is impossible to recognise the nature of the incrusted mass before it has been extracted. In other cases, a body may remain for years in the vagina and then suddenly produce the most manifold disturbances of micturition, so that the whole picture may be very complicated. In every case, in man or woman, in young or old, the oddest articles may be found by digital exploration or sounding. The presence of broken ends of bougies or catheters are most readily explained. In the male urethra, pencils, paint-brushes, brush handles, straws, thin straps, etc., may be introduced by masturbators. Women may introduce needles, needle-cases, and similar articles for the same purpose. Pebbles, marbles, seeds, etc., are occasionally found. Dieffenbach relates that he removed a fork, five inches in length, from a man's bladder, by perineal section.

CHAPTER XXVII

CONDITIONS MET WITH IN VARIOUS DISEASES OF THE BLADDER

Stricture, prostatic hypertrophy, lithiasis, and foreign bodies in the bladder are frequently accompanied by cystitis. Hæmaturia is often met with in vesical calculus, neoplasms, and many other conditions. Any interference with the bladder, litholapaxy, suprapubic or perineal section, even catheterization, may be followed by so-called urethral fever. Injuries, ulcerative perforation of the bladder or urethra, may produce urinary infiltration. Not infrequently uræmic intoxication of the blood confronts the surgeon. All these conditions occur in the course of various diseases, and will therefore be briefly discussed in this chapter.

The gross pathological changes of the urine demand our first attention.

The threads appearing in the urine in cases of stricture point to a catarrh of the urethral follicles, but they also occur in prostatitis or in hypertrophy of the bladder. In order to determine their origin, it is necessary to observe whether they appear at the beginning or end of urination. The patient is directed to urinate into three glasses. The first of the urine is collected in one, the chief quantity in the second, and that portion which is finally squeezed out of the bladder in the last.

The Chronic Cystitis which accompanies stricture may vary in intensity. Pyelitis and nephritis may have already developed.

Chronic cystitis may conveniently be divided into three degrees. In the mildest grade, the urine is slightly turbid, and a *cloudy sediment* deposits on prolonged standing. An alkaline reaction rapidly sets in—that is, in the course of one to two hours—or the urine may show mild alkalinity from the outset. The chemical composition is normal; the sediment is composed of ammonio-magnesic phosphate, bladder epithelium, and so-called mucous cells (Schleimzellen). The second grade is characterized by the occurrence of *pus*. The pus is recognised macroscopically by the viscid sediment which adheres to the tube. This quality is due to the action of the ammonium carbonate on the pus. The urine is alkaline from the start, cloudy, and of ammoniacal odour. The most serious form is characterized by *stinking* urine. The strongly alkaline urine is dirty brown or greenish. Its odour is putrid; a strong odour of sulphuretted hydrogen often predominates. The urine may contain blood pigment.

Pyelitis may also be divided into three degrees of intensity. The mildest grade is characterized by normal amount of urine. The urine is cloudy, *acid* in reaction, contains traces of albumen and a few pus cells. A more severe involvement of the pelvis, *suppurative* pyelitis, produces a pale, cloudy urine, with a plainly visible sediment, the reaction still remaining *acid*. The sediment is never viscid; it consists of pus, of which each cell is plainly distinguishable under the microscope. The amount of albumen corresponds to the amount of pus found in the sediment. Pyelitis of the

third degree is characterized by a complicating parenchymatous affection of the kidneys. The albumen is more abundant than can be accounted for by the quantity of the pus, and the amount of urea excreted during the twenty-four hours is lower than normal.

Cases in which blood is contained in the urine—Hæmaturia—are more difficult to recognise.

Bleeding from the kidney is recognisable in the urine only if the hemorrhage has taken place in or distal to the tubuli uriniferi. As the blood coagulates in the tubules, fibrin casts coated with red blood-cells are found microscopically, and may be regarded as characteristic of renal hemorrhages. Any one who has made a practice of examining the urine of such cases will recognise bleeding from the kidney by the appearance of the urine, which has a dirty brown-yellow colour. Bloody coagula, several inches in length, resembling the ordinary round-worm, if found in the urine, are very suggestive. They are casts of the ureter, and usually cause colicky pains during their expulsion. The chemical examination shows the chief symptoms of kidney disease—acid urine, more albumen than is accounted for by the amount of blood present, a low specific gravity, diminution of urea, calcium and other phosphates, etc.

Hemorrhage from the bladder occurs only in vesical affections, consequently the urine shows the signs of a chronic cystitis, or the symptoms complained of by the patient point to some of the diseases of the bladder which have been discussed above. The urine, therefore, is found to be strongly alkaline, and contains ammonium carbonate, with the viscid sediment with which we are familiar. No casts are seen; the clots

are rounded with irregular outline, and inclose phosphates. Microscopically, triple phosphate and bladder epithelium appear in great quantities. Chemically, we find the specific gravity within normal limits, and the urea, in the twenty-four-hour specimen, is not diminished.

To determine whether the blood comes from the bladder or from the kidney is, at times, one of the most difficult problems in diagnosis. And even if we take for granted that the hemorrhage is from the kidney, it frequently is impossible to fathom the cause of the trouble. Neoplasms, calculi, and tuberculosis are the more frequent causes. At times, after we have been compelled to resort to a nephrotomy, it is found, at the operation, that the kidney is not diseased. This condition, called by the French *hémophilie rénale*, is very mysterious.

Bleeding from the bladder, occurring in middle-aged men afflicted with prostatic hypertrophy, may be solely due to this affection. Such hemorrhage is most apt to occur after physical exertion.

When unmixed blood flows from the urethra it may be accepted as a sure sign of *urethral hemorrhage*. If the patient urinates, the blood and urine appear unmixed, or the urine contains small, fresh clots. That the causes may be manifold is readily realized from what has been previously said.

My friend, Professor Mosetig, in Vienna, surprised me by demonstrating the etiological cause in a case of bleeding from the urethra. None of the ordinary causes could be found. Mosetig turned to the man and asked him whether he had not tied a string around his penis. The patient at once confessed.

URETHRAL FEVER is the English appellation for what in Germany is known as *Reaction* of the urinary tract. What does this mean?

It is well known that nervous subjects may after catheterization have a chill, which is not followed by further consequences. In an hour or two the patient

is quite well, and remains so. As no other explanation than a reflex nervous disturbance can be offered, the name of *nervous* reaction has been applied. In distinction to this, Dittel places the so-called *morbid* reaction.

Patients suffering from kidney or bladder disease may, after attempts at catheterization, dilatation of a stricture, or sounding of the bladder, have a chill within the next twenty-four hours, and, *in addition*, an *exacerbation* of the pre-existing affection of kidney or bladder. This is followed by a protracted illness, characterized by delirium, gastro-enteritis, and typhoid condition. If the *nervous* reaction is of violent character, subsequent to the chill, protracted illness may develop, but the urinary organs remain undiseased—i. e., in statu quo. To distinguish a nervous from a morbid reaction we must take into consideration the character of the urine, both chemical and microscopical, diminution in the daily quantity excreted, etc.

According to Dittel, we need not wait for the report of the urine, for persistent headache and absence of complete remissions point to a morbid process. If the urethral chill occurs after *injury* to the urethra, such as may be caused by attempts at dilatation, the reaction is called *traumatic*.

As a rule, if normal acid urine is injected into the tissues of an animal, no local reaction occurs unless the technic is faulty. After operations performed upon the human subject, if acid urine flows over the fresh wound surface, reaction does not usually take place. This observation influenced Simon, and later Menzel, to experiment upon the effect of urine on healthy tissues. They proved that alkaline urine kills the tissues

and causes sloughing. Acid urine, however, can also prove fatal to the tissues under certain conditions; this is due to the influence of bacterial action.

In one of my wards a careless orderly perforated the rectum while giving an enema, and the fluid (oil and lukewarm water) was injected into the perirectal tissues. The resulting picture was an exact counterpart of urinary infiltration. The tissues sloughed and the process spread along the perineum, scrotum, and inguinal region. As I was not informed of the accident, I first noticed the local symptoms in the perineum and diagnosed urinary infiltration. But the genito-urinary tract proved healthy, the urine normal. After the true cause had been acknowledged, I found a hole in the rectum at the site of a varicose ulcer. Autopsy showed that the urinary organs were normal. Bacterial infection here, too, was the main factor.

Whatever the cause of URINARY INFILTRATION, the symptoms are those of a deep sloughing process, analogous to a sloughing wound, which spreads to the neighbouring tissues, infiltrates and destroys them. The appearance and course of such an infiltration—assuming that it occurs in the perineum—is as follows: The perineum is swollen, dark red, hot, and painful; its margins are edematous. This change spreads rapidly to the scrotum and penis or mons, extends upward onto the belly and downward to the groin. By the time that new regions are involved, the original focus is covered with blebs. These vesicles contain darkish fluid, and scattered about are dark-blue to green spots, with irregular dentate margin. The tissues feel hollow; an emphysematous crackling can be felt, and if early incision is not resorted to the whole area breaks down into a fetid slough. The patient suffers from general symptoms also, a chill at the onset, and fever during the course of the disease.

The point at which the infiltration takes place varies

greatly, and may be situated in any portion of the urinary tract from the pelvis of the kidney to the external meatus of the urethra. I saw a case of urinary infiltration result from a point outside the urinary passages. The trouble was due to an ulcer on the inner surface of the prepuce, causing phimosis. The condition was at once recognised after the prepuce had been split. The course taken by the extravasated urine depends upon the relation of the site of rupture to the triangular ligament—i. e., the deep layer of the perineal fascia. The rupture may be anterior or posterior to this structure. If the suprapubic region and the tissues above Poupart's grow red and edematous during the course of a pericystitis in the space of Retzius, the rupture usually is situated behind the triangular ligament. On the other hand, similar symptoms first appearing in the scrotum and perineum point to a rupture anterior to the membranous urethra. It is not always possible to pass a sound in these cases.

The patient is frequently able to inform us of the exact time of rupture. At the time of the accident he noticed a desire to urinate, followed by a deep, tearing pain. Although only a little urine and blood was passed, the bladder felt completely empty.

URÆMIC INTOXICATION is a symptom-complex which results from advanced kidney disease or from some mechanical obstruction to the excretion of the urine. The true cause of uræmia has not yet been determined. The symptoms may appear either rapidly or slowly. As a rule the first symptom is headache, followed by somnolence or apathy, which may reach an extreme degree. Vomiting, often of most persistent and uncontrollable character, is added to these, or convulsive

attacks, most commonly epileptiform, rarely tetanic in nature, take its place. The patient lies completely comatose, his respiration grows stertorous, the convulsions recur again and again, and death from paralysis of all the functions ends the scene. Uræmia may run a more chronic course. The most severe attack may pass off and the patient regain a comparative degree of health, but the uræmic condition recurs in the course of weeks or months.

Such attacks appearing during the course of a severe kidney disease may well raise the question as to whether the cause is uræmic, or whether the condition is due to an œdema of the brain. I shall not dilate on this theme. I desire to cite one more special case. A patient who has repeatedly suffered with renal colic, and perhaps even passed renal calculi, is now subject to complete suppression. We know that he has no advanced kidney trouble. Examination shows that the bladder is empty. The bladder is again found empty after several hours have been allowed to pass. If the anuria continues for several days, the condition, usually ascribed to uræmia, is probably due to a horseshoe kidney, whose single ureter has been blocked by a calculus.

Finally, URINARY FISTULÆ, which are found as complications of many previously existing conditions, require mention.

Urinary fistulæ in the male may be situated in any part of the urinary tract; their cause, as a rule, is stricture. Internally, they may open into the urethra or bladder; externally, on the scrotum, penis, perineum, the fold of the groin, on the pubes, the hypochondrium, the upper part of the thigh, or into the rectum.

I had a patient who, as the result of stricture, had two fistulæ which opened into the rectum, several which opened on the scrotum, perineum, thigh, and one in the gluteal region. Just beneath the navel a painful abscess developed, which was at once recognised as a beginning fistula. Strange to say, the patient did not seek hospital treatment until this abscess formed.

At times difficulties in diagnosis may arise in connection with these fistulæ. The first point to determine is, whether the fistulous tract leads down to the urethra or not. Sometimes the drops of fluid which trickle away can not be distinctly proved to be urine. A metal sound is passed along the urethra, a probe into the fistula, and it is then determined whether the instruments come into contact. If the course of the fistulous tract is sinuous, these means may fail. It may be necessary to inject coloured fluids into the urinary passages in order to see whether they appear through the fistula. In the next place, it may be necessary to determine whether the internal opening lies in the urethra or in the bladder. If the urine appears only when the patient urinates, the opening is in the urethra. The urine may dribble continuously, and yet the opening may be in the urethra, provided the patient is subject to incontinence from some other cause. This point has already been spoken of in connection with injuries. It should again be emphasized here, because incontinence is more often found as the result of urinary fistula than of trauma. Careful sounding may decide. Dittel very properly remarks that the spot at which the sound and probe *first* come in contact is the internal opening (they may come in contact inside the bladder and thus give a false impression).

Urinary fistulæ in the female may open in various

places. A ureteral fistula may have its outlet on the belly wall. The first nephrectomy performed by Simon was in just such a case, the fistula dating from an operation previously performed. In the majority of instances the fistula opens into the vagina, and most commonly is due to parturition. The diagnosis in these cases must be directed to determine two points: 1. Does a fistula exist? 2. Of what variety is it?

The first point requires careful examination only in case the fistula is very small. In fistulæ of larger size, introduction of the finger into the vagina at once detects the defect, and if the opening permits, the finger may be passed into the bladder. This examination will also allow us to recognise the shape of the opening, the thickness of the edges, unevenness of outline, etc. If the fistula is minute, careful examination of the patient, placed upon the gynecological table, is required to discover its existence. Sometimes coloured fluids, such as milk or India ink, must be injected into the bladder in order to demonstrate the fistula by watching for the spot in the vagina in which the fluid appears.

In regard to the second point. We distinguish: 1. Urethrovaginal fistulæ, which allow the urine to escape only during the act of micturition; therefore, no incontinence. 2. Vesicovaginal fistulæ, through which the urine constantly escapes. 3. Ureterovaginal fistulæ, which are characterized by a combination of these symptoms, for here the dribbling is constant, although periodical voluntary emptying of the bladder also occurs. The sound ureter empties into the bladder, and gradually fills it. The diseased ureter empties into the vagina, and causes the dribbling. A ureteral catheter, passed into the fistula, enters the ureter, but not the

bladder. Coloured fluid injected into the bladder naturally does not escape per vaginam. We assume that that portion of the ureter which is between the bladder and the fistula has been obliterated, but even without this, fluid injected into the bladder would but rarely penetrate into the ureter. By introducing a bent probe through the fistula, efforts can be made to reach the bladder through the ureter, and there bring the probe in contact with a metal sound previously introduced through the urethra.

The fistula may be so situated that it opens at the internal urethral meatus, and thus strikes both urethra and bladder. This condition is called a urethro-vesicovaginal fistula. A vesicovaginal fistula may have its opening placed in such a fashion that part of the circumference is formed by the uninjured cervix—a superficial cervical fistula—or part of the cervix may have been sacrificed and the rest form the edge of the opening—deep vesicocervical fistula. Finally, the opening may be situated within the cervical canal; this is called a vesicouterine fistula. The urine or fluid injected into the bladder appears at the external os.

A ureteral fistula opening into the cervix (ureterouterine) will be characterized by periodic emptying of the bladder, and continues dribbling of urine from the cervix. Fluid injected into the bladder does not appear at the os. If the cervix is dilated by sponge-tents, the fistulous opening may be seen and probed.

If both ureteral and vesicovaginal fistulæ exist in the same case, the symptom of periodical micturition is wanting. Here accurate and careful probing is necessary. The instrument introduced into the bladder never comes in contact with the probe introduced into

the ureter, and this last-mentioned sound passes far up into the region of the kidney.

Kinking or spiral course of the ureter requires a flexible catheter. In such cases other phenomena occur, such as cessation of flow from the ureter for a longer or shorter period, with pain in the loin due to the impeded outflow of urine. This is followed by the sudden discharge of larger quantities of urine, with immediate relief from the pain.

In conclusion, a condition which may occur in the course of various diseases of the genito-urinary tract, *anuria*, may be mentioned. By this is meant the cessation of the flow of urine into the bladder. If a patient has bilateral renal calculi, it might happen that both ureters became obstructed at the same time. No urine would then enter the bladder, and bilateral hydronephrosis would be the outcome. If the patient has only one ureter (*one kidney*) this accident might occur more readily. Under anuria we include the conditions in which the kidneys do not secrete urine. If this occurs in severe renal disease, its cause is, of course, readily understood. Such cessation of secretion may also, however, be due to purely reflex irritation.

CHAPTER XXVIII

DISEASES OF THE PENIS AND VULVA

Diseases of the penis require but little discussion. Benign neoplasms are of very rare occurrence, if we except the *gonorrhœal condyloma* which is frequently met with. Epithelioma of the penis should offer no difficulty in diagnosis, if the age of the patient, and the marked induration of the ulcer, both at its base and edges, are taken into account. The evident involvement of the surrounding tissues by extension—in marked contrast to the destructive progression of an ulcer—the shotty inguinal glands, and the duration of the trouble must also be considered. Sometimes epithelioma of the penis is found in the form of a nodule within one or both of the corpora cavernosa. It is at once recognised by its hard consistency. Frequently a primary cancerous growth of the glans is followed by metastatic nodules in the corpora cavernosa.

In cases of paraphimosis, remember to look for a thread tied about the penis, as cause of the trouble. Venereal processes will not be considered.

Cavernitis may result from trauma or from suppuration in the neighbourhood, followed by perforation into the corpora. It occurs, therefore, both in the form of a local, circumscribed, or a general inflammation.