

finally reach one which passes through the stricture. Instead of a searcher, it may prove of advantage to use an olive-pointed bougie. In withdrawing the bougie, the *length* of the stricture can be estimated, for during the withdrawal of the olive the instrument is clasped more firmly by the strictured portion. If the stricture is very tight, fill the urethra with filiform bougies (cat-gut bougies), and try each one in turn. One is sure to lie in the opening of the stricture.

Some points in the symptomatology require further detail. The site and nature of the stricture can sometimes be ascertained by the peculiar change in the character of the stream. One of the most experienced of genito-urinary surgeons, Professor Dittel, of Vienna, teaches the following: A stricture of the posterior urethra, if of large calibre, gives a rather thick stream without projectile force. If the stricture is tight, the urine appears in small, disconnected drops. Stricture of the anterior urethra allows the urine to flow with greater velocity: if the stricture is narrow and short, the stream is split; if moderately long, the urine flows in a short curve. Involuntary dribbling after micturition indicates a dilatation behind the stricture. If, in addition, the dribbling continues throughout the intervals, we must conclude that the superficial sphincter of the bladder has been incorporated in the callus, and has undergone fibrous degeneration—this occurs in extensive strictures of long standing which are palpable externally—or that it has become paralyzed, which takes place in recent stricture of small extent, situated in the penile portion.

Among the causes of chronic obstructions, *vesical calculi* occupy an important place. Patients suffering

with stone state that they pass blood at varying intervals. They are troubled with a dull pain localized in the perineum, increased during exercise, such as walking or driving. Change in the character of the stream is especially characteristic. The patient starts to urinate, and the stream is strong and full for a few seconds. Suddenly, the flow is interrupted; a few drops are passed, but gradually the urine begins to flow more freely, the stream broadens, only, however, to narrow once more or stop entirely. Just as suddenly, the urine is again passed with normal force. Thus all grades of obstruction, from normal urination to complete stoppage, occur during a single emptying of the bladder. Every patient suffering with this trouble has learned by experience that certain manipulations will aid micturition, and that the obstruction may often be relieved by change of posture. If the anamnesis brings out these points, we at once turn to the stone-searcher as the most suitable instrument to employ in the local examination. We select the thickest instrument which can be passed without great discomfort. Sounding enlightens us concerning the width of the urethra, the presence or absence of strictures, possible prostatic hypertrophy, etc. Inspection of the penis may show that the prepuce has been elongated by traction made by the patient to relieve pain. Retracted scars point to healed fistulæ or strictures, due to the passage of stones at some previous date.

If the bladder is reached without hindrance, manipulation of the instrument gives certain information. The searcher is first passed backward to the posterior wall of the bladder, and then pulled forward once more. It is then turned to the right and to the left. This ma-

nœuvre not only enables us to look for a stone, but also to measure the capacity of the bladder approximately. By passing the tip along the wall, we feel trabeculæ if well developed, and in certain cases are able to form some conception of the sensitiveness of the mucous membrane.

In regard to the stone, it is desirable to determine its position, size, shape, hardness, and chemical composition. Each of these points has its own significance. It is not sufficient to discover the actual position of the calculus. It must also be determined whether the stone is freely movable or fixed in its place.

If the stone is found in the same spot at repeated examinations, if it is unaffected by the patient's change of position (while the searcher is in the bladder), or if it presents the same area whenever the sound is passed over its surface; if the hemorrhage and dysuria are insignificant, either from the start or after a certain period—it is safe to assume that the calculus lies in a diverticulum. Sometimes the stone plays hide-and-seek with the surgeon. To-day it is readily found, to-morrow it has disappeared; one physician finds it, another can not feel it, and doubts its existence. Von Dumreicher used to tell several amusing stories of this kind. He assisted Wattman at a lithotomy, in which no stone was to be seen when the bladder was opened. The bladder had partially contracted in the shape of an hour-glass, of which the upper half contained the stone, the lower being empty. Pressure above the symphysis released the stone. A similar observation was made as early as the time of P. Franco.

In order to form some conception of the *size* and shape of the stone, it is necessary to grasp its various

diameters between the arms of a lithotrite. A rough estimation can be gained by rectal palpation.

The *hardness* of the stone depends upon its composition. Chemical and microscopical examination of the urine is frequently an insufficient guide. Sounding produces a note when the stone is struck, but large experience is required in order to interpret this note correctly. Examination with the lithotrite may be employed not only to determine the resistance offered to the closure of the instrument, but also to break off fragments which can be examined chemically.

The various kinds of calculi act differently to the pressure exerted by the lithotrite.

When a *phosphatic* calculus is grasped, it gives the impression of a compressible, sandlike body.

A *uric acid* calculus offers a firm resistance. If the screw is tightened, the outer layers are crushed, and consequently the branches of the lithotrite approximate. When the pressure is suddenly released, the screw does not recoil.

The resistance offered by a stone composed of *oxalates* is very great. This variety of calculus does not seem to be compressed or crushed when the lithotrite blades are tightened; moreover, when the pressure is suddenly released, the blades snap back.

Cystin calculi are of the consistency of wax.

This instrumental examination is of great importance in supplementing urinary examination, which can only show the composition of the outer layers of the stone.

Chronic obstruction may be due to *disturbances of innervation* of the bladder. In these cases, great difficulty is often experienced in emptying the bladder.

The first drops are passed only after severe straining; the duration of the whole act is greatly prolonged; the stream is thin and weak, and yet no mechanical obstruction can be found. If the patient is advanced in years, we suspect hypertrophied prostate. Sounding shows the lumen of the urethra to be unobstructed, the bladder free from foreign bodies; rectal examination shows a prostate not especially enlarged. The difficulty evidently lies in a paralysis of the *detrusor*. This can be demonstrated in the following way: The patient is asked to empty his bladder, and after he has finished passing his urine he is catheterized. Several ounces of residual urine are withdrawn by the catheter.

Spasmodic contraction of the sphincter vesicæ may produce symptoms of dysuria of marked intensity—*spasmodic stricture*.

In an extremely interesting case, observed by v. Dumreicher, the symptoms corresponded exactly to those seen in concentric hypertrophy of the bladder. The sound detected no stricture, the urine was normal; the whole disease evidently was a neurosis. The patient, who had formerly been obliged to urinate every ten minutes, was cured by an artifice practised by v. Dumreicher. He engaged the patient in a conversation lasting two hours, thus conclusively proving to him that he could hold his urine. Dittel records another case: A patient, about to go on a journey, was suddenly attacked with retention, and the physician who first treated him found an obstruction. Dittel was confronted by the same obstruction, but when he left the catheter in the urethra for fifteen minutes the instrument suddenly entered the bladder. Von Dumreicher encountered a similar case, the patient being a physician. A sixth of a grain of morphine sufficed to relieve the spasm. Psychological causes may produce spasm of the bladder or urethra. Gouthrie relates that a certain lawyer was invariably attacked by retention before he argued an important case; similarly a clergyman, who was affected before he preached. Some people suffer with this trouble—strangury, so-called—after drinking freshly brewed

beer, others after coitus, still others after coitus if they have previously partaken of fresh beer. Patients suffering from pyelitis, arthritis, or diabetes may be subject to spasmodic stricture; fissures of the anus, worms, etc., may produce it by reflex irritation.

We have previously mentioned that the symptoms produced by a stone are also caused by a pedunculated tumour within the bladder. The diagnosis can only be made with the searcher, and repeated examinations may be necessary if the neoplasm is covered with incrustations.

Carcinoma of the bladder, which most frequently is of the villous variety, produces a different picture. The symptoms are those of a chronic cystitis. A positive diagnosis can be made only after discharged portions of the tumour have been examined under the microscope. A tentative diagnosis can be made if the patient is well advanced in years, if the cystitis increases in intensity in spite of treatment, if frequent hemorrhages occur. Additional evidence is furnished if rectal examination reveals a painless resistance, if carcinoma of other organs can be demonstrated (especially in the neighbouring lymphatic glands), and if cachexia is an early symptom.

Papillomata of the bladder, sometimes multiple, produce severe hemorrhages, but are unaccompanied by the other symptoms of malignancy which are present in cancer. They develop slowly; the hemorrhages recur at irregular intervals, and the whole course extends over many years.

Urinary disturbances which produce symptoms that do not agree with any typical disease must lead to the suspicion of a foreign body. This does not mean, however, that foreign bodies in the bladder may not give the typical symptoms of vesical calculus. At times it

is impossible to recognise the nature of the incrustated 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.