a phlegmonous inflammation of the loose connective tissue. In both of these locations abscess formation is the usual termination of the inflammatory process, an occurrence which is always attended by distressing bladder symptoms. Abscesses in both of these places, unless incised early, are very prone to rupture into the bladder, an accident which is often followed by an obstinate cystitis. Inflammation of the subserous connective tissue, following infection through the lymphatic channels, is a very obscure affection, and a positive diagnosis is more frequently made in the post-mortem room than at the bedside. The formation of multiple abscesses in such cases is not an unusual occurrence. More or less pericystitis is almost always associated with paracystitis involving the intraperitoneal portion of the bladder.

(*c*) *Interstitial Cystitis.*—Interstitial cystitis involves the middle or muscular coat of the bladder. Infection reaches this coat, which is the seat of the most numerous lymph channels, either by secondary extension from some adjacent inflammatory focus, or directly from the mucous lining; much more rarely it is conveyed by way of the circulation. In either case it usually leads to a diffuse inflammation involving the whole middle coat, which becomes elevated into greatly thickened rugæ and can be felt by the sound. The small abscesses rupture into the bladder, leave diverticula, heal slowly, and often form recesses for stone. Following this form of cystitis the bladder undergoes marked diminution in size through cicatricial contraction. In the embolic form of interstitial cystitis, circumscribed inflammation and abscess formation are the results of infection.

(*d*) *Endocystitis.*—Cystitis proper, as the term is usually applied, refers to an inflammation of the mucous membrane of the bladder. Such an inflammation may be limited to the trigonum, to the urethral or to the ureteral orifices, from which points diffuse cystitis has its origin. The inflammation may almost from the beginning involve the whole mucous surface. Inflammation of the neck, the most sensitive portion of the bladder, gives rise to the most distressing symptoms. In cystitis proper the urine contains, almost from the beginning, the morphological elements of the inflammatory products—blood, epithelial cells, and pus corpuscles—the presence of which always constitutes an important distinguishing feature between endocystitis and the other anatomical varieties of inflammation of the bladder.

Pathological Diagnosis.—"The effect of microbes and their toxins on the tissues of the bladder varies according to the specific pathogenic effects of the original bacteria, the number of microbes, and their degree of virulence. The inflammatory product is also greatly influenced by the condition of the urine and the nature and extent of the predisposing causes."

"The pathological classification must be based entirely on the character of the inflammatory product; cystitis, endocystitis, or cystitis proper being taken as the type of the disease."

(*a*) *Catarrhal Cystitis.*—"From a modern pathological standpoint catarrhal cystitis is a term used to indicate the existence of a superficial inflammation of the interior of the bladder in which the epithelial cells furnish the principal part of the morphological elements of the inflammatory product. It is, like all catarrhal inflammations in other localities, a surface affection. The mucous membrane is swollen and red, and the inflammatory process consists in increased exfoliation of epithelial cells and the formation of mucous in abundance. If the disease become chronic, thickening of the mucous membrane and secondary infiltration of the muscular coat lead to hypertrophy of the bladder wall. Retention of urine aggravates the inflammation and increases the vesical distress. Erosions and superficial ulcerations may develop during the course of the disease. The urine is usually acid, and contains pus and an abundance of bladder epithelium. In cases in which the urine has undergone alkaline decomposition the inflamed surface presents a dirty whitish deposit of muco-pus."

(*b*) *Suppurative Cystitis.*—"Suppurative cystitis appears clinically as a diffuse affection, in which not only the epithelial lining but also the deeper structures are generally involved. The microbic infection is of sufficient intensity to destroy the protoplasm of the morphological products of the inflammation (white corpuscles purely epithelial, and connective-tissue cells), and transform them into pus corpuscles. The urine contains large quantities of pus and bladder epithelium. During the acute stage small fibrinous patches appear upon the inflamed surface. Ulceration differing in extent and depth is of common occurrence. Deep necrosis may lead to perforation. If the urine is ammoniacal, the necrosed patches present a grayish-white color and are encrusted with sand-like deposits. The decomposition of the urine is generally due to other microbes than those which have caused the suppurative inflammation; that is, it is generally the result of mixed infection. Besides the usual pyogenic microbes, the ammoniacal urine contains some species of saprophytic bacteria or the diplococcus ureæ. Suppurative cystitis generally begins as an acute inflammation, but is very likely to pass into the chronic form, and direct extension of the infective process is liable, sooner or later, to implicate the kidneys."

(*c*) *Ulcerative Cystitis; Simple Ulcer of the Bladder.*—"In this class of cystitis it is not my intention to include the cases of suppurative cystitis which terminate in ulceration, which would only indicate an advanced stage of the disease, but I desire to limit the application of the qualifying term ulcerative to a form of cystitis in which ulceration takes place almost from the beginning of the inflammation. In cases of this kind the infection appears to be of a peculiar kind, limited in extent, and the resulting inflammation leads quickly to a circumscribed destruction of tissue, the formation usually of a single circumscribed ulcer, the so-called simple ulcer of the bladder. This form of cystitis is quite rare, and resembles in many respects gastric ulcer and the round duodenal ulcer."

(*d*) *Exudative Cystitis.*—"Inflammation of the mucous membrane of the bladder accompanied by the deposition, upon the inflamed surface, of the products of coagulation necrosis should be called exudative cystitis. The descriptive terms, membranous, diphtheritic, croupous, and fibrinous, are confusing and misleading and should be excluded from the present nomenclature in the description of this pathological form of cystitis. The exudate consists largely of fibrin, and is variously modified in quantity and appearance by the character of the infection and the condition of the urine. The exudate is the best possible proof of the severity of the infection and intensity of the inflammation. It proves the existence of a deep-seated lesion and great damage to the blood-vessels in the inflamed tissues. This form of cystitis is most frequently observed in puerperal women and women suffering from pelvic tumors large enough to subject the bladder to harmful pressure."

"Savor ('Cystitis crouposa bei saurem Harn,' *Wiener klinische Wochenschrift*, 1895, No. 44) observed a case of exudative cystitis on the fourth day after extirpation of the uterus by the abdominal route. The catheter was not used either before or after operation. Membranes 5 or 10 cm. in length were expelled with the urine. These membranes were composed of fibrin and contained in their meshes numerous pus corpuscles. The urine was ammoniacal only for one day. In the urine sediment the colon bacillus was found, and was regarded by the author as the essential microbic cause of the inflammation. Savor made experiments with pure cultures of this bacillus with a view of reproducing this special form of inflammation upon serous and mucous surfaces of other organs in animals, but the result of his endeavors proved negative. The urine in exudative cystitis is usually alkaline, and Savor believed that in his case it remained acid after the first days owing to the absence of a mixed infection. In the majority of cases exudative cystitis occurs in women during the child-bearing period, and positive proof

of the pathological nature of the cystitis is always furnished by the expulsion of membranes or shreds of fibrin with the urine."

(*e*) *Exfoliative Cystitis.*—"Exfoliative cystitis is an inflammation of the bladder in which almost from the very beginning the toxins of the microbes which produce the disease destroy the mucous membrane and sometimes even the muscular coat, which, if the patient survive, become detached with the inflammatory products and are expelled with the urine, or in some instances have to be extracted by the surgeon. This is the most dangerous form of cystitis, and can occur only as the result of the most virulent infection, aided in most cases by local predisposing causes. In exudative cystitis the toxins precipitate the inflammatory product by causing coagulation necrosis; in exfoliative cystitis they cause necrosis of the mucous lining of the bladder and occasionally also of the muscular coat. The same mechanical causes which are so influential in exudative cystitis are usually present and active in the production of the exfoliative forms.

"The differential diagnosis between exudative and exfoliative cystitis can be made only by a careful study of the membranes, shreds, or masses expelled or removed from the bladder, which often must necessarily include the use of the microscope as a diagnostic aid" (Senn).

Bacteriological Diagnosis.—The most modern views on the etiology of cystitis place microbes in the first rank, relegating all the other causes to the grade of predisposing factors. From this standpoint it behooves the diagnostician to consider well the identification of the particular microbes which are at work, not only to emphasize his diagnosis, but to point out clearly an appropriate course of treatment.

While on this quest it is necessary to keep in mind that the bladder wall, under normal conditions, is very tolerant of the presence, even in large numbers, of a single species of micro-organism; that it can for a long time harbor new growths and foreign bodies without any or with but slight protest; that it may be subjected to disturbances in its circulatory apparatus, to traumatic insults, etc., and give but temporary evidences thereof, until there are added certain pathogenic microbes, the *sine qua non* of any form of cystitis. A brief consideration of these will now be in order.

The *bacillus coli communis*, that constant inhabitant of the intestinal tract, and most common of all denizens of the bladder, when alone, floating in an acid medium, refrains from breaking up urea. Melchior found that the bacillus coli was present in every instance in which the urine was acid.

Saprophytic (*Mixed*) *Infection.*—"In more than one-half of the cases of acute and chronic cystitis, infection is the result of the presence and combined action of two or more kinds of microbes. Pus microbes and the saprophytes decompose urine, rendering it alkaline. Ammoniacal urine acts as an irritant to the mucous membrane of the bladder, producing textural changes, and prepares the way for the action of the bacteria which are more directly concerned in the production of the inflammation. A mixed infection must be suspected in all cases in which the urine is ammoniacal. Gas formation (pneumaturia) occasionally takes place from the presence of the bacillus lactis aërogenes (Heyse) and the bacillus aërogenes capsulatus of Welch. The experiments of Schnitzler show that the decomposition of urea and the putrefaction caused by microbes are often greatly influenced by the composition of the urine; gas being produced only in those with diabetic urine. Saprophytic infection is almost always associated with urine retention, and may precede or follow infection with the microbes which are the essential cause of suppurative cystitis. It is in such cases that careful systematic irrigations of the bladder prove of such eminent value in correcting the alkalinity of the urine and in arresting the suppurative inflammation" (Senn).

Staphylococcus Infection.—"The staphylococcus pyogenes albus and aureus, the microbe most frequently found in all suppurative affections, has been often demonstrated as a solitary microbe, and in association with other pyogenic microbes and saprophytic bacteria in the urine of patients suffering from catarrhal and suppurative cystitis. The staphylococcus is a comparatively mild microbe, and its presence as a sole microbic cause should be suspected in inflammatory affections of the bladder in which the infection does not penetrate deeply, and in which the urine shows no evidences of exfoliation. In staphylococcus infection the urine may be ammoniacal without the presence of saprophytic bacteria, as pus microbes, when present in large numbers, decompose the urea, besides lighting up the suppurative inflammation" (Senn).

Streptococcus Infection.—"That the streptococcus pyogenes is not often the cause of cystitis becomes apparent from a bacteriological examination of the urine from six cases of inflammation of the bladder made by Huber (*Correspondenzblatt für Schweizer Aerzte*, October, 1893). He found this microbe only once; in the remaining five cases the bacillus coli communis" (Senn).

"Melchior found the urine acid in all cases of cystitis in which the streptococcus was found as a solitary microbe. It is well known that the streptococcus generally produces a diffuse form of inflammation, during which the connective tissue is often destroyed by the toxins and is later eliminated or removed in the form of shreds. The streptococcus invades the lymphatic channels and connective-tissues spaces, and is almost constantly found in phlegmonous inflammation and diffuse abscesses. A streptococcus cystitis is characterized by the intensity of the local and general symptoms and by more or less destruction of the tissues of the bladder wall. The presence of this microbe may be surmised in cases of diffuse interstitial and exfoliative cystitis" (Senn).

Erysipelatous Cystitis.—"Infection of the bladder with streptococcus erysipelatis is extremely rare, but there can be no doubt of the possibility of such an occurrence" (Senn).

Typhoid Infection.—Melchior reports a case of typhoid infection of the bladder in a male convalescent from typhoid; but no such case has been met with in females.

Diplobacillus Infection.—"The diplobacillus of Friedländer, which has been found in so many suppurative lesions complicating or following pneumonia, in rare instances has been found as the only microbic cause of cystitis. The urine contained pus, a small quantity of albumin, and diplobacilli" (Senn).

Gonococcus Infection.—Infection of the bladder due to the extension of gonococci from the urethra as a solitary infection does at times take place, but in the majority of cases these microbes are associated with some other species. Gonorrhœal cystitis presents itself more frequently in the form of a trigonitis, as a localized affection with a tendency to become diffuse and to extend to the kidneys. Wertheim, in a girl nine years of age, excised, through the cystoscope, a piece from the bladder mucous membrane, and found therein an abundance of gonococci, some between the epithelial cells, some having produced thrombosis in the capillaries and veins.

Tuberculous Cystitis.—"Tuberculous cystitis furnishes the best clinical representation of chronic cystitis. With few exceptions, a primary chronic cystitis is of a tuberculous nature. It is important to bear this in mind in the examination of all cases of cystitis in which the initial symptoms point to a chronic inflammatory process."

"Tuberculosis of the bladder is caused either by infection with the bacillus of tuberculosis through the blood, by extension of a tuberculous process by continuity of surface from the kidney or the genital organs, or by the rupture of a tuberculous abscess into the bladder. Vesical tuberculosis is found more frequently in males than in females, and is usually a disease of early and middle life. Localization of tubercle bacilli in the mucous membrane of the bladder, like that of pyogenic and saprophytic bacteria, is favored by antecedent affections of the urinary tract. Primary tuberculosis from infection through the blood is so rare that König doubts its existence. Infection takes place most fre-