prostate, or where the artery of the bulb is given off farther back than usual, or the main artery of the prostate enters the gland in a position exposing it to injury. These complications are met by especial attention to the means of arresting hæmorrhage, already detailed in describing the lateral operation. Secondary hæmorrhage sometimes comes on several days after the operation. Thompson has had four cases, two of which were fatal. The wound is small; ligature can rarely be applied. Thompson advises perchloride of iron, carried in upon lint at the end of a probe, or the actual cautery. Perchloride of iron might be injected. South reports arrest of the hæmorrhage in several cases by pressure on the pudic artery, long continued.

Peritonitis, more common in the child, may complicate the operation in the adult. The rectum may be wounded, or the perineal wound may inflame from mechanical injury or diathetic cause, resulting possibly in sloughing of a part of the rectum. Fistula may be left behind, retention may follow the operation, or temporary or even permanent incontinence, and even occasionally sterility, from obliteration of the ejaculatory ducts by section or subsequent inflammation. Epididymitis may come on, as after any operation involving the prostate. Cystitis may run high from injury to the bladder during extraction of the stone; chronic disease in the kidney may be kindled into an acute state. All of these complications are to be met according to suggestions already laid down in other parts of this treatise.

By far the most common complications after operation are inflammation of the parts around the bladder-neck (cellulitis), and infiltration, both due to the same cause—mechanical violence in extracting too large a stone, or jagged fragments, through an insufficient opening. Lack of vitality in the patient undoubtedly conduces to these results, and infiltration may be due to an incision surpassing the limits of the fibrous capsule of the prostate. But that infiltration is more often dependent upon tearing and laceration during the extraction of large stones, is advanced by Thompson, supported by the fact that in children infiltration is rare, although the incision, as a rule, in the lateral operation, generally surpasses the limits of the prostate, and notwithstanding the fact that in children the cellular tissue is particularly loose.

Relapse of stone is liable to occur if any fragment is left in the bladder, and no part of the operation requires more care than the thorough evacuation of *débris*, in any case where a stone has been broken intentionally, or accidentally crushed during extraction. If, after healing of the wound, any symptoms referable to stone should continue, a careful search may detect the fragment, while yet small, and furnish an opportunity for the use of the lithotrite.

CASE OF INSTRUMENTS FOR STONE.

The following instruments might be grouped into one case. They are sufficient to meet all the ordinary requirements of stone:

Thompson's searcher.
Thompson's lithotrite, heavy and light.
Evacuating catheter.
Urethral forceps.
Lateral lithotomy-staff, small and large.
Median lithotomy-staff.
Lithotomy-scalpel.
Straight, sharp-pointed, narrow, stiff-backed bistoury.
Blizard's knife.
Blunt gorget.
Little's director.
Scoop.
Lithotomy-forceps, with crossed handles.
Lithotomy-forceps, with curved blades.
Crushing-forceps, with extra piece.
Tube with globular head, for washing bladder.
Shirted canula.
Keith's tenaculum.

CHAPTER XIX.

DISEASES OF THE URETERS.

Anatomy.—Anomalies.—Chronic Inflammation.—Dilatation.—Stricture.—Wounds.

The ureters are the excreting ducts of the kidneys. They run down on either side behind the peritonæum from the kidney over the brim of the pelvis to the base of the bladder, and pass through its coats in an oblique, valvular way, making two of the angles of the trigonium Lieutaudii, of which the internal orifice of the urethra is the third. The structure of the ureters is mainly muscular. There is an inside mucous membrane, then come the circular and longitudinal layers of unstriped muscle, bound together by connective tissue.

Not very infrequently the ureter is double or triple; the abnormality existing through the whole length of the canal, or, more commonly, the several branches uniting above at a distance of one or more inches from the pelvis of the kidney, to form one canal from that point on into the bladder. Occasionally there is but one ureter. Sometimes the ureter ends in a blind extremity, in which case the kidney cannot functionate, and atrophies.

The diseases of the ureter are few and unimportant, being for the most part a continuation of other disease. Chronic inflammation of the ureter extending upward from the bladder, or downward from the kidney, exists, but is hardly worthy of consideration. Pressure (by tumor or otherwise) upon any portion of the ureter causes the canal above to become enormously distended, so that it may reach the size of the thumb or even larger. This occurs markedly in extrophy of the bladder, and is sure to happen if a kidney-stone becomes lodged in the canal on its way to the bladder. Stricture may follow the injury done by a calculus in its passage, or malignant or tubercular disease may extend to the ureter from the bladder or kidney. The blood in hæmaturia may come from the ureters. The ureter may be ruptured by external violence, or severed by a wound—injuries leading often to fatal extravasation of urine.

CHAPTER XX.

DISEASES OF THE KIDNEY.

Anatomy.—Anomalies.—Injuries.—Suppression of Urine.—Nephralgia.—Phosphatic Urine.—Oxaluria.—Gravel and Kidney-Stone.—Nephritic Colic.—Pyelitis, Pyelonephritis, and Peri-nephritic Abscess.—Pyelitis, Pathological Lesions.—Causes.—Calculous Pyelitis.—Peri-nephritic Abscess.—Treatment of Pyelitis (calculous), Solvent Treatment, Nephrotomy.—Hydronephrosis.—Kidney Cysts.—Hydatids.—Tubercle.—Cancer.—Ablation of Kidney.—Syphilis of the Kidney.

The scope of this work does not warrant a description of all organic and functional kidney-diseases.[1] Only such surgical diseases are here dealt with as are most frequently encountered by the practitioner interested in genito-urinary surgery, such morbid states as are liable to be attended with, or complicated by, functional or organic bladder-disease, or such as may require instrumental interference for their relief.

Anatomy.—The kidney lies on either side in the lumbar region, high up, its upper border reaching above the last two false ribs. It has the familiar shape of the kidney-bean, is surmounted above by the suprarenal capsule, like a cocked-hat, and lies outside of the peritonæum surrounded by fat, with its hilum directed inward. The healthy adult kidney weighs from four to six ounces. It is surrounded by its own investing fibrous capsule, close inside of which lies the secreting or cortical portion of the kidney, dotted by its innumerable Malpighian bodies, and containing the convoluted uriniferous tubes; these terminating in the converging straight tubes which unite to form the pyramids, the medullary portion of the kidney. The pyramids terminate in nipple-like protuberances called papillæ, which dip into the cavity known as

[1] For such information the student is referred to text-books on urinary diseases—Roberts, Rayer, Civiale, Dickenson, Moreland, and others.

the pelvis of the kidney, each papilla surrounded by a cup-like cavity in the pelvis known as a calix. All of these calices unite to form the cavity of the pelvis of the kidney from which the ureter is given off. The two kidneys are sometimes united at their upper extremity, forming what is called the horseshoe-kidney, usually lying astraddle the spine. Sometimes there is but one kidney, in which case it is much larger than usual. Occasionally there are three or more. Instead of being fixed behind the peritonæum in the lumbar region, the kidney may be only loosely connected there, and may become displaced in the abdomen, and freely movable (floating kidney). Still more rarely the kidney is found in an abnormal position in the cavity of the bony pelvis, or elsewhere. If one kidney is absent, atrophied, or diseased, the other remaining healthy, the latter undergoes gradual conservative hypertrophy, greatly increasing in size.

CONTUSIONS AND WOUNDS.

The kidney is rarely wounded by any accident not in itself fatal. When the patient survives such an accident, more or less infiltration of the tissues by urine is sure to follow. The kidney itself inflames, causing partial or entire suppression, with blood in the urine, hot skin, high pulse, thirst, headache, pain running down to the testicle, vomiting, etc. Perhaps abscess results. Contusions are more common. The kidney may be ruptured or lacerated by a fall, by crushing violence, or by a severe blow. Such rupture may be caused where the signs of external violence are insignificant. If the anterior surface of the kidney be ruptured, the urine may escape into the peritonæum, giving rise to fatal peritonitis; if the posterior, the sub-serous tissues will be infiltrated, and chills, with high fever, will precede the formation of pus. The contusion may injure the vitality of a portion of the kidney, but not be attended by actual laceration. In such a case there would be more or less acute traumatic nephritis, terminating possibly in abscess.

The symptoms of laceration of the kidney vary in degree according to the extent of damage done. Collapse usually comes on at once with strong tendency to vomit, as in injuries of the testicle. There is pain over the injured organ, pain running down the ureter into the testicle, and in the testicle itself, retraction of the testicle; often pain across the hypogastrium, and a heavy, numb feeling in the thigh. The urine, which may require to be drawn at first through the catheter, will be usually bloody, scanty, and dense, possibly containing blood-casts of the uriniferous tubules, and frequently long, thin clots—casts of the ureter.

The prognosis, if the laceration be extensive, is almost necessarily fatal; if it be slight, the patient may survive.

Treatment consists in absolute rest, opium to quiet pain, and the use of the catheter and enemata to secure evacuation of the discharges.