The bowel is thus converted into a cloaca, and becomes quite tolerant of the urine, which can be retained for from four to six hours. Ascending infection is also uncommon. In Maydl's plan, which I followed, "a ureteral catheter is introduced into each ureter after the operation field has been cleansed as well as may be, and an elliptical section surrounding the mouths of both ureters is then cut from the bladder wall, great care being taken not to injure the ureters. Next the peritoneal cavity is opened. A convenient loop of the sigmoid flexure or rectum is selected and brought out of the abdominal wound. The ureters, with their attached portion of trigone, are then freed, a longitudinal incision is made in the wall of the gut with the necessary precautions, and into this the section of trigone is sutured. The remainder of the bladder is now stripped of its mucous membrane, and the abdominal wound closed as tightly as possible with splitting and transposition of the recti if necessary. As a final precaution, the sphincter ani is stretched and a tube inserted and left in for several days to establish drainage and minimize the danger of leakage and renal retention."

More recently Peters of Toronto recommended transplantation of the ureters into the rectum extraperitoneally, and Moynihan² recorded a case where he had transplanted the whole of the exposed posterior wall of the bladder into the rectum extraperitoneally.

The credit of devising the extraperitoneal method of anastomosis belongs, however, not to Peters but to Dr. Alfred A. Lendon of Adelaide, South Australia, who performed the operation two months before Peters. Dr. Lendon published a very interesting and exhaustive clinical lecture on Extroversion of the Bladder, in the BRITISH MEDICAL JOURNAL of April 28th, 1906, in which number also will be found an account of an operation by Lendon's method performed by Mr. H. Simpson Newland, also of Adelaide. To Australia, then, and not to Canada, belongs the credit of introducing the improvement on Maydl's operation known as "extraperitoneal uretero-proctostomy."

CASE.

Mary M., aged 6, was sent to me by Dr. Petrie-Hay, Forbes, in July, 1907.

On admission to the Royal Infirmary her condition was as follows: The posterior wall of the bladder lay in a line with the abdominal wall, and the openings of the ureters could be distinctly seen about half an inch apart. No urethra could be found, and the labia were very imperfectly developed. The urine kept almost constantly dribbling from the openings of the ureters. There was a great amount of irritation and excretion of the surrounding parts. The patient's mother stated that as the child grew older the condition seemed to affect her more, and that during the last eighteen months she had not been so active as before. On admission the patient's general condition was rather low, but she showed marked improvement under treatment, and was operated on on August 21st.

The operation was done according to the above description, but I thought it desirable to insert a small gauze drain above the pubes. For two days after the operation the patient suffered somewhat from shock, but the pulse then slowed down and her general condition markedly improved. Urine from the first escaped freely through the tube in the rectum. About a week after the operation a small quantity of urine with a faecal odour began to escape from the wound at the pubic drain, but this ceased in about a week.

About a month after the operation the chart showed a rise of temperature at night with a quickening of the pulse, but no tenderness could be detected in either kidney. Small doses of salol were given and the rectum was washed out with boric solution. The child was propped up in bed and encouraged to drink large quantities of water to flush the urinary passages. These symptoms disappeared after a time under treatment. The patient then commenced to put on flesh rapidly, and was able to walk about without discomfort.

On November 11th she was discharged from hospital, and at that time she was able to retain urine in the rectum for from three to four hours.

The patient was thus eighty-two days in hospital after operation. She could have been sent out weeks before, but I kept her in partly to be under observation and partly to show her as a somewhat rare case to the students of the clinical surgery class at the beginning of the winter session.

REFERENCES.

¹ *Annals of Surgery*, August, 1906. ² *Ibid.*, February, 1906.

DR. T. R. ST. JOHNSTON, of the Colonial Medical Service, has been appointed a Justice of the Peace for Padroga, Fiji.

PROLAPSE OF THE INVERTED BLADDER THROUGH THE URETHRA.

BY CHARLES LEEDHAM-GREEN, F.R.C.S.,

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IN May of last year, a girl, aged 18 months, was admitted to the Children's Hospital, Birmingham, under my care, on account of a small swelling which had recently appeared between the labia.

The mother stated that a similar swelling had been seen once before, when the child was a month old, but it had disappeared on being bathed with warm water. Four days before the baby was brought to the hospital the swelling had been again noticed, and, in spite of bathing, had persisted.

On examination, a soft red protrusion could be seen between the labia, about the size of a walnut, and covered with mucous membrane. On abducting the thighs, it was observed that this mucous membrane was thrown into several small longitudinal folds, which, at the neck of the swelling, were continuous with those of the urethra. The small openings of the ureters were distinctly visible on either side of the prolapse, and from them urine was intermittently ejected in a characteristic manner. The whole of the bladder was not affected by the protrusion, although it was large, for a metal sound could be passed in front of it for a short distance into the diminished cavity of the bladder. When the child cried or strained the swelling became tense and larger, and the mucous membrane of the rectum protruded at the anus (see Fig. 1).

Under an anaesthetic the prolapse was readily reduced through the dilated urethra, which was large enough to admit the little finger with ease. The protrusion of the bladder seemed to cause little or no pain. The urine was free to escape from the exposed ureters, and the urethra was so lax that the blood supply to the bladder was scarcely interfered with. The delicate mucous membrane, however, had suffered from its exposure, and several small ulcers had developed in consequence.

Apart from this special trouble nothing abnormal could be detected in the child. There was apparently no congenital defect of the bladder, urethra nor vagina. She was an unusually healthy, well-developed, breast-fed baby, without a sign of rickets or other constitutional disease. According to the mother the child had never suffered from worms, constipation or diarrhoea, and had never had any difficulty or straining when the bowels were moved or the urine evacuated. Apart from the baby's being somewhat weakly during the first month or two of its life, the mother could not suggest anything that might have predisposed to the condition. All her other five children were well and strong.

The cure was only effected after some difficulty. At first it was hoped that, if the prolapse were reduced and prevented from coming down for a few weeks, the urethral sphincter muscles would regain their tone, and the tendency to prolapse would disappear. Therefore the buttocks and thighs were simply strapped together and the urine drawn off with a catheter from time to time. As this method failed to keep up the prolapse, the vagina was packed with iodoform gauze, so as slightly to compress the urethra against the symphysis. The buttocks and thighs were fixed together as before and the child was suspended by the legs in a gallow's splint, as in the treatment of fracture of the thigh in infants. This was more successful, but failed to cure the tendency to prolapse when the child cried or strained, and after a time the vagina became irritated by the tampon, and this treatment had to be abandoned. Finally, under an anaesthetic a small amount of liquefied hard paraffin was injected into the perurethral tissue at the neck of the bladder (see Fig. 2). This measure at once proved successful. The prolapse has not been down since; the cystitis which was present rapidly cleared up, and the child when last seen, some four months after the injection, had perfect control over the bladder.

Inversion and prolapse of the bladder is a condition which has received but scanty attention at the hands of most writers on vesical troubles, whether in the male or female. Yet scattered here and there in the medical literature there are a number of instances in which the condition has been noticed. Most of the references, it is true, are unfortunately so brief and inexact as to be of little value. But there are also a few accounts of carefully observed cases. It is evident that many varieties of the condition are met with, from the mere dimpling in of a portion of the bladder wall without any prolapse of the organ, as described by Foubert and by Buttl, to the complete inversion and prolapse of all the walls of the entire bladder, as in the cases mentioned by de Haen, Malagodi, and Meckel. In the majority of cases recorded urine can still collect in the unaffected portion, though its expulsion may be prevented or hindered by the inverted part blocking the urethra.

Remembering the firm adhesions, in the female, of the base of the bladder to the anterior vaginal wall, we

should neither expect to meet with an inversion of the whole of the bladder nor a partial inversion affecting the trigonum. Yet both of these conditions have been recorded more than once. In the case treated by de Haen the bladder was completely inverted and prolapsed, so that in carrying the finger behind the symphysis pubis it found itself in a pouch outside the abdomen. Malagoli also relates a very similar case associated with rectal and uterine prolapse. Meckel reports a case of complete inversion and prolapse, the only one on record without displacement of the other pelvic organs. All these cases were found in females, in whom, indeed, prolapse of the inverted organ is alone possible. Yet there are a few instances in which the first stages of a slight inversion of the male bladder have been noticed. Foubert describes one of an old officer who for some years before his death had suffered from retention of urine, which had to be relieved by the catheter. After death it was found that the bladder was pouched in at its upper and posterior part, the point of invagination reaching to the bladder neck. Rutti also mentions a similar case in a man where the caecum occupied the pouch formed by the invagination of the bladder. Noel, Patron, Malherbe, Pousson, and others also record instances of a prolapse affecting the mucous membrane of the bladder only. It is, however, open to serious doubt whether all of these were properly described as being prolapse of the bladder. Some of the accounts rather suggest a prolapse of the dilated lower end of the ureter; but the description attached to most of them makes it almost idle to speculate as to their true nature. For the same reason it is difficult to say whether it is more common for only the mucous coat or the entire thickness of the bladder wall to be affected. It would seem as if the latter were the more common. The causes which may give rise to the condition are evidently various. In a few cases there has been a gross congenital defect of the uterus, anterior vaginal wall, or urethra, which would deprive the bladder of much of its usual support. In others, there is a history of a fall or other injury from which the patient dated the onset of the trouble. A history of straining, such as that caused by prolonged diarrhoea or vesical tenesmus, is noted

Fig. 2.—A, Site of injection of paraffin.

by others. Thomson, for instance, mentions the case of a woman, aged 40, who, during an attack of acute cystitis, suddenly experienced a violent pain on micturition. On examination he found a firm tumour, about the size of a

walnut, projecting from the orifice of the urethra. Under an anaesthetic the finger could be passed into the bladder by the side of the tumour, and its pedicle felt to be springing from the posterior wall of the bladder. The incrustation was removed and the prolapse reduced. After the reposition the wall of the bladder could be felt by the finger to be quite normal, save for the cystitis present, which rapidly subsided under rest in bed. There was no return of the prolapse, and Thomson regarded the case as an invagination brought about by the natural straining of the bladder to get rid of the incrustation, whose weight had led to the first dimpling in of the bladder wall. It is easy to see that if, in consequence of intra-abdominal pressure or other cause, an invagination of the bladder wall takes place at any point, the irregular and violent contractions of the vesical muscles, occasioned by the interference to micturition, might tend to increase the inversion more and more till it prolapsed through the urethra.

Many of the cases of prolapse have been met with in infancy, even at the time of birth, occasioned perhaps by an abnormally wide urethra; but only rarely has any grave congenital defect of the urethra or bladder been noticed.

Pousson believes that when the vesical mucous membrane is alone prolapsed it is brought about, in the first place, by a dilatation of a pre-existing mucous crypt at the neck of the bladder, which pushes the urethral mucous membrane before it until it appears at the urethral orifice (see Fig. 3). He bases this view on microscopic observation of the extirpated prolapse in cases met with by Malherbe and himself. The diagnosis of bladder prolapse may be very simple, as in the case that came under my notice, where the detection of the openings of the ureters at once revealed the true nature of the condition. Or, when the prolapse is less complete, it may easily be mistaken for a simple prolapse of the urethral mucous membrane or the extrusion of a pedunculated bladder tumour, as in that case

recorded by Crosse, where a surgeon was about to ligature the supposed tumour. But perhaps the most difficult case to diagnose is that in which there is prolapse of a dilated cystic condition of the lower end of the ureter, such as Englisch, Cohn, Fenwick, and others describe. But here the translucency of the cyst is characteristic, and a cystoscopic examination, made after returning the prolapse into the bladder, at once dispels all doubt.

Fig. 3.

From the following list, which I have drawn up from the recorded cases, it will be seen that the treatment seems seldom to have given rise to much trouble; replacement of the organ, and a pad and bandage applied to prevent the extrusion of the bladder, was sufficient in many of the cases to effect a cure. Lowe's case was more difficult, inducing him to adopt the bold procedure of repeated cauterization of the urethra—a method hardly likely to be

followed by subsequent surgeons. Where the prolapse only affects the mucous membrane, then its excision, as practised by Patron, Malherbe and Pousson, probably offers the best method of dealing with it. It also has been suggested that the prolapse should be excised, even when it involves all the coats of the bladder, save when the ureters are involved in the displacement.

1. BUMKE (*Jahrb. f. Kinderheilk.*, Bd. 29, 1889).—Female, aged 6 months. Partial prolapse of bladder. Reduced and kept up by pad and bandage. Cured.

2. CROSSE (*Trans. Provincial Med. and Surg. Assoc.*, 1846).—Female, aged 3 years. Partial prolapse showing the openings of the ureters. Cured by pad and bandage, but slight incontinence of urine persisted.

3. FOUBERT (*Schmidt's Jahrbuch*, Bd. 100, S. 225).—Male of advanced age. First stage of inversion seen at autopsy.

4. DE HAEN (Reported in *extenso* by Hoin, *Essai sur différentes hernies*, p. 342. Paris. 1768).—Female. Inversion and prolapse of the entire bladder. Vagina and rectum also prolapsed. Death from gangrene of bladder.

5. LEEDHAM-GREEN.—Female, aged 18 months. Partial prolapse of bladder showing openings of ureters. Cured by injection of hard paraffin.

6. LEVRET (*Journ. de Méd., Chir., Pharm.*, etc., 1773, xl, 269).—Female. First stage of inversion seen at autopsy.

7. LOWE (*Lancet*, 1862, vol. i, p. 250).—Female, aged 2½ years. Congenital prolapse of bladder. Cured by cauterization of the urethra, but slight incontinence of urine persisted.

8. MALAGODI (*Racoglitare Medico di F.no*, 1855).—Female. Complete inversion of bladder. Rectum also prolapsed. Death from gangrene of the bladder.

9. MALHERBE (*Ann. des Mal. Organes Génito-Urinaires*, 1884, ii, 734).—Female. Partial prolapse of mucous membrane of bladder. Cured by ligature and excision.

10. MECKEL (*Traité d'Anatomie pathologique du Lohstein*. Paris. 1829).—Female. Complete inversion of bladder. Only case unaccompanied by displacement of the other pelvic organs.

11. MURPHY (*London Medical Gazette*, vol. xl, 1833).—Female, aged 4 years. Partial prolapse, showing orifices of the ureters. No recurrence after replacement.

12. NIEHAUS (*Correspondenzbl. f. Schweiz. Aerzte*, No. 5).

13. NOEL (*Mém. de l'Acad. R. y. de Chir.* 1769. T. II, p. i).—Female. Congenital prolapse of a translucent cyst, the size of a hen's egg, filled with urine. (Probably a prolapse of a cystic ureter.—C. L. G.)

14. OLIVER (*Edin. Med. Journ.*, Bd. 22, p. 769).—Female, aged 16 months. Some congenital defect of uterus and vagina. Prolapse reduced and kept up by pad and bandage. Cured.

15. PATRON (*Archives Gén. de Méd.*, 1857).—Female. Partial prolapse of mucous membrane of bladder. (Cystic lower end of ureter (?).—C. L. G.) Ligatured and excised. Cured.

16. PEROY (in Boyer, *Traité des Maladies Chirurgicales*, 1824. T. xi, p. 86).—Female, aged 52 years. Inversion and prolapse of portion of bladder. Cured by the tying in of an elastic bougie.

17. PILGRAM (*Inaug. Dissertat.* Bonn. 1892).—Female, aged 10 months. Cared by use of vaginal tampon.

18. POUSSON (*Ann. des Mal. des Org. Génit.-Urin.* 1894. Vol. xii).—Female, aged 30 years. Partial prolapse of mucous membrane of bladder. Cured by excision.

19. RUTTI (*Schmidt's Jahrbuch*, Bd. 100, p. 225).—Male. Autopsy showed first stage of inversion.

20. SOLINGEN (*Observ. de mulier. et infant. morb. chir.* P. 741).—Female. Prolapse of vesical mucous membrane. Cared by use of bougie, as in case of Percy.

21. THOMSON (*Lancet*, 1875. P. 46).—Female, aged 40 years. Did not recur after digital replacement.

22. TIZONI (*Gazzetta medica di Lombardia*, 1855).

" SOLITARY KIDNEY," WITH THE NOTES OF A RARE CASE.

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My object in reporting this example of "solitary kidney" is to draw renewed attention to a class of case which now and again crops up, when least expected, and often ends disastrously.

Now that kidney operations are so often undertaken, these cases have been found to occur fairly frequently in the practice of any large hospital; a surgeon performs some operation (it may be only a slight one) on one kidney, which necessarily interferes with its function for the time being, and which under ordinary circumstances (the other kidney being healthy) would result favourably; but if the other kidney happens to be absent, or so diseased as to be incapable of dealing with the waste products of the body, uraemia ensues, and another of those appalling accidents which are the bugbear of every urinary surgeon has happened.

The term "solitary kidney" is widely and somewhat loosely used to denote several distinct and separate classes of case, but it has enjoyed such an extended vogue that it is useful to retain it, whilst recognizing that it includes the three following classes:

1. *Congenital absence of development of one kidney*, its vessels and the corresponding ureter. Occasionally this is associated with non-development of the genital organ on the same side of the body. In a few cases the ureter is only partially absent, the upper end being represented by a fibrous cord, whilst the lower end may even be pervious for a few centimetres and have an opening into the bladder. The kidney on the opposite side is hypertrophied, and may occupy its normal position in the loin or be displaced downwards into the pelvis or in front of the sacrum. Its ureter most frequently opens into the bladder in the normal position, but may open anywhere on the posterior wall or base. This is the rarest form of "solitary kidney," and the case which I am about to describe belongs to this class.

2. *Fusion of the two kidneys into one mass*, the simplest and most frequent form of which is the well-known "horseshoe kidney," in which two of the poles (usually the lower) are united by a bridge of kidney substance across the middle line; they vary from this to an irregular-shaped mass of kidney tissue. In this form there are never less than two ureters, which usually enter the bladder in the ordinary position; three or four ureters have been frequently met with in this type. They may unite before opening into the bladder or open separately, in which instance they usually open close together in the normal positions. I have throughout the above descriptions laid particular stress on the number and position of entrance of the ureters into the bladder, because any abnormality in either the number or position of these openings noticed during a cystoscopic examination should suggest some malformation of the kidneys, which might not otherwise have been suspected.

3. *Those cases in which one kidney is either rudimentary, degenerated, or so diseased as to be incapable of itself of carrying on the excretory needs of the body*. This class is probably that most frequently met with by surgeons, particularly in tuberculosis and nephrolithiasis, which diseases so frequently affect both kidneys at the same time, whilst the symptoms very often point to disease of one organ only, and it is not until suppression of urine follows some operation performed to relieve these one-sided symptoms that disease of the other organ is suspected.

The case which I am about to describe belongs to the first of these classes.

During the routine examination of the body of a man aged 30 years, who died from cardiac failure following chronic mitral disease, I was surprised, on feeling for the right kidney, to find that the usual site of that organ in the loin was quite empty; and, further, that on close inspection no trace of any kidney on this side was to be found, either in the pelvis or elsewhere. On dissection it was also apparent that neither the corresponding renal vessels or ureter had been developed; there was not even a pad of fat or other tissue to represent the missing organ.

THE Pan-American Medical Congress will hold its fifth meeting at Guatemala from August 6th to 10th, 1908. The work of the Congress will be distributed among twenty-one sections. English, Spanish, French, and Portuguese are the official languages of the Congress. The general secretary is Dr. José Azurdia, of the Guatemala School of Medicine.