Selected papers on stone, prostate and other urinary disorders / by Reginald Harrison.

Presented by

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PREFACE

THESE articles have for the most part appeared since the production of my work on the "Surgical Disorders of the Urinary Organs" (4th Edition, 1893), which is now out of print. In revising and bringing them up to the present date I am indebted to Mr. J. G. Pardoe, M.B., for much valuable assistance.

6, LOWER BERKELEY STREET, W.
May, 1899

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VESICAL STONE AND PROSTATIC DISORDERS.*

In bringing under attention some points connected with the surgery of the urinary organs, it is impossible to refrain from observing the important changes that have recently taken place in the operative treatment of some of the affections of these parts. Lateral lithotomy has practically disappeared from the scene, suprapubic and perineal cystotomy, more especially in their application to calculus, have undergone important modifications and been revived, the older methods of removing stone from the bladder by crushing have been supplanted by Bigelow's process of litholapaxy, and the surgery of the kidney, with the various methods this includes, now occupies a permanent and prominent position in our text-books.

The almost entire disappearance of lateral cystotomy, using this term in its more extended application to various affections and injuries of the urinary apparatus, is a turn of affairs which I venture to think cannot be viewed entirely with satisfaction.

* The Bradshaw Lecture. Royal College of Surgeons. December 1896. (In Abstract.)

By what other means yet devised, may I ask, can a surgeon by an opening from the perineum in the male secure the removal of a stone and the dependent drainage of a diseased bladder without the use of apparatus, together with the necessary infliction of a wound on the prostate which there are reasons for thinking has not unfrequently been the means of arresting its growth, if not of inducing its atrophy when enlarged? Nor can it be doubted that in certain forms of injury involving the outlet from the bladder, complicated as this sometimes is with fracture of the bones constituting the pelvic arch, as in instances of extra-peritoneal rupture of the bladder, an incision as for lateral cystotomy has frequently been the means, by at once establishing free and untrammelled drainage for the urine, of alone bringing about a successful termination to the case. On grounds such as these I should be sorry to think that the mode of performing this operation has either ceased to be taught in our schools or to be tested by our examiners.

Lateral cystotomy has to a large extent been displaced by the revival of the suprapubic or high operation on somewhat altered lines, and with this substitution I am not disposed to find fault. By this method an easy access to the bladder for the purposes of exploration and drainage not requiring a dependent opening, for the removal of growths from the interior of this viscus as well as pendulous excrescences from the prostate, is provided. In the case of small stones, both in the adult and the child, its substitution for crushing in uncomplicated cases is often unnecessary,

whilst in the instance of very large calculi, though no other course may be open, the risk to life, it must be remembered, is considerable.

LITHOLAPAXY, AND PROSPECTIVE ADVANCES.

Turning to the crushing operation for stone as now generally practised on the lines laid down by Bigelow in 1878, we shall find much connected with it of interest to discuss without encroaching upon historical and personal controversy. There can be no doubt whatever that the anticipation expressed by the author of the term "litholapaxy" as to the crushing and evacuation of stone from the bladder by an uninterrupted and completed process, with hardly any reference to its size or constitution, being followed by a largely diminished mortality, has been more than realised. I may perhaps be excused in referring to the pleasure it afforded me in being present at the Massachusetts General Hospital in 1878, and witnessing some of the cases which formed the earliest portion of the important series that Bigelow subsequently published* in illustration of his work. It would not be right in thus alluding to the much diminished mortality that has followed successive improvements in the crushing operation for stone, to omit to acknowledge the great impetus given to this direction of work by Civiale and Guyon in France and by Sir Henry Thompson in this country. By the latter the Museum of this College has been greatly enriched by his gift of a collection of calculi

* "Litholapaxy." W. Wood and Co. New York, 1878.

which is unique in its extent and clinical history, whilst our library and literature have largely profited by his pen.

It would be an interesting study, and one not without prospect of promoting further developments in treatment, to trace, if occasion permitted, the various advances that have been made in the construction of the mechanical appliances used in crushing and evacuating stone in the bladder. I am disposed to think, however, that the more general application of chemistry and physics—including such investigations as Rainey's on Molecular Coalescence relative to the Formation of Calculi—to all forms and positions of urine stones will eventually lead to further improvements in practice.

These latter describe the mode in which calculi are built up in the human species by an exact and unvarying process which is capable of being imitated in the laboratory. Or, as Rainey observes, "there seems to be no reason why this explanation of the formation of these urinary calculi by molecular coalescence should not be regarded as the correct one." Thus may we hope eventually to learn to interpose conditions artificially, which, being at variance in some way with a precise and regular formative act, necessarily render the completion of a stone-producing process abortive. In the more methodical study, in relation to their control, of the forces which make cohesion of certain natural products of the body possible or impossible, further advances may be hoped for.

SOME CAUSES OF STONE RECURRENCE.

The general experience of crushing operations as now practised under the name of "litholapaxy" seems to indicate that the liability to recurrence increases considerably as age advances. Recurrences before sixty years of age are rare, and are usually traceable to some exceptional circumstance, such as urethral stricture, or to obstruction attended with pouching or trabeculation of the bladder; hence we may conclude that hypertrophy of the prostate and the structural complications arising out of this in conjunction with atony or imperfect powers of urine expulsion are frequent concomitants in by far the larger proportion of stone relapses after lithotrity. This is the view which finds general acceptance.

This explanation only applies to instances of recurrence in which the calculus is mainly phosphatic and of vesical origin, in contradistinction to those in which a fresh descent from the kidney takes place, and arrest and growth in the bladder ensue. Cases are occasionally met with in which the operation of crushing is followed within a few days by an attack of renal colic. Here a diathetic stone is either spontaneously expelled in the course of micturition or, being too large to get over the bar caused by an enlarged prostate, requires pulverising with the lithotrite before its evacuation can be effected. In cases where persons have been in the habit of passing renal calculi for years it is frequently found when the prostatic age is reached that the ureters, no doubt much dilated by previous attacks,

allow stones of considerable size to descend into the bladder comparatively painlessly, which are subsequently trapped by the enlarged prostate. Otherwise they might, as previously, have been spontaneously voided.

Recalling, however, the ordinary circumstances under which stone recurrences after lithotrity most frequently occur we are brought to consider, not the necessity for imposing other restrictions upon the employment of an operation by which so much has been achieved at so small a risk to life, but how far progressive surgery permits us to remove or mitigate complications in structural defects which provide mechanical difficulties, sometimes insuperable, in the way of a complete evacuation of the fragments, and which subsequently furnish favourable conditions for repeating the process of stone-making when once a nucleus is there.

SHRINKAGE OF ENLARGED PROSTATE.

We may therefore proceed to inquire—(1) as to the means we have, if any, of diminishing the enlarged prostate; (2) as to the extent they are applicable to cases complicated with recurring vesical stone; and (3) the alternatives for litholapaxy under circumstances of this nature. If the question were put to a student under examination, What surgical measures have been followed by atrophy or shrinkage of the hypertrophied prostate? I think he would be justified in replying somewhat in this way. It has followed cases of simple incision into

the prostatic ring as in the second stage of lateral lithotomy. It has supervened upon puncture of the bladder through the enlarged prostate with retention of the cannula for some weeks, as I have elsewhere recorded.* Shrinkage of the enlarged prostate has followed upon double and single castration and upon double and single vasectomy or division of the vas deferens. This answer would of course not be regarded as including cases of partial or complete removal of the prostate gland now known under the name of prostatectomies.

The second question which necessarily arises out of the preceding statement—namely, as to how far these several methods of inducing shrinkage or inactivity are applicable to cases of hypertrophied prostate complicated with recurring vesical stone—is not so easily or so briefly answered. Prostatic incision, or puncture as first referred to, apart from the limited nature of the observations where atrophy seems to have followed them, would hardly be applicable in cases otherwise suited for lithotrity. I will, therefore, pass on to notice the adoption of castration and vasectomy in respect to the object now under review.

CASTRATION FOR ENLARGED PROSTATE.

Reference to the latter proceedings opens up a subject which so far as it relates to the practice of surgery is new, though from an anatomical and

* "Surgical Disorders of the Urinary Organs," fourth edition, p. 276.

physiological aspect it has previously received some attention which must not be entirely overlooked. John Hunter* appears to have experimented on animals in reference to this point, and more recently Griffiths† has added importantly to these researches. Decimus Hodgson‡ of Glasgow wrote in 1856 : "In persons who have been castrated the prostate dwindles down almost to a rudimentary condition."

The inference, however, that what is true relative to the normal state of these parts also applies in varying degrees to the hypertrophied prostate does not appear to have been utilised systematically for practical purposes until Dr. William White,§ of Philadelphia, drew attention to it. Since this paper appeared the operation of castration and other proceedings arising out of the same train of thought relative to the enlarged prostate have been somewhat extensively employed.

From the records of this operation, now amounting to several hundred cases, we may conclude that in a considerable proportion of cases much improvement followed; that the mortality and liability to brain failure were not inconsiderable; and as Dr. Cabot points out, relative to the selection of cases, that castration seems especially efficacious in examples of large tense prostates when the obstruction

* Works edited by Palmer.

† *Journal of Anatomy and Physiology*, vols. xxiii. and xxiv.

‡ "On the Prostate Gland." Churchill, 1856.

§ *Transactions of the American Surgical Association*, 1893 and 1895. Dr. Ramm of Tromso also published an early case in support of Dr. White's proposal. *Nord. Med. Arkiv.* Aug. 1895.

is due to the pressure of the lateral lobes upon the urethra and is of but little use in myomatous and fibrous glands.

I have hitherto been addressing myself more particularly to the application of castration to prostatic hypertrophy generally. Scattered, however, through the cases which have been recorded are some few where it has been utilised for recurrence of stone after crushing operations with advantage, where this complication was prominent. I cannot quote a case of my own in illustration, not having had occasion to resort to it under these circumstances, but I am acquainted with one where it well served this purpose.

It was that of a male seventy years of age who had stone recurrence after lithotrity on three occasions at intervals of a year or so. On the fourth time of relapse the urine and bladder were in so foul a state from cystitis and great enlargement of the prostate that a suprapubic cystotomy was performed by means of which a phosphatic stone was again removed and the bladder drained for some time. The patient, however, was intolerant of all the methods that were tried with the object of keeping the wound open by various drainage appliances, and eventually it closed before the latter process was completed. This was followed by a speedy return of all the symptoms of cystitis and the commencing formation of more phosphates. To meet this condition the bladder was again cleared by the lithotrite and the aspirator and double castration was performed. The relief was complete and permanent, as the patient has been free of his stone and his symptoms for over two years and has no need either of his catheter or his irrigator.

It is under circumstances such as these that castration may occasionally find a place in the treatment of recurring stone complicated with enlarge-

ment of the prostate. In selecting it, however, apart from other considerations, the surgeon must be reasonably clear in his opinion that the case is not one either of encysted or pouched stone; otherwise, as castration affords no opportunity of making either a digital or ocular examination of the interior of the bladder, a suprapubic prostatectomy would, in the face of these complications, be preferable.

VASECTOMY FOR ENLARGED PROSTATE.

After reading Dr. White's paper, I took an opportunity of stating a case* where I had casually, though at the urgent desire of a patient, divided the vasa some years previously (under somewhat exceptional circumstances which I narrated) with good results continuing over a considerable period of time. Further, I drew attention, in connection with the subject of injuries to the vas deferens, to certain cases recorded by Hilton and Birkett† where atrophy of the corresponding testis was proved to have followed the accidental division of this tube either by section or laceration. My contention was that if division of a vas brought about atrophy of the corresponding testis it was logical to conclude that the remote effect on the prostate would be the same as if the testis had been actually removed. That is to say, the division of one vas would occasion unilateral atrophy, first of the testis and afterwards of half of the prostate. Whereas if both vasa were divided

* *Brit. Med. Journ.* Sept. 23, 1893.

† Holmes's "System of Surgery," first edition, vol. ii. p. 739.

both testes and the whole of the prostate should subsequently undergo shrinkage. I think I may claim that this has now been demonstrated.

It will be seen that in bringing about prostatic atrophy or inactivity by section of the ducts, it is through the medium of a double process, or, rather, by the induction of an atrophy by an atrophy. Hence the effects of vasectomy upon the prostate are longer delayed and more gradual than when the testes are primarily removed.

CARCINOMA OF PROSTATE.

If the consideration and discussion of these two operations relative to prostatic hypertrophy does no more than lead us to reconsider many points connected with the pathology of this part, much will have been accomplished. I have long thought that slowly progressive carcinoma of the prostate, resembling in some features the more ordinary forms of hypertrophy, is far more common than is generally believed to be the case. My attention was first called to this matter in 1886, when I recorded a case* which I will briefly refer to.

It was that of a man aged fifty-nine years who as a private patient I had the opportunity of watching for two years up to the time of his death. In the first instance he suffered from some irritability of the bladder, which he could not completely empty. He was losing flesh, becoming pale, and though the mental faculties remained vigorous to the last he constantly complained of pain in the loins, nates, and thighs. In the course of a few

* *Op. cit.* p. 509.

weeks he became entirely dependent upon the catheter. His prostate as felt from the rectum was hard, nodular, and almost insensitive to the touch, though it was not much enlarged nor were any neighbouring glands found to be involved. As his general health slowly declined minute petechial spots appeared on various parts of his body and his feebleness gradually increased. Occasionally he passed a small quantity of blood with his urine. He appeared to die from exhaustion, the result of prolonged blood vitiation. After death his prostate was examined by Mr. F. T. Paul, who reported it to be an unmistakable example of carcinoma, remarking at the time that the precise nature of the disease would probably have been undiscovered had it not been carefully looked for, as there was but little to distinguish the specimen from ordinary hypertrophy. There was no evidence to show that this was other than the primary disease.

I have since met with several instances of this kind in practice, and have been able occasionally to confirm the diagnosis by pathological examination.

Clinically this group of slowly progressive carcinomata may be distinguished by the following indications. In the first place they are generally met with in persons who are rather under what I would speak of as the prostatic age—that is to say, they chiefly occur in males of fifty-five or thereabouts. When felt from the rectum the gland, or a part of it, is found unusually hard, bossy, and rather insensitive to the touch. They seldom bleed much or ulcerate unless damaged by a catheter or sound. Though the use of the former is generally required more or less constantly before the case terminates, there is seldom either sudden or complete retention, or even distension of the bladder. Reflected pain in various parts such as the thighs, nates, and rectum

is often complained of, in addition to much painful irritability of the bladder. Death is usually caused by blood vitiation and exhaustion, with well-marked signs of what we used to speak of as a cachexia.

UNSUITABLE CASES FOR VASECTOMY.

I have referred to fibrous and carcinomatous prostates for the purpose of remarking that for such growths as these neither castration nor vasectomy is at all likely to be of any avail. Together they represent a by no means uncommon condition of this part, and their treatment must be conducted on the principles which are applicable generally to growths involving the interior and neck of the bladder. In going over the recorded cases of castration and vasectomy it is not difficult, in reading between the lines, to see that amongst them are included instances of the two conditions to which I have just referred, and where experience shows that no good was likely to accrue from what was done. These we must endeavour to exclude, and then I think we shall find that division of the vasa deferentia will be found a fairly reliable means for relieving advanced forms of prostatic hypertrophy without incurring the additional risks, not to mention other drawbacks, which naturally attend such an operation as castration. I have in some instances employed division of the vasa in recurring stone with cystitis due to much enlargement of the prostate with great and I believe permanent advantage.

It will be understood that the operative expedients

I have drawn attention to as worthy of consideration are only applicable to grave varieties of prostatic disease, whether complicating vesical stone or not. When we recognise how considerable a proportion of well-matured brains carry on long and useful lives with advantage to those belonging to them as well as to the community at large, and who are more or less dependent upon the aid a catheter affords, it is unnecessary to say that such measures as those I have been discussing can only apply in any degree to the exceptions and not to the rules. The latter are already, I believe, adequately provided for, whilst in the interests of the former all proved methods, either of cure or relief, must receive, as they always have done, our careful and unbiased consideration.

PERINEAL LITHOTRITY.

As an alternative proceeding in some cases of vesical stone where, by reason of a diseased condition of the parts, litholapaxy was not applicable, it appeared that there was much in Dolbeau's * method of perineal lithotrity to recommend it. The objections against it chiefly centred in the employment of forcible dilatation of the prostatic urethra and the neck of the bladder, and in the instruments used in crushing and evacuating the stone fragments. Further, no provision appears to have been made by Dolbeau for draining the bladder systematically after the stone had thus been withdrawn.

* "De la Lithotritie Perineale." Paris, 1872.

These objections, however, seemed capable of removal, and I proceeded to practise this operation from time to time, as suitable cases presented, in the following manner. In the first place, an ordinary *boutonnière*, or median perineal cystotomy, is practised on a grooved staff sufficient to admit the introduction of the finger into the bladder as for digital exploration. This represents all the dilatation of the prostate or neck of the bladder that is attempted. The next step is to withdraw the index finger and substitute a pair of crushing forceps specially made for this purpose, though in other respects resembling an ordinary pair of lithotomy forceps, either straight or curved. These have been constructed for me by Messrs. Krohne and Sesemann. They are made in different sizes, the most powerful having a screw at the handle by which the full crushing power is brought into play. In circumference the combined blades correspond in size with an average index finger, and contain, well within cover, a strong cutting rib running down the centre of each, by which the fragmentation of the stone or stones is chiefly accomplished. By means of these forceps the stone is sufficiently reduced in size as to be either easily withdrawn in fragments from the bladder by these instruments, or to be sluiced out with a cannula and an ordinary wash-bottle as used for litholapaxy. Straight cannulæ such as these will be found the most convenient for this purpose. After the stone has been withdrawn and the bladder and prostate carefully examined either with the sound or the finger, the drainage-tube is introduced

and retained for as long as necessary in accordance with the nature of the case.

In a recent paper by Mr. Herbert Milton of Cairo * I see that the operation of perineal lithotrity figures prominently and successfully amongst the two hundred cases of stone he records. He has employed it much on the same lines as I have described in twenty-one instances with one death. Though speaking of Bigelow's operation as the more brilliant of the two, he evidently has reason to regard perineal lithotrity as now revived as the more generally useful. Taking Mr. Milton's twenty-one cases and fifteen of my own, we have a total of thirty-six with one death, which, considering the size of many of the stones and the complications that were present, gives, I think, a very satisfactory result, and one that will compare favourably with other operations, either crushing or cutting, used in the treatment of stone. I have a growing impression that in districts where by reason of the great age that is often attained by persons suffering from stone in the bladder, and where the opportunities for practising litholapaxy are not very frequent, perineal lithotrity will be more generally utilised.

LITHOLAPAXY IN CHILDREN.

Before leaving subjects connected with the treatment of vesical stone by crushing, I would briefly allude to a change in practice for the better which is a direct outcome of much excellent work in the

* The *Lancet*, April 18 and May 2, 1896.

application of this operation to male children. I refer to the successful employment of litholapaxy in this direction by Dr. Keegan—work which has been importantly supplemented by my colleague, Mr. Freyer.

Sudden retention of urine in young males is most frequently caused, as we are all aware, by the impaction of a small stone in the urethra. Such an incident, apart from the extreme urgency of the symptoms thus produced, has not unfrequently led to ulceration of the urethra and serious, if not fatal, extravasation of urine into the neighbouring tissues. In fact, it may be stated, with hardly an exception, that it is under these circumstances alone such a calamity is met with in these young subjects. In earlier days, when the catheter detected that a stone was thus impacted, the practice universally was either to cut down and remove the calculus from the position it occupied in the urethra, or if possible to push it back into the bladder, and then to extract it by some form of lithotomy or cutting operation. Though either proceeding was usually successful, it entailed an operation which necessarily required a period of convalescence to follow. Amongst some of my earliest lithotomies in male children were cases occurring under these circumstances. In illustration of the importance of this change in practice I may be permitted to mention, briefly, the particulars of a recent case.

It was that of a boy aged four years whom I saw with urgent retention of urine due to the lodgment of a stone in the urethra just behind the scrotum. I pushed the stone back into the

bladder and the retention was at once relieved. On the following morning the child was placed under an anæsthetic and the stone crushed. The débris was discharged in the natural course of micturition and the patient was practically well without any delay, as the urine was never even tinged with blood. Sir William Roberts was kind enough to examine the fragments of the calculus, and reported that it consisted of uric acid with a coating of oxalates and weighed a little over fifteen grains. A short time ago the patient would undoubtedly have been submitted to a more serious operation.

I may incidentally mention that I reported * a similar case where I practised lithotrity in a male child aged eleven years in 1881, and have since from time to time successfully adopted this proceeding. I believe this was one of the first recorded examples in so young a subject, a circumstance I was reminded of by Dr. Keegan. Some small lithotrites were then made for me by Messrs. Weiss. I have not met with an instance of recurrence of stone after litholapaxy in children.

THE ROENTGEN RAYS IN CALCULOUS DISORDERS.

In bringing these observations to a conclusion I will briefly refer to the application of the Roentgen or X-rays to this branch of surgery. To what extent this means may be utilised in matters which have occupied a considerable portion of this lecture has yet to be more fully demonstrated. In its application to the diagnosis of calculus situated within any portion of the male or female urinary apparatus, it has not hitherto been found sufficiently reliable.

* *Op. cit.*

In thus noticing this method of investigation it is with the hope that in its further development and application it will, amongst other aids, enable us to dispense with the use of the sound as a means for detecting stone in the bladder.

How few surgeons, in whatever degree they may be engaged in work of this kind, can feel that the skilful employment of the steel sound is an absolute guarantee against the possibility of a stone escaping their vigilance. When we look at the shape the diseased bladder and prostate often assume, it is astonishing that this somewhat primitive mode of examination so rarely fails us; but it is in just this particular class of cases that we rely upon it most, and as to which our disappointment is the keenest if it falls short of our expectation, whatever the explanation may be.

No more desirable object in connection with the practical use of these rays can be wished for than their adaptation to determining the presence, position, and constitution of the various stony concretions that have their habitat in the human urinary organs.

A FURTHER CONTRIBUTION TO THE SURGERY OF STONE IN THE BLADDER.

TABULAR STATEMENT OF CASES OF PRIMARY STONE IN THE BLADDER TREATED BY LITHOLAPAXY (1890–97).

No.	Age.	Days under treatment.	Stone.		Result.	Condition of		
			Composition.	Weight.		Bladder.	Prostate.	Urine.
				Gr.				
1	63	19	Uric, phosphatic.	15	Good.	Pouched.	Large.	Alkaline.
2	61	28	Phosphatic.	150	,,	,,	,,	Ammoniacal.
3	59	10	,,	120	,,	,,	,,	,,
4	79	19	,,	53	,,	Cystitis.	,,	,,
5	64	18	Uric.	80	,,	Normal.	Normal.	Normal.
6	65	20	Uric, phosphatic.	86	,,	Cystitis.	Large.	Ammoniacal.
7	74	10	Phosphatic.	130	,,	Pouched.	,,	Alkaline.
8	68	7	Uric, phosphatic.	65	,,	,,	,,	,,
9	57	5	Uric.	16	,,	Normal.	,,	Normal.
10	64	8	Phosphatic.	64	,,	,,	,,	Ammoniacal.
11	55	6	Uric.	55	,,	,,	Normal.	Normal.
12	56	10	,,	12	,,	,,	,,	,,
13	60	28	Phosphatic.	30	Death	Pouched.	Large.	Ammoniacal.
14	60	15	,,	600	Good.	,,	,,	,,
15	71	18	Uric, phosphatic.	200	,,	,,	,,	,,
16	61	6	Phosphatic.	180	,,	,,	,,	Purulent.
17	20	8	Uric.	60	,,	Normal.	Normal.	Sanguineous.
18	66	7	,,	150	,,	Pouched.	Large.	Normal.
19	53	6	Uric, oxalate.	120	,,	Normal.	Normal.	,,
20	56	8	Uric.	86	,,	,,	,,	,,
21	75	12	,,	120	,,	,,	Large.	,,
22	68	18	Phosphatic.	84	,,	,,	,,	Purulent.
23	31	30	,,	74	,,	,,	Normal.	Alkaline.
24	64	11	Uric, phosphatic.	189	,,	,,	Large.	Purulent.
25	69	7	Phosphatic.	24	,,	Pouched.	,,	Ammoniacal.
26	43	7	,,	26	,,	,,	Normal.	,,
27	41	16	Uric, phosphatic.	34	,,	Normal.	,,	,,
28	45	9	Oxalate.	8	,,	,,	,,	,,
29	64	9	Uric.	65	,,	,,	Large.	Albuminous.

30	67	5	Phosphatic.	25	,,	Pouched.	,,	Ammoniacal.
31	70	6	,,	30	,,	,,	,,	Sanguineous.
32	72	6	Uric, phosphatic.	100	Death.	,,	,,	Ammoniacal.
33	46	8	Oxalate.	30	Good.	,,	,,	Purulent.
34	66	14	Phosphatic.	240	,,	,,	,,	Normal.
35	69	16	Uric.	228	,,	Normal.	,,	Purulent.
36	39	8	Oxalate, phosphatic.	31	,,	,,	Normal.	Normal.
37	76	14	Phosphatic.	65	,,	Pouched.	Large.	Ammoniacal.
38	58	8	Uric, phosphatic.	120	,,	,,	Normal.	Normal.
39	54	9	Uric.	69	,,	Normal.	,,	,,
40	61	7	,,	68	,,	Pouched.	Large.	,,
41	65	15	,,	180	,,	Normal.	,,	,,
42	65	7	,,	190	,,	Pouched.	,,	,,
43	67	7	Phosphatic.	20	,,	Normal.	Normal.	Ammoniacal.
44	72	3	,,	89	,,	Pouched.	Large.	,,
45	64	12	Uric.	182	,,	Normal.	Normal.	Albuminous.
46	69	9	,,	130	,,	,,	Large.	Normal,
47	74	15	Phosphatic.	20	,,	Cystitis.	,,	Ammoniacal.
48	73	14	Uric.	80	,,	Pouched.	,,	Alkaline.
49	64	10	,,	40	,,	Normal.	,,	Normal.
50	68	18	,,	182	,,	,,	,,	,,
51	65	7	,,	80	,,	Pouched.	,,	Ammoniacal.
52	64	6	Oxalate.	13	,,	Normal.	,,	Normal.
53	62	10	Uric.	120	,,	,,	Normal.	,,
54	62	13	Phosphatic.	95	,,	Cystitis.	Large.	Ammoniacal.
55	47	6	,,	80	,,	,,	Normal.	,,
56	73	4	Uric, phosphatic.	80	,,	Pouched.	Large.	,,
57	69	7	Uric.	125	,,	,,	,,	Purulent.
58	62	22	,,	91	,,	Normal.	Normal.	Albuminous.
59	66	14	Uric, phosphatic.	143	,,	Pouched.	Large.	Purulent.
60	74	6	Phosphatic.	335	,,	,,	,,	,,
61	60	13	Uric, phosphatic.	76	,,	Normal.	,,	Normal.
62	64	3	Uric.	12	,,	,,	,,	,,
63	65	10	Phosphatic.	240	,,	Cystitis.	,,	Ammoniacal.
64	75	12	Uric	1200	,,	Normal.	,,	Purulent.
65	62	17	,,	91	,,	,,	,,	Albuminous.
66	73	23	,,	100	,,	Pouched.	Large.	Albuminous.
67	71	14	Uric, phosphatic.	600	,,	Normal.	,,	Alkaline.
68	25	10	,,	18	,,	,,	Normal.	Normal.

TABULAR STATEMENT OF CASES OF PRIMARY STONE IN THE BLADDER TREATED BY LITHOLAPAXY (1890–97)—(*Continued*).

No.	Age.	Days under treatment.	Stone.		Result.	Condition of		
			Composition.	Weight.		Bladder.	Prostate.	Urine.
				Gr.				
69	56	14	Oxalate.	240	Good.	Normal.	Normal.	Purulent.
70	54	18	Phosphatic.	120	,,	Pouched.	,,	,,
71	59	10	,,	336	,,	,,	Large.	,,
72	74	2	Uric, oxalate.	120	,,	,,	,,	,,
73	4	1	,,	15	,,	Normal.	Normal.	Highly acid.
74	67	16	Uric.	240	,,	Contracted.	,,	Normal.
75	70	6	,,	90	,,	Pouched.	,,	Purulent.
76	61	8	Uric, phosphatic.	15	,,	Normal.	,,	Normal.
77	35	9	Phosphatic.	33	,,	,,	,,	Purulent.
78	52	17	Oxalate.	416	,,	,,	,,	Oxaluria.
79	38	20	Phosphatic.	57	,,	Phosphatic.	*Nil.*	Alkaline.
80	54	17	,,	65	,,	Cystitis.	Large.	Ammoniacal.
81	45	10	Oxalate.	279	,,	Contracted.	Normal.	Normal.
82	64	10	Oxalate, phosphatic.	150	,,	Cystitis.	Large.	Alkaline.
83	30	7	Uric.	76	,,	Normal.	Normal.	Normal.
84	56	7	Phosphatic.	320	,,	Cystitis.	,,	Alkaline.
85	67	9	Uric, phosphatic.	120	,,	Pouched.	Large.	Purulent.
86	60	4	Phosphatic.	30	,,	,,	Normal.	,,
87	72	6	Uric.	120	,,	,,	Large.	Normal.
88	62	10	Uric, phosphatic.	244	Death	,,	,,	Ammoniacal.
89	84	10	Phosphatic.	23	Good.	,,	,,	,,
90	56	5	Uric	180	,,	Normal.	Normal.	Normal.
91	74	6	Uric, phosphatic.	11	,,	Pouched.	Large.	Ammoniacal.
92	76	29	,,	975	Death.	,,	,,	,,
93	69	13	Uric.	385	Good.	Normal.	,,	Albuminous.
94	65	11	Phosphatic.	20	,,	Pouched.	,,	Purulent.
95	69	15	,,	21	,,	Normal.	,,	Normal.
96	5	18	Cystin.	150	,,	,,	Normal.	Purulent.
97	60	8	Uric.	191	,,	Pouched.	Large.	,,

98	66	9	Phosphatic.	26	,,	,,	,,	Ammoniacal.
99	75	17	,,	34	,,	,,	,,	,,
100	34	9	Uric.	10	,,	Normal.	,,	Normal.
101	31	8	Oxalate.	15	,,	,,	,,	,,
			Cases treated by Perineal Lithotrity (1890–97).					
102	49	19	Uric, phosphatic.	430	Good.	Contracted.	Normal.	Ammoniacal.
103	52	31	,,	1446	,,	Cystitis.	Spastic.	,,
104	56	56	,,	480	,,	,,	Normal.	,,
			Cases treated by Suprapubic Lithotomy (1890–97).					
105	56	55	Uric.	308	Good.	Normal.	Normal.	Puro-sanguineous.
106	35	32	,,	900	,,	,,	,,	Sanguineous.
			Cases treated by Median Lithotomy and Drainage (1890–97).					
107	44	20	Phosphatic.	24	Good.	Cystitis.	Normal.	Ammoniacal.
108	41	61	,,	85	,,	Pouched.	,,	Purulent.
109	25	23	,,	23	,,	Normal.	,,	,,
110	55	30	,,	18	,,	Pouched.	,,	Ammoniacal.

REMARKS.

Case 6: Operation repeated 13 months afterwards; death. Case 9: Prostate subsided after removal of stone. Case 12: Urethral stricture dilated. Case 13: Advanced kidney disease. Case 14: Pouch seen with cystoscope. Case 16: Diabetic. Case 17: Suprapubic cystotomy a year subsequently; recovery. Case 18: Double vasectomy subsequently for enlarged prostate; good result. Case 23: Urethral stricture treated by dilatation. Case 26: Urethral stricture. Case 32: A suppurating saccule and pelvic cellulitis caused death. Case 33: Stone sacculated in prostate pushed back and crushed; shrinkage of prostate; recurrence due to fresh descent from kidney. Case 48: Paralysed. Case 54: Tight stricture: (1) internal urethrotomy and (2) litholapaxy. Case 55: Internal urethrotomy for stricture 13 months previously; nucleus of stone a bougie of ol. theobrom. Case 56: Single vasectomy for enlarged prostate on recurrence. Case 60: Double vasectomy for enlarged prostate. Case 66: Very small and contracted bladder with a pouch; double vasectomy. Case 69: Pelvis much distorted by old spinal caries. Case 70: Chronic stricture of urethra; litholapaxy repeated 15 months after; death; suppurative nephritis. Case 71: Double vasectomy for large prostate. Case 73: Impacted stone causing retention; pushed back and crushed. Case 74: Suffered much from chronic bronchitic asthma. Case 78: Complicated with large hydrocele. Case 79: Mucous membrane encrusted with phosphates. Case 81: Incontinence of urine for 3 years previously and constantly wearing a urinal; power of bladder completely restored after operation. Case 84: Chronic urethral stricture. Case 88: Complicated with old stricture and suppurative nephritis. Case 92: Much relieved by operation; death from senile decay; urine specific gravity 1008. Case 94. Double vasectomy for enlarged prostate. Case 100: Prostatic stone pushed into bladder and crushed; shrinkage of prostate. Case 101: Stone seen with cystoscope in orifice of left ureter. Case 102: Lithotrity attempted, but perineal lithotrity substituted. Case 104: Chronic urethral stricture; pyelitis; division of stricture. Case 106: A villous growth was also suspected, but not discovered. Case 110: A stricture necessitated division and drainage.

NOTE.—All the cases were those of male patients except No. 79, which occurred in a female.

A FURTHER CONTRIBUTION TO THE SURGERY OF STONE IN THE BLADDER.

From time to time I have passed under notice* and compared with my own experience various processes which have in recent years been employed in the treatment of stone in the bladder, and have endeavoured to illustrate their applicability to individual cases in practice. The record of additional cases which forms part of this paper will enable me to offer some further remarks on various points still open to consideration. The patients here referred to have all been operated upon by me either in hospital or private practice during the interval of 1890–97, and include every instance thus dealt with during this period. It will be convenient to divide my subject-matter into three parts: (1) a tabulated record of all my operations during the period referred to, with special reference to litholapaxy as the procedure now generally adopted; (2) observations relative to the prevention and treatment of

* "Observations on Lithotomy, Lithotrity, and the Early Detection of Stone in the Bladder" (Churchill, 1883). "Surgical Disorders of the Urinary Organs" (fourth edition, Churchill, 1893). "Diseases of the Bladder in Twentieth Century Practice of Medicine" (Wood and Co., New York, vol. i. 1895).

recurring stone; and (3) some remarks on certain operations for stone in the bladder which may be regarded as supplementary to litholapaxy.

I.—A TABULATED RECORD OF OPERATIONS DURING THE PERIOD 1890-97, WITH SPECIAL REFERENCE TO LITHOLAPAXY AS THE PROCEDURE NOW GENERALLY ADOPTED.

To proceed with my first division, it will be seen on reference to the table of cases (p. 22) that it comprises 101 litholapaxies, 3 perineal lithotrities by my method, 2 suprapubic lithotomies, and 4 median lithotomies, making a total of 110 persons operated upon.

LITHOLAPAXY.—Since 1878, when I was in Boston and spent some time with Bigelow watching his earlier operations by this process, which he was then developing, I have continued to practise it, using with but slight modifications the appliances which I showed for the first time in England at the annual meeting of the British Medical Association in 1878* on my return from the United States. No more striking testimony to the completeness of Bigelow's work could be found than the fact that the instruments of his day, after a lapse of over twenty years, have undergone no important change. It is rare to find an invention so perfect in its initiation as this in all its details. On reference to the table of cases it will be seen that 6 of the 101 litholapaxies terminated fatally. (1) A man, aged sixty-five years (No. 6), who was operated upon

* *Brit. Med. Journ.* vol. ii. 1878.

successfully on the first occasion, died on the third day after the repeated operation, which was performed thirteen months subsequently. The kidneys were extensively involved in suppurative nephritis. The stone was a phosphatic one, weighing close upon 2 oz. The repetition of the operation had clearly been delayed too long. (2) A man, aged sixty years (No. 13), died on the twenty-eighth day after operation from chronic suppurative nephritis and syncope. (3) A man, aged seventy-two years (No. 32), died on the sixth day after operation from pelvic cellulitis, probably due to suppuration within a vesical sac or pouch. (4) A man, aged fifty-four years (No. 70), who was operated upon successfully on the first occasion, died after a similar operation repeated fifteen months subsequently from suppurative nephritis caused by a chronic urethral stricture, which had gradually contracted. Had on the second occasion a perineal lithotrity, with division of the stricture and drainage of the bladder and ureters, been practised, he would have had a better chance of recovery. The patient derived so much relief from the first operation that he wished it repeated on precisely the same lines. (5) A man, aged sixty-two years (No. 88), died on the tenth day after operation from extensive suppurative nephritis consequent on a urethral stricture of some years' standing. He was much exhausted from many weeks' travelling under painful circumstances. (6) The remaining fatal case was that of a man, aged seventy-six years (No. 92). He died on the twenty-ninth day, after what promised to be a very successful

operation. A large urate stone was crushed and evacuated, the dried fragments of which weighed 975 gr. The prostate was much enlarged. The calculus had previously caused him great pain, and the operation afforded complete relief from this. He died from senile decay. Of the 101 different persons included in the table, and who were submitted to litholapaxy, 23 were known to have one or more recurrences, for which I treated them on subsequent occasions. One man (No. 17), I heard, had a second stone successfully removed by another surgeon by a suprapubic cystotomy about twelve months after my operation. In these 23 persons who had recurrence of stone after crushing I repeated litholapaxy once in 13 of them, twice in 2, thrice in 1, four times in 1, five times in 1, six times in 1, nine times in 2, and ten times in 2, making a total of 174 litholapaxies in 101 individuals, with six deaths, as previously detailed. In several of the repeated operations the proceeding resolved itself into occasionally removing from the bladder calculous concretions with the aid of the lithotrite and aspirator, much on the same principle as the dentist removes tartar which has collected about the irregularities of the teeth. These occurred for the most part in elderly men with atonic bladders, who were more or less dependent on their catheters, and possessed but little power of voluntary expulsion. To submit these cases to a cutting operation for the purpose of removing the concretions and draining the bladder could not be recommended, as during the intervals, sometimes extending over many months, they

enjoyed fair, and even active, health. For instance, in case No. 1 the patient, whom I first operated upon early in 1890, and upon whom I have repeated the operation nine times, is alive and well, and though not in robust health leads as comfortable a life as most people do at seventy-one years of age who are dependent upon the catheter. No. 3, operated on in 1890, followed by two recurrences at about three months' interval each, has had no recurrence since 1891, and is now again leading an active professional life. No. 4 had the operation repeated six times, but has had no recurrence since 1893. No. 44 has had nine recurrences. He is in excellent health, though he has recently had another operation after a previous two years' interval. I have since divided both his vasa, and I think it likely that he will be no further troubled either with stone or prostatic symptoms. These cases were all unfitted for any other procedure. In none of them have the patients hitherto shown any signs of kidney complication.

As in records by other surgeons which have been recently published, the mortality connected with all these proceedings has been reduced to so small a percentage as to assimilate them in this respect to those which we are accustomed to speak of as minor or non-fatal operations. The period of convalescence has also been considerably lessened. In both of these important respects there has been generally a remarkable diminution during the last twenty-five years of the present century.

The stones noted in the table both as to composi-

tion and weight include all the commoner varieties of calculi and one cystin (No. 96). The collected and dry fragments of the 101 primary litholapaxies were found to weigh 13,413 gr., or an average weight of over 2 dr. removed from each patient. The largest calculus in this litholapaxy series was a urate (No. 64) which weighed 1200 gr. In the 73 operations undertaken for recurring calculi the fragments removed varied from about 20 gr. in weight to over 2 oz. These calculi were for the most part phosphatic. The youngest patient operated upon (No. 73) was a boy four years of age. A urate calculus weighing about 15 gr., which had caused several acute attacks of retention of urine, was pushed back into the bladder, and then crushed and evacuated. He was well and about on the following day. In the same way a cystin calculus was removed from a boy five years of age (No. 96).

A urethral stricture complicated several of the cases of litholapaxy (Nos. 12, 23, 26, 54, 55, 70, 84, and 88). Urethral stricture, as several of these cases show, offers no obstacle in the way of litholapaxy provided the kidneys are fairly sound and have not commenced to suppurate. When the latter has taken place litholapaxy can only be undertaken with a considerable degree of risk. This complication proved fatal in cases No. 70 and No. 88. Where stricture is of that degree of tightness or of previous duration as to render suppurative nephritis imminent or actual, perineal lithotrity, with division of the stricture and subsequent drainage, is far safer. Case No. 104 of the series is another illustration of

this. This patient had been treated for stricture for over a year before I sounded him and found a large stone in addition. Litholapaxy would probably have been fatal in not providing drainage for the suppurating bladder, ureters, and kidneys. Perineal lithotrity was selected, and since the operation, over four years ago, he has enjoyed excellent health, and has had no recurrence either of stone or of stricture. In two of the cases (No. 33 and No. 100) the stone was embedded within the area of the prostatic urethra. In one instance it was seen with the cystoscope. With a sound aided by my finger in the rectum in both cases the stone was freed, pushed back into the bladder, and crushed.

In looking over the table of cases which accompanies this paper it will not be difficult to recognise that prostatic hypertrophy and the conditions associated with it most frequently co-exist with stone recurrence. I shall therefore pass on to the second part of my paper, and proceed to offer some observations relative to the prevention and treatment of vesical stone when met with under these circumstances.

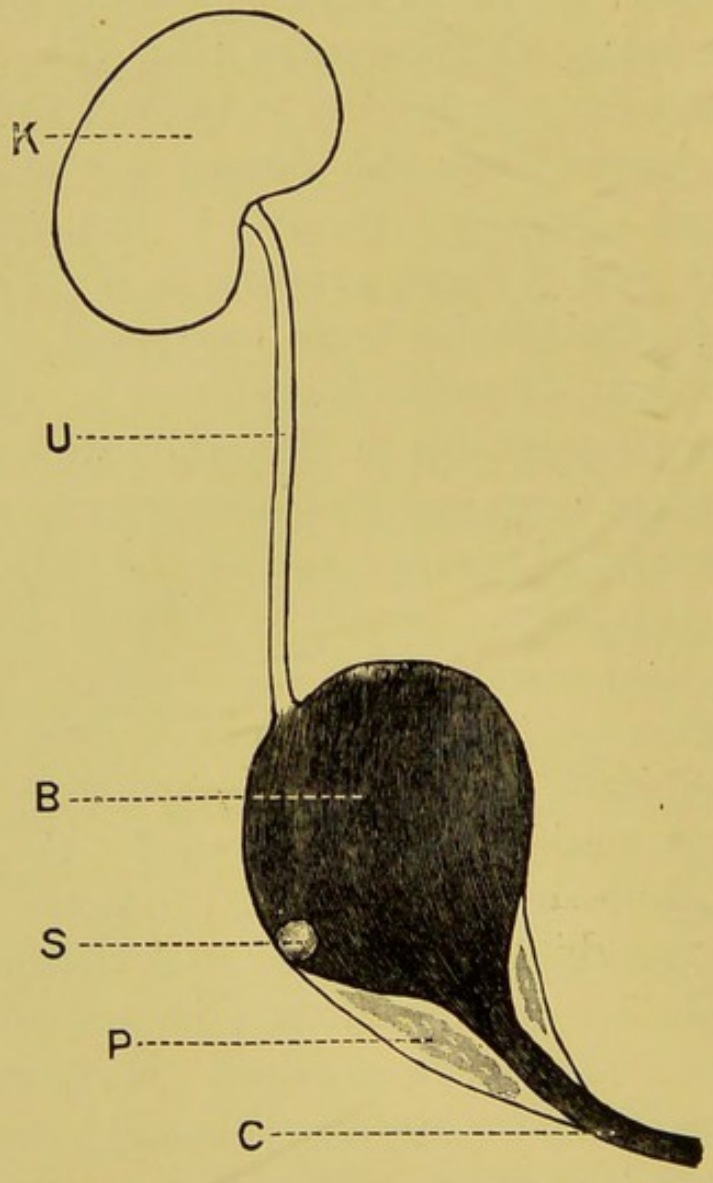
II.—OBSERVATIONS RELATIVE TO THE PREVENTION AND TREATMENT OF STONE RECURRING AFTER OPERATION.

It is only in connection with the surgical treatment of stone in the bladder when complicated with prostatic enlargement and the vesical conditions associated with this, that it becomes necessary to offer any special remarks in reference to stone recur-

rences after operation. Litholapaxy or crushing when practised on the child or the young adult under normal structural conditions is so rarely followed by the re-formation of stone as hardly to require notice. It happened only once in this series under the latter circumstances (No. 17), and this was probably due not directly to bladder causes, but to a fresh descent from the kidney, as also occurred in a second instance (No. 33). The remaining recurrences and a large proportion of the entire number of litholapaxies were associated with this particular form of urinary obstruction. There is nothing very remarkable in this when we remember that, excluding three or four young persons about or below puberty, the average age of the patients was over sixty-two years. Nor is it difficult to understand why this should be. The enlarged prostate not only often renders the act of complete micturition mechanically difficult and impossible, but it furnishes favourable local conditions for the growth of stones which, having descended from the kidney, are thus detained there. Under such circumstances the male bladder may not inaptly be regarded as a bedding-out ground for renal calculi. Many instances in this series served to illustrate this, and to show how gravel and calculi (Figs. 1, 2), which were formerly expelled naturally ceased to be so as soon as the prostatic age had been reached. And what applies to kidney calculi and concreted crystals is equally true of other foreign bodies which a chronically inflamed bladder is apt to contain. That an incomplete removal of the débris after a crushing operation

may be responsible for some recurrences there can be no doubt, but not, I believe, to the same extent as some are disposed to consider. A red urate or a

FIG. 1.

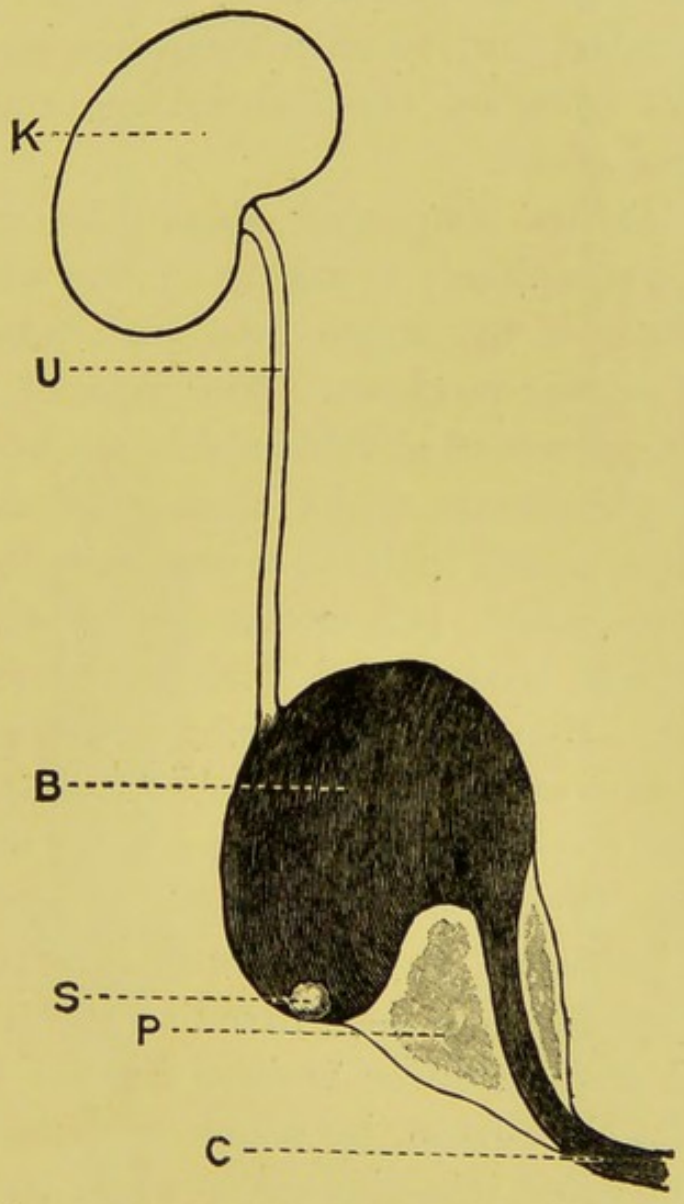


Showing descent of stone through normal bladder and prostatic urethra. K, kidney; U, ureter; B, bladder; S, stone; P, prostate; C, urethra.

black oxalate stone is sometimes supplanted by a pure white phosphate. More than one recurring calculus which I have removed had a fixed origin on the rough cicatrix of a previous suprapubic cysto-

tomy; two were formed on centres furnished by the remains of silk sutures employed in the latter operations, and others undoubtedly have had their origin

FIG. 2.



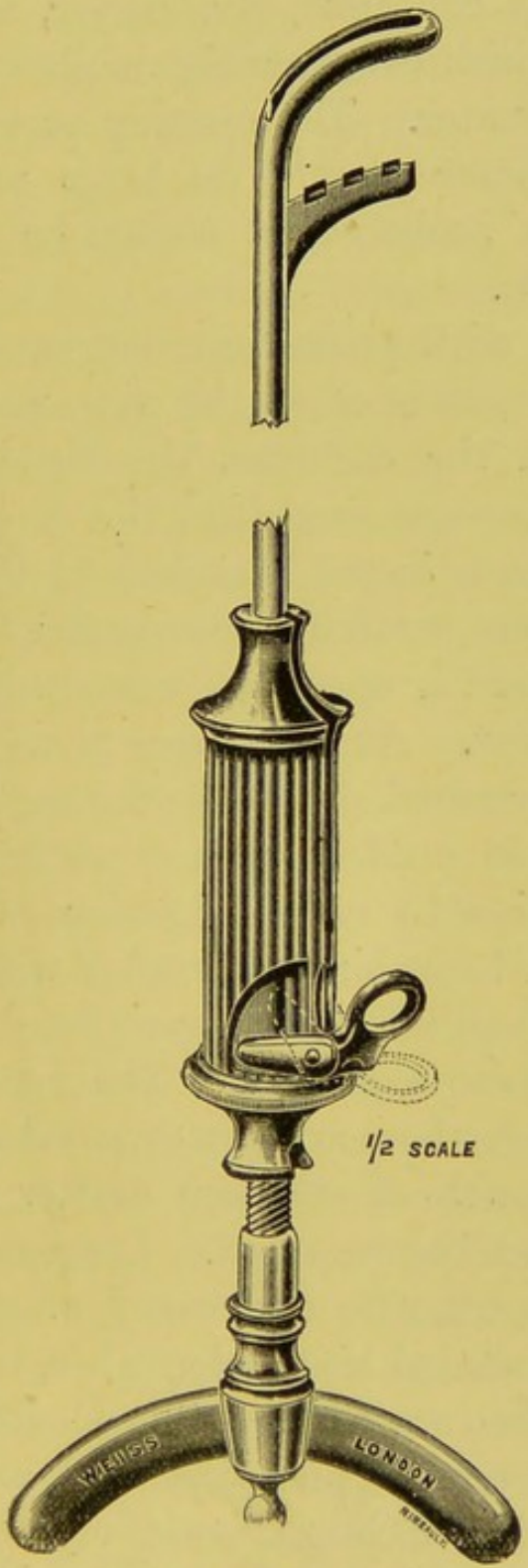
Showing Stone trapped by enlarged prostate in pouched bladder. K, kidney; U, ureter; B, bladder; S, stone; P, prostate; C, urethra.

on nuclei provided by shreds and sloughs from an inflamed bladder. Further, the sacs and pouches of bladders distorted in this way by prostatic obstruction furnish hiding places for débris which are

almost inaccessible. In view of such obstacles, and to prevent recurrence taking place, much importance must be attached to the thorough clearance of the bladder in the first instance, to the subsequent management of the case after it has left the hands of the operator, and to such measures as have for their object bringing about shrinking or atrophy of the enlarged gland.

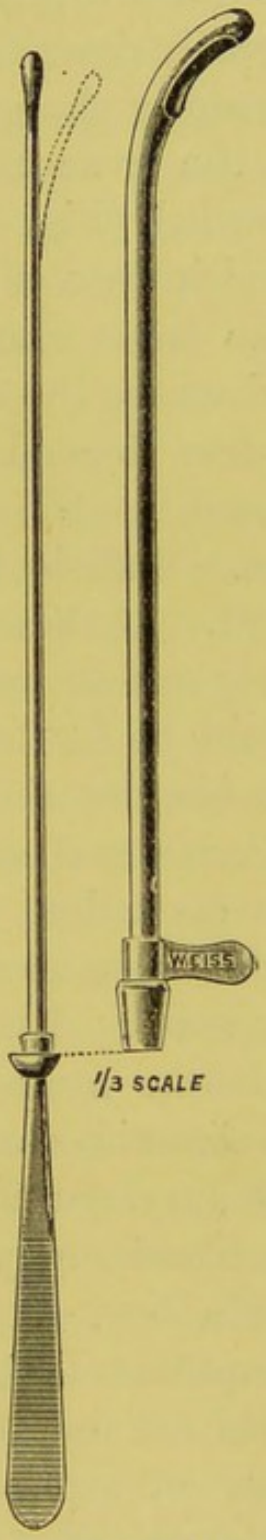
The lithotrites employed should be capable of rapidly and completely breaking up the stone without pounding it too much into such masses as a pestle and mortar produces. The jaws of the lithotrite whilst protected should be able to cut up stones such as the phosphates, which, though soft and friable, are apt when mixed with the mucus from the bladder to run into tough pultaceous pieces which may readily be left behind and form nuclei for further concretions. Hence the powerful fenestrated lithotrites are, as a rule, to be preferred. For use with large stones the lithotrite last made for me (Fig. 3) by Messrs. Weiss and Son has proved a most admirable pattern. It will be seen that to save the hand a cross-bar has been fitted to it instead of a wheel and a short lever worked by the thumb, in place of the old button, by which the sliding movement is converted into the screw when the stone is seized. It must, however, not be forgotten that the former adaptation greatly increases the power which can be brought to bear upon the instrument. A cautious operator will, consequently, be chary how he utilises his maximum force. Nor must the aspirators and catheters used for withdrawing the

FIG. 3.



The lithotrite.

FIG. 4.



The aspirating catheter and stylet.

broken fragments from the bladder be less efficient. In this series of cases I have continued to use Mr. Morgan's aspirator. My colleague, Mr. Freyer, has recently described one which is extremely simple and is readily charged with water. The opening or eye in the evacuating catheter should be large and bevelled (Fig. 4) and a probe stylet should be at hand in case of impaction.

In cases complicated with prostatic enlargement and where the patient is, as is often the case, more or less dependent upon the catheter, the bladder should be attended to for some time after the operation. Sufficient importance is not attached to this point. If these cases were carefully looked after for three or four months after the operation, recurrences would be far less frequent. At least once a week the bladder should be washed out with the metal catheter and aspirator, as used in connection with the operation, in addition to such irrigation and catheterism as the patient can himself employ when necessary. I have also had some large-eyed flexible catheters made to fit these aspirators. The latter are sometimes useful where there are sacs or pouches. The aggregation and growth of calculous matter in the bladder may thus often be prevented. I recently saw a boy, aged four years, who had many of the symptoms of stone. I sounded him under ether, but could not find one. I then washed out his bladder with an aspirator catheter as just described and removed quite a quantity of large urate crystals with much relief to the patient. It was, as Mr. Braine remarked at the time, "a good stone spoilt."

Free crystals remaining in the bladder are not an infrequent cause of various irritations and reflexes in young subjects.

The effect of silver nitrate as a local application in cases of chronic cystitis with prostatic enlargement where there is a tendency to produce phosphatic concretion is well known. I remember a case some years ago which bears importantly upon this practice. It was that of an elderly man who, when suffering from residual urine, broke a gum-elastic catheter whilst passing it, and left several inches of it in his bladder. His general condition was such that no immediate steps could be taken to remove it, and it was therefore advised that the bladder should be washed out twice a day with a weak solution of silver nitrate. This was done, and ten days afterwards the patient allowed me to extract the broken portion entire with a smooth-bladed lithotrite. What struck me on doing so as remarkable was that neither on the piece of catheter nor within the bladder was there any sign of phosphatic concretion. I presume that the action of the nitrate, as with other salts which may be artificially introduced into the bladder, prevented molecular coalescence taking place, as the urine was alkaline and offensive during the ten days the catheter remained in the bladder.

In the third place, my series of cases furnishes examples (Nos. 18, 56, 60, 66, 71, and 94) where vasectomy was employed with the view of bringing about shrinkage of the prostate. It appeared to do good in all these instances—(1) in rendering access to and from the bladder easier both as to micturition

and the use of catheters, and (2) in getting rid of that slimy mucus, not unlike birdlime, which clings so tenaciously to the bottom of vessels in which it is allowed to settle. Vasectomy was resorted to under these circumstances in instances where, in addition to the recurrence of the stone, serious symptoms of prostatic obstruction existed. The stone having been removed in the usual way by the lithotrite and aspirator, one vas was resected in the way described in the succeeding lecture, and seven days afterwards the remaining one was treated in the same manner, about an inch of each tube being taken away. The small wound usually heals under a collodion dressing in forty-eight hours.

I have never had occasion to resort to castration in connection with my stone operations, as I think that a trial should first be made of vasectomy before so serious an operation is proceeded with. I have, however, recorded one instance in my Bradshaw lecture (where I have discussed this subject at some length), in which I know excellent results followed castration in a case of recurring stone with urgent and increasing symptoms of prostatic obstruction. In the instances of vasectomy just referred to no recurrence of stone has yet occurred to my knowledge, and there has been a general improvement in the symptoms connected with the enlarged gland which co-existed. I think a further experience and a still more extended period of observation will warrant me in concluding that the diminishing number of recurrences in this series was due not entirely to any additional pains taken in the first instance in

the removal of the stone, but partly also to the use for some time after of the evacuating catheter and wash-bottle and to the employment of vasectomy on recurrence, in suitable cases, where there was much prostatic enlargement, which practices I have more recently adopted. I will now proceed to the third and concluding portion of my subject.

III.—SOME OPERATIONS WHICH MAY BE REGARDED AS ALTERNATIVES OF LITHOLAPAXY.

In the last nine cases of stone in the bladder arranged in this series (No. 102 to No. 110) it was thought necessary to employ some form of incision to facilitate the removal of the calculus, either entire or by first breaking it. The selection of one or other of these proceedings had reference mainly to conditions or complications outside the mere presence of a stone, as in no instance was the latter itself deemed to be beyond the reach of litholapaxy. In every case recovery was complete and, so far as I know, permanent. The average age of these nine individuals was about forty-six years, whilst in the previous series of litholapaxies the average was about sixty-two years. In three of these cases perineal lithotrity, on the lines I have elsewhere described, was selected; in two suprapubic lithotomy or the high operation was practised; whilst in the remaining four the *boutonnière* or median operation was employed as providing for the extraction of the stone and the subsequent drainage of the bladder, the latter being the main consideration.

A few words will be devoted to noting the special advantages connected with the several proceedings and their application to some of the cases selected.

PERINEAL LITHOTRITY.—The chief reason for selecting this mode of dealing with the stone in the three patients (No. 102 to No. 104) may be very briefly stated. It was essentially a mechanical one, having reference in the first instance to an extremely contracted and thickened bladder, where after trial it was found impossible to use the lithotrite with safety in such a limited area ; in the second instance to an unusually rigid or fibrous prostate which rendered the introduction of the short curved lithotrite exceptionally difficult ; and in the third instance to a very strictured urethra. The patient in the third case had previously undergone an internal urethrotomy and two divulsions by Holt's method by other surgeons, and the canal was structurally unfitted for the instruments used in crushing operations. Further, as will be readily understood, suppurative nephritis was impending if not already in existence. The patient made a good recovery. In these three cases, in addition to the special features I have mentioned, the stones were large and hard, weighing respectively 430 gr., 1446 gr., and 480 gr. One of the patients (No. 103) who was submitted to perineal lithotrity in 1893 nine months afterwards had an attack of cystitis which threatened to become chronic. As this would probably have led to a recurrence of stone, I opened and drained the bladder from the perineum for ten days. This speedily cured the

cystitis. I hear that the patient continues to have excellent health and has had no return of the stone. In a previous series of cases, in two instances, I drained the bladder by a median perineal puncture and drainage-tube, where some weeks after lithotrity the urine remained purulent and chronic cystitis continued. In both of these the independent drainage, apart from and subsequently to the removal of the stone, acted beneficially and certainly appeared to complete the cure. In neither of these patients did recurrence take place, though before the drainage was employed it looked as if this was most likely to happen.

The chief points in favour of the selection of perineal lithotrity appear to be these : (1) it enables the operator to crush and evacuate large stones in a short space of time ; (2) it is attended with a very small risk to life as compared with other operations, such as lateral or suprapubic lithotomy, and is well adapted to old and feeble subjects when for any reason crushing is inadmissible ; (3) it permits the operator to wash out the bladder and any pouches connected with it more effectually than by the urethra, as the route is shorter and the evacuating catheters employed are of much larger calibre ; (4) the surgeon can usually ascertain, either by exploration with the finger or by the introduction of forceps into the bladder, that the viscus is cleared of all débris ; (5) it enables the surgeon to deal with certain forms of prostatic outgrowth and obstruction complicated with atony of the bladder in such a way as to secure not only the removal of stone,

but the restoration of the function of micturition; and (6) by the subsequent introduction and temporary retention of a soft rubber drainage-tube states of cystitis due to the retention of urine in pouches and depressions in the bladder wall are either entirely cured or are permanently improved. To lock up unhealthy ammoniacal urine after a lithotrity in a bladder which cannot properly empty itself is to court the formation or recurrence of a phosphatic stone. Hence it is well suited to some cases of recurrent calculus. I have never known the wound to remain unhealed except in those instances where for some reason or other it has been desired to construct a low-level urethra.

Suprapubic Lithotomy.—This was successfully practised in two instances (No. 105 and No. 106). In both, from the pain and the frequency and duration of the hæmorrhage, growth was also suspected but not discovered. The bleeding was so free and was so readily excited that the cystoscope afforded no assistance, and I thought it better to remove the stones in such a way as to enable me to directly explore the interior of the bladder. No cause for the bleeding other than the calculus was discovered. It is seldom that the latter occasions so much hæmorrhage. The stones weighed respectively 308 gr. and 900 gr.

I am not much in favour of this method in removing large calculi from elderly males. In younger persons it is much safer, and there is less objection to it. The mortality is considerable, as shown by Guyon, in males over fifty years of age. The

cicatrix which is left in the bladder sometimes greatly interferes with complete micturition, and in two instances a rough scar was shown on exploration as forming a holding-ground for phosphatic concretion. In one of these instances the internal scar has been excised with advantage.

Median Perineal Lithotomy with Bladder Drainage.—In four instances (No. 107 to No. 110) this simple operation was practised for the removal of small stones which were incidental to chronically inflamed and suppurating bladders. The bladder was subsequently drained for varying periods on the same principle as is sometimes utilised in the case of chronic abscesses, a satisfactory result being obtained in every instance.

Nitrous oxide gas and ether were the anæsthetics usually employed throughout the whole series of operations, and nothing occurred to make me alter the favourable opinion I have expressed as to this method of producing insensibility. In elderly and debilitated persons with weak hearts the stimulating effect of the ether in improving the circulation was often most marked; nor were any casualties noted in connection either with the instruments used or the parts operated upon. No serious hæmorrhage was encountered where incisions were necessary, and after the litholapaxies it was rare to find the urine more than tinged with blood forty-eight hours after the operation. Any cystitis which was present at the time of operation usually rapidly subsided after the removal of the stone, and no trouble with elevations in temperature, rigors, or fever complicated recovery.

As to sounding for stone I would repeat what I have often said. I much prefer that the stone should be removed where this is practicable on the occasion when it is first detected by the sound and the diagnosis is made. This practice predominated in this series, as the more I see of stone in the bladder the more I recognise the utility of this precaution, particularly in the case of elderly males. Where the prostate is large stones grow up like mushrooms in the pouch-like space between it and the back of the bladder, and make, as it were, nests for themselves. Where there are two or three they often become fitted to each other like tesselated tiles, and if this arrangement is accidentally and suddenly disturbed most acute cystitis is apt to follow. Most of us know how much discomfort a displaced piece of tartar will cause in the mouth until it is completely removed. Even when they are delicately and lightly touched with the sound the stones may get out of gear with their bed, and if urine finds its way underneath them to some unaccustomed spot an acute cystitis may be aroused in the interval between the detection of the stone with the sound and its removal by the lithotrite. In one patient (No. 41) this actually happened and made a simple operation a serious one, as I had to crush and remove the stone seven days after sounding in the presence of a most acute inflammation which otherwise, I am sure, would have proved fatal. He had, as I anticipated, a recurrence, and I removed a small phosphatic stone eight months afterwards (in March 1894). He has since enjoyed

excellent health and has had no recurrence. The process of sounding, however skilfully performed, is certainly not an agreeable one, and is best accomplished under an anæsthetic. Fewer stones would escape detection, and consequently be sooner removed, if this was a more general practice. The cystoscope has in several instances been of much service in clearing up doubtful points: for example, in determining the presence and position of pouches or sacs and whether urine derived certain changes observable in it from either, and from which, kidney or from sources below these organs. In one case of encysted calculus (No. 100) not only was the stone seen but its removal was facilitated by exact knowledge as to its location. In another case (No. 101) the cystoscope clearly showed the impaction of a stone in the orifice of one of the ureters.

In conclusion, this series of cases may serve to illustrate—(1) conditions under which the surgical treatment of stone in the bladder, in the adult male particularly, has to be undertaken, at all events in this country; and (2) various operations which may be selected for its cure or relief. Of course, the relative proportions of the latter to each other will vary in some degree, and it is only reasonable that this should be expected. I well remember some years ago, when "lithotomy *versus* lithotrity" was a burning question, being present as a junior at a consultation where, after the diagnosis of stone in the bladder had been made, the operating surgeon in charge asked the opinion of his senior colleague,

a man possessed of much common sense and surgical experience, as to whether crushing the stone or cutting should be practised. "Whichever you can do best," was the prompt but somewhat curt reply. Lithotomy was selected, and the patient made an excellent recovery. I doubt if at that time crushing had been resorted to whether the case would have terminated equally well. Where the pathological conditions were so equally balanced I do not think a better answer could have been given.

THE TREATMENT OF PROSTATIC OBSTRUCTION, WITH SPECIAL REFERENCE TO VASECTOMY.*

From much evidence it may be concluded, first, that castration and vasectomy have been demonstrated as exercising an influence for good in cases of disordered function associated with hypertrophy of the prostate. Secondly, that differences in results following these operations are probably explainable by the variable conditions in form, structure, or complication which the enlargement presents; and, thirdly, that such differences indicate that no uniform practice is likely to be forthcoming, and that each case must, so to speak, be dealt with on its own merits.

I do not think that any one following the several communications on this subject, or having any practical experience of castration or vasectomy can question the correctness of the first conclusion in numerous instances which have occurred. I say numerous, as in a proportion of the cases the results

* Read before the East London and South Essex District, Metropolitan Counties Branch, British Medical Association, Nov. 17, 1898.

apparently failed to accomplish what was desired. Notwithstanding this, some of the latter have been so satisfactory—I may say so remarkable—as to lead to a belief that such methods may be advantageously utilised. Many of the cases so treated have now been under observation for sufficiently long periods of time as to enable us to form an opinion as to the permanency of the changes which have followed.

The general acceptance of this deduction leads up to the consideration of the conclusion relative to variable results being due to structural differences.

In any museum possessing sufficient specimens of this affection we shall have no difficulty in recognising many varieties of it in form and structural composition, excluding, of course, all new growths, such as those described in an earlier paper.* In one instance the prostatic enlargement assumes the shape of a pendulous excrescence with a grape-like pedicle, which invades the interior of the bladder; in another there are a number of these outgrowths resembling vegetations; in a third the gland presents a uniform increase and a horse-shoe disposition of the lobes is observed; whilst in a further variety the proportion between muscle and gland is so altered and the tissues so degenerated as to reduce the latter either in part or in whole to a mass not unlike a uterine fibroid.

The third deduction, that such differences necessitate corresponding varieties in treatment, hardly

* *Trans. Royal Med. and Chir. Society*, vol. lxv.

requires comment. It has been remarked, and possibly with a degree of truth, that this part has to some extent been a victim to fashion. The influence exercised by the demonstration of a successful operation in instances where routine treatments have failed in removing pain may no doubt have led to a somewhat indiscriminate adoption of the procedure in question.

We not unfrequently meet with patients, old men, who at some time in their lives have undergone an operation for extraordinary troubles arising out of prostatic obstruction. Amongst the latter I can recall examples of suprapubic and perineal prostatectomy, perineal prostatotomy, cystotomy, and various forms of bladder drainage, and more recently castration and vasectomy. In the majority of these the patients have expressed their obligations for what was then done, as well as to those by whom it was done. On the other hand, we meet with instances when either little or no good followed. Now, I would ask, was it fashion or failure in discriminating the respective applicability of these various operations to different structural conditions that was chiefly responsible for these mixed results? I confess I think that the latter is the case. It seems just as unreasonable to suppose that we shall eventually find a uniform method of treating obstructing prostates as to imagine a similar state of things in the case of a hernia whether strangulated or not. A surgical panacea for all kinds and degrees of enlarged prostate is hardly likely to be forthcoming.

The necessity for adopting more radical measures

in cases of retention and irritable bladder arising out of prostatic obstruction is not infrequently due to the early want of antiseptic precautions. There are many difficulties in the way of a practical application of the latter in connection with a long-continuing use of the catheter, but though we may fail in giving effect to them they are none the less to be aimed at. It is distressing to see, as we sometimes do, the want of even common cleanliness in the use of these instruments.

In some instances of enormous distension arising in connection with chronic prostatic enlargement, it may be incidentally mentioned that it has been found a good plan to draw off the urine by degrees suprapubically with a fine cannula and Dieulefoy's aspirator, without attempting catheterism until the dimensions of the bladder have been reduced, and then substituting the catheter. What is known as catheter fever, or, in other words, septic infection, may thus be warded off under circumstances where it is not unlikely to occur. The greater safety of the trocar here is probably due to the absence of any interference with the obstructing prostate and deep urethra, in the first instance, when tension is high and the possibility of difficulty with the catheter greater.

It should not be forgotten that a considerable number of persons attain great ages and yet carry about with them with little or no inconvenience very large prostates. It is an accident—a chill or a prolonged retention of urine—that not infrequently temporarily incapacitates the bladder of such

an individual, and causes a degree of distension as to require the catheter, which should be selected and used with due regard to antiseptic precautions.

If the distension is extreme and the urine normal, the practice is a sound one not to remove the whole contents of the bladder on the first occasion, but to reduce the quantity by instalments each time the catheter is required, so as to allow the over-stretched walls to gradually contract. Old bladders do not recover from the effects of distension so quickly as young ones. If, on the other hand, the urine is found decomposed at the first catheterism, or subsequently becomes so, it is obvious that the whole of it should be withdrawn on the earliest occasion and the bladder washed out and sterilised.

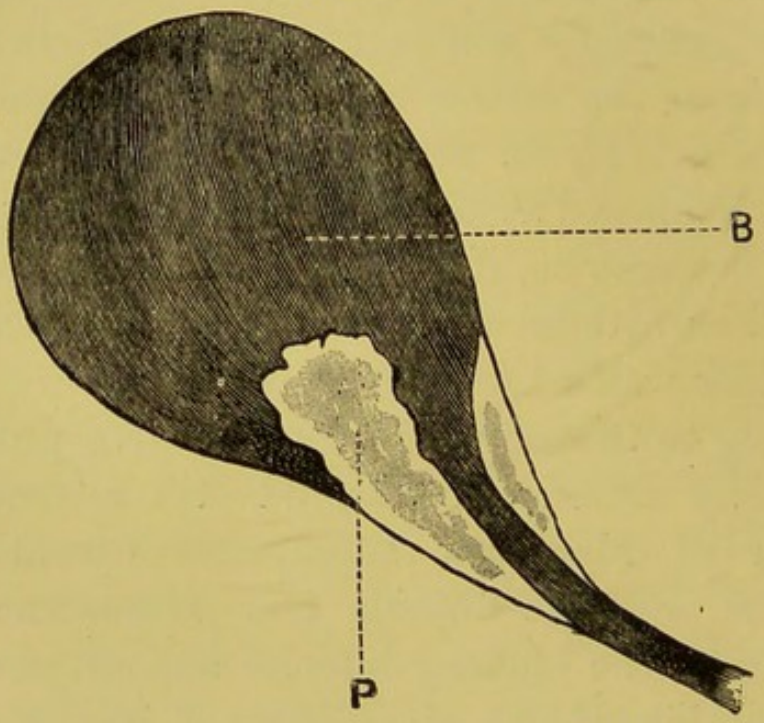
Turning to the more strictly operative procedures occasionally called for, I would still advocate the adoption of MacGill's suprapubic operation for pendulous prostatic fibroids and excrescences encroaching on the bladder interior and often causing more irritation than a stone (Figs. 5, 6). For these varieties it has proved both safe and efficient.

Though recognising that some good results have followed castration, it is an operation I have never regarded with much favour in prostatic obstruction. The mortality following it is not inconsiderable, and what is almost worse, is the mental failure and weakness that often detracts from any advantage the urinary organs may reap from it.

I prefer vasectomy, or rather resection of the vasa, in advanced forms of prostatic obstruction, when other measures, such as medication and the

use of the catheter, are futile in affording adequate relief. Whether this succeeds or not, there is no risk to life or to intellect, if I may judge from my experience of it during the last five years, both in hospital and private, and if it does not answer there is nothing to prevent castration being subsequently

FIG. 5.



Illustrating Prostatic Outgrowth. B, bladder; P, Pendulous Prostate.

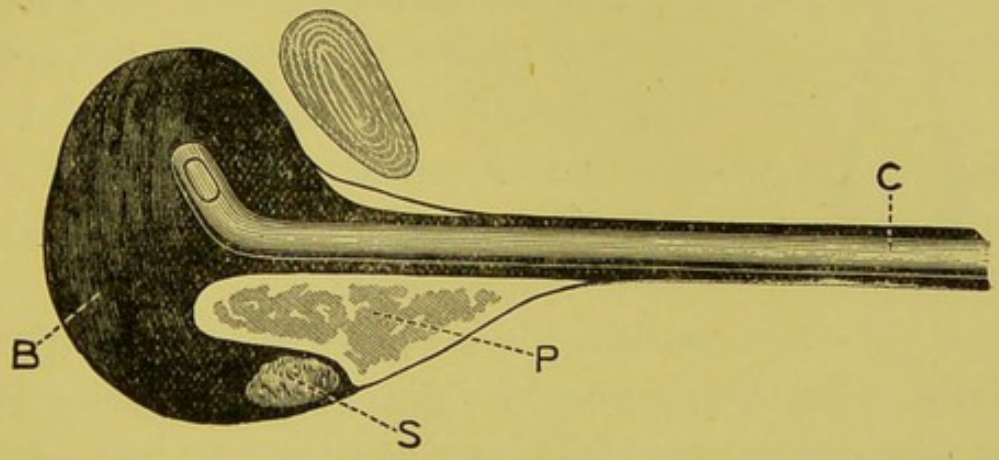
performed. If vasectomy fail, the latter is not likely to do otherwise.

So far as the effects on the prostate are concerned, they are slower in their development after vasectomy than after castration. In some instances, where both vasa were divided, it was several months before the full amount of relief was obtained, though improvement usually commences within a week. To the gradual manner in which

the changes are brought about the safety of this operation is much due.

There is but little to add to the description generally given of resecting a portion of the vas. The small tube can usually be felt and rendered subcutaneous in the upper portion of the scrotum by the fingers of an assistant, the hair being

FIG. 6.

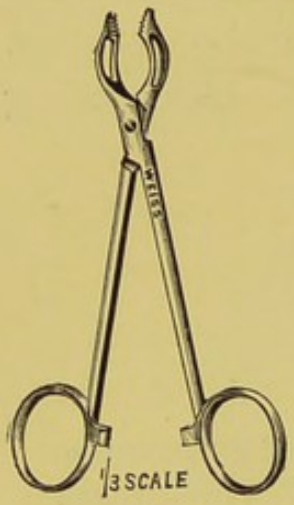


Illustrating Prostatic Outgrowth, or Tongue (hypertrophic), drawn from case treated by suprapubic cystotomy (*Harrison*). B, bladder; C, evacuating catheter; P, prostatic outgrowth; S, stone fragment imprisoned behind prostatic tongue by pressure of metal catheter.

previously removed and the part prepared antiseptically. A linear incision an inch in length is then made over the line of the duct, which readily exposes it. The latter is seized with a pair of Morant Baker's artery-clamp forceps and withdrawn through the wound (Fig. 7). It may require cleaning from all surrounding tissue and vessels of the spermatic cord with a few touches of a scalpel. The base of the loop is ligatured and the free portion removed by curved scissors. The stump of the vas is slipped back into the scrotum and the

incision closed with one or two fine sutures. A collodion dressing on gauze is applied, and healing usually takes place in forty-eight hours. Occasionally, where the scrotum was swollen or indurated I have had a little difficulty in preventing the vas slipping backwards, which has caused some delay.

FIG. 7.



I do not usually divide both vasa on the same occasion, and prefer that there should be an interval of at least seven days. Though the operation may be performed under local anæsthesia by cocaine or eucaine, it is better that the patient should take nitrous oxide gas and ether for the few minutes of insensibility that may be required; the stimulating effect of the latter in old people is advantageous.

Pavone,* who has recently reported twenty-eight cases out of thirty-four where the patients were either cured or improved after vasectomy, advises that in addition to excision the ends of the canal should be twisted so as to ensure complete closure. The possibility of the restoration of the occluded vas when a ligature only has been used had been illustrated by Dr. Bransford Lewis.† Here, on the return of prostatic symptoms, it was found that the

* *Il Policlinico*, No. 15, 1896.

† *Journal of Cutaneous and Genito-Urinary Diseases.* New York, 1896.

continuity of the duct had been re-established after the ligature had come away.

The cases selected for vasectomy are those of obstruction caused by the prostate, where the enlargement is general and not limited to a pendulous lobe, and where the gland, from its feel, has not become largely fibrotic but apparently retains a fair proportion of its secreting and muscular element. These cases are usually associated with some degree of residual, though not necessarily disordered, urine.

I have practised vasectomy in several stone cases, where recurrence took place for reasons which rendered it probable that the prostate was directly responsible, with advantage—in patients suffering from increasing difficulty and frequency in passing their urine or their catheter, in others where, in spite of the latter, vesical irritability and spasm were more or less incessant, and for repeated hæmorrhage arising out of difficult catheterism. I have also utilised it in some instances where persons wished to avoid commencing catheter life.

The following are a few illustrative cases :

Case I.—A man seen in 1894, aged seventy-four, with a very large prostate, for which eventually he had to use a catheter. In the following year he had symptoms of calculus for the first time, and I crushed and removed a phosphatic stone weighing when dried 305 grains. On two subsequent occasions, within twenty months of the first operation, he had recurrences of phosphatic stone which were successfully dealt with in a like manner. The enlarged prostate appeared to be the cause of this, and I therefore divided both vasa. Since this was done, in December 1896, he has had no further return, and though largely dependent on his

catheter, which he uses easily, he leads an active life for a man of seventy-eight years of age.

Case II.—A man aged sixty-five suffering for some time from prostatic obstruction. First seen in December 1897. The leading symptom was difficult catheterism, or, as his doctor expressed it, "if he could only pass a catheter himself his life would be a less burden." Six months after the operation the latter writes me: "The operation has certainly done him good, in this way, that he can pass a catheter easily when, as before, it was often a very troublesome procedure."

Case III.—A man aged sixty-nine came into hospital in January 1896. Large prostate, great frequency both day and night, interfering with his work. Not dependent on catheter. One vas was then divided. This was followed by such improvement in the frequency that the second tube was not operated on. This relief was continued till the middle of this year (1898), when symptoms of frequency returning, he came to the hospital, when the remaining vas was divided. On the side that had previously been operated upon the prostate was small, the opposite lobe being large and indurated. This case is interesting as showing that a single vasectomy is sometimes sufficient to check prostatic growth. I have noticed this in other instances.

Case IV.—A man aged seventy, whom I saw early in January 1898. Had symptoms of prostatic enlargement for some months previously, when, after a chill, complete retention of urine took place. He had never before used a catheter. I saw him in consultation, and a catheter was passed with some trouble after a previous trial had been made. Retention shortly after recurred, and, as the same difficulty was experienced, the instrument was tied in and retained. As from the feel and size of the prostate we anticipated further trouble of this kind, I divided the right vas on January 27, 1898, and the remaining one some days later. The power of voluntary micturition began to return after the first tube was resected. The size and nature of the prostate, the urgency of the symptoms of obstruction, and the completeness of recovery without subsequent necessity for a catheter, were features which rendered this case an extremely interesting one. I saw the patient six months afterwards and found him in good health and urinating normally. The prostate, as determined by rectal examination, had

undergone considerable shrinkage. I have no doubt, though the gland was very large, that actual retention was occasioned by a congestion which was controlled by the vasectomy. Tying in and retaining a metallic catheter in the case of an elderly man is not a very safe or reliable proceeding, and is often followed by a dry tongue and septic indications. Vasectomy is worthy of further trial in these acute cases, as in this instance it was probable that a permanent use of the catheter was averted.

Case V.—Man aged seventy, seen in November 1895. Very large prostate, uses the catheter four times in twenty-four hours. He has shaky hands, and the difficulty of passing the instrument is increasing. Early in 1897, as the latter was much increased and some sugar had appeared in the urine, I advised a double vasectomy, which was performed with an interval of four weeks. Seven months afterwards he writes me: "I certainly am very much better than I was before the operation, and so long as I am quiet and able to carry out my regular treatment I get on very comfortably. How it would have been if I had not undergone the treatment probably you know better than I do."

Case VI.—Man aged seventy-five. Seen in November 1897. He had spent most of his time in India. Very large prostate, and almost entirely dependent on catheter. Increasing difficulty in putting his instrument in. Much bladder irritability. December, double vasectomy. Seen October 1898. Condition much more comfortable. Passes his catheter quite easily and is going abroad for the winter. He voluntarily expels about one-third of his urine and the rest by catheter. As he complains occasionally of some smarting when voiding urine naturally, I advised him to lubricate his catheter with castor-oil and Peruvian balsam, which appeared to answer its purpose.

Case VII.—A man aged seventy-three. Very large prostate, contracted and pouched bladder. Great frequency in micturition, but not requiring catheterism. This case may be regarded as an unsuccessful one, as I think something better might have been done for the patient in the first instance had his age and general condition permitted it. In one respect, however, it is of interest as demonstrating the effect of a double vasectomy relative to the introduction of instruments into the bladder when the prostate is extremely large and the floor and third lobe prominent. I

attempted to crush a stone for the patient in April 1895, and though it was not very large the operation was attended with more difficulty than I ever experienced with one of this size and composition. This arose from the great prominence of the prostatic floor, the contracted and pouched state of the bladder, and the difficulty of picking up the stone fragments, the lithotrite being tilted forwards so as to be in contact with the anterior wall of the bladder instead of being, when reversed, in relation with the pouch, of which the huge prostate formed the lower boundary. The bladder would hardly hold any fluid, so that the movements of the lithotrite had to be much restricted, otherwise damage might have been easily caused. However, after some little delay, I succeeded in breaking up a hard urate stone and evacuating about 100 grains of it. I thought it better not to proceed further, though conscious that a considerable portion of the calculus had not been disposed of. The patient was a bad subject for any operation, and I therefore had to be content with what was done. No harm followed, he was much relieved, and left the hospital in twenty-one days. On his return some months after I first proceeded to sound the bladder, but found the instrument would not enter. I therefore recognised that so far as access was concerned the prostatic obstruction was even greater than on the former occasion, and rendered it impossible to crush and evacuate the stone in the usual way. I therefore resected both his vasa, with a short interval between, as the symptoms caused by the calculus were not pressing. Six weeks after this I removed the entire stone by litholapaxy, the prostatic obstruction having in the interval shrunk considerably, as was also shown by rectal examination. It is now a year since the latter operation, and though the patient is better and can follow his occupation, he has at times a good deal of pain after the use of the catheter, and some chronic cystitis. He is not as careful as could be desired in the use of his catheter, the washing out of his bladder, and the adoption of such antiseptic precautions as are quite within his reach. Still he has not received the amount of relief from the vasectomy as I anticipated. I believe this is due to a pendulous outgrowth or tongue proceeding from the floor of the prostatic urethra and stretching upwards into the bladder, which has only been partially benefited by the general shrinkage of the gland.

It would have been better to have removed the stone at first by the suprapubic incision, together with the protruding portion of the gland, but the patient was averse to this. Having regard to his age, his general good health and his ability to carry on his work as a clerk, in spite of some pain at times, and the necessity for using a catheter, I have not pressed a cystotomy upon him. He has recently found much benefit from taking urotropine.

It may be asked whether vasectomy should be advised in the case of a man who merely wants to dispense with the use of the catheter, which he passes easily with complete relief. In other words, what is the effect of it on the prospects of catheter life? If no other reason is assigned, I would reply that, as we cannot guarantee the restoration of complete voluntary micturition, the operation is to be regarded from this standpoint somewhat in the light of an experiment, and is not to be urged. On the other hand, for instance, where a man cannot use his fingers, and is unable to be dependent on others for this assistance, I should certainly recommend it. I have known it succeed in effecting the desired object under these particular circumstances.

We must not forget that the question as to the return of voluntary micturition after this class of operations is not one of prostate alone. Shrinkage of the gland can be artificially induced with reasonable certainty, but this does not necessarily mean that the normal and voluntary contractility of the bladder returns after months or years of either complete or partial disuse. The very reason which indicated an operation of this kind may often be regarded as the culminating point in a series of

degenerative processes which have been going on, as Guyon has so well pointed out, indefinitely, in which the enlarged prostate becomes the most prominent feature. The physician has to take into consideration not only the weak heart and deranged valve, but also the atheromatous blood-vessels, in making his estimate as to the extent of what can be done for a patient with a disordered circulation.

It is not often that the surgeon will have the opportunity of endeavouring to bring about shrinkage of the prostate by operation at an early stage of this disorder, though the necessity for the regular use of the catheter may be both imminent and permanent. It should be remembered that a catheter life once fairly commenced is seldom ended, and that it is within the province of surgery to prevent the initiation of such a dependence if possible. Though a complete restoration of the voluntary power of micturition rarely follows vasectomy in cases where a long period of catheterism pre-existed, we must not undervalue the partial renewal of this function, which often results and gives a consciousness of greater independence to the patient in the pursuit of his ordinary avocation. In estimating the results of vasectomy credit must also be given in some instances for its preventing further obstruction and other complications arising.

It is likely that this operation will be extended to other disorders of the urinary organs. Though the normal function of these ducts is that of convey-

ing the seminal fluid from the testes to the vesicles and prostatic urethra, they are equally capable of transmitting micro-organisms in both upward and downward directions. In this sense they may therefore be regarded as distributors of disease.

Some years ago I saw a delicate-looking young man with a strong tuberculous family history with a nodule in his left testicle remaining after an acute gonorrhœa. This nodule was deemed to be tuberculous or likely to become so. The question then raised had reference more especially to the removal of this by operation on the ground of its suspicious nature. The urine was healthy and so was the opposite testicle and its tubes. Nor was I able to discover any evidence of deposit so far as the finger could reach either in the vas or the prostate. The patient, who had had some medical education, was anxious that either the nodule or the testis should be removed. I did not feel disposed to recommend either course. Having regard to the fact that the disease appeared limited to the nodule, and that any infection would probably pass along the canal of the vas deferens I proposed to excise a portion of the latter. This was done, and the wound healed in a few days. A year afterwards it was found that the testis and nodule had both atrophied, and no signs of tuberculous infection could be detected. The patient's health and sexual powers remain unimpaired.

The second group of cases of transference of infection through these ducts may be illustrated by the inflammations that take place of the testes and tubes occurring in connection with some cases of prostatic hypertrophy where catheterism is necessary and often difficult.

This is a complication which when frequently repeated seriously adds to the gravity and pain of these disorders. Early in the year 1896 I saw a man approaching seventy years of age, otherwise in good health, who, in addition to much prostatitis, repeatedly

suffered from most painful epididymitis in one or both organs, though sexual power had ceased for some years. He was dependent on the catheter, and these attacks had been going on for some months, almost entirely confining him to bed and preventing him attending to his business. I divided his vasa for him with great relief, so far as his prostatic symptoms generally were concerned, and since this was done he has had no further trouble with his testicles.

Care should be taken that the ligature on the vas is securely tied, otherwise some inflammation, due to the escape of bacteria, may be excited in the scrotal tissues. This once occurred to me, and caused some few days delay.

Hence vasectomy may be said to provide for the treatment of some chronic and painful affections of the testis arising under these circumstances without resorting to castration.

There is another class of cases where the ill effects of long-standing obstruction is seriously felt and not infrequently proves the immediate cause of death. I refer to atrophy of the kidneys arising out of the back pressure which is thus occasioned by the obstacle in front. Hence, though the trouble commences with the prostate, it may end with the kidney. A characteristic of this condition is the increasingly low specific gravity of the urine, indicating the absence of the proper proportion of the solid constituents of this secretion, and the possibility of death from uræmia. Here, as Sir James Paget observed, "there will be danger from the most gentle catheterism." * Low densities in urine

* "Lectures and Essays." Edited by Howard Marsh.

sometimes rise steadily to normal and remain so after vasectomy commences to take off the strain of difficult micturition by the induction of atrophy in the obstruction.

The course of events after these operations on the genital tract relative to prostatic hypertrophy appears to be of two kinds—(1) the immediate, and (2) the more remote. The former are usually observed within a few hours after vasectomy, and are, I believe, explainable by vascular changes. Where the bladder has for some time previously been irritable, and urination, or the calls for the catheter, frequent and disturbing, it is common to find that this ceases, or the intervals of rest are greatly prolonged after vasectomy. That this relief is due to the temporary withdrawal of blood from the part seems probable from the fact that, coincidently with it, where any previous tendency to prostatic hæmorrhage has been observed, as when the catheter is introduced, the bleeding generally ceased and did not return. I may remark that the nocturnally recurring bladder irritability peculiar to elderly men with enlarging prostates appears to be due to a highly congested condition of the prostatic veins, not unlike the temporary penile engorgement of erectile structures. Thus the act under these circumstances may be regarded as a reflex, which it is almost impossible to control as sleep presses. The immediate effect of vasectomy is usually to suppress this, whatever the explanation may be.

The more remote changes in the prostate

following vasectomy have reference to its size or consistence, as observed mainly by digital examination from the rectum, and partly by feeling with bougies, and seeing with the cystoscope. These changes, so far as I can form an opinion, extend over periods of time ranging from about a fortnight to over twelve months after the completed operation. The rate of progress varies relatively to the structural condition of the enlargement, as previously noted. Where the hypertrophy is regular, vascular and spongy, the changes are more marked than when it is limited, pendulous and fibrous. It should not be overlooked that the process of hypertrophy in the prostate is usually slow, and many months or years may elapse before a condition of obstruction is arrived at, if ever this happens. Hence our means of inducing atrophy should not be too abrupt in their action. In this way some of the mental effects, such as have followed the simultaneous removal of both testes, may be explained. I have been in the habit of examining the prostates of persons, at all ages, who have for some reason lost one testicle, and have usually been able to distinguish a difference between the two sides of the gland, the part corresponding with the castration being softer and less developed. In these respects there has been a general correspondence in the hypertrophied prostate after vasectomy. Consequently I am inclined to conclude that the changes in the prostate following the latter operation are in the first place vascular, and in the second structural, and that in this way the

good effects on the hypertrophied gland may in the majority of instances be explained. On the other hand, these effects are proportionately less marked where the parts have passed into a condition which is insusceptible either to vascular or other influences short of extirpation of the gland itself. This, I think, is in correspondence with observations that have been made by others.

I will add a few words relating to a not uncommon complication of enlarged prostate. A vesical sac in a bladder where the prostate is also enlarged may minimise or even negative the result of an otherwise successful vasectomy or castration. For though the gland may be made in these ways to shrink considerably, the sac, by its uncontrollable and independent overflow of urine, or by its chronic suppuration and bacterial infection, is capable of maintaining leading symptoms which, in the first instance, were solely attributed to the prostate. Much depends on the position and shape of these sacs, and the relation of their mouths to the general cavity of the bladder as to whether they are benefited or not by the shrinkage of the obstruction which is thus obtained. The presence of a sac after the prostate has been reduced in size may usually be made out by gently moving a soft rubber catheter about in the bladder after the first discharge of urine has taken place, when a secondary escape will probably follow, or the orifice of the pouch may be seen by a cystoscope.

Further, it must be remembered, that as there sometimes is a very close resemblance physically

between an hypertrophied prostate and a slowly progessive carcinomatous one, the one may be mistaken for the other. If vasectomy is practised in the latter no material good comes out of it. The disease continues to advance at about the same rate as it would otherwise have done; but, on the other hand, no harm occurs from it. It has happened to me, I believe, more than once, though I have not been able to determine this by inspection.

In thus referring to various forms and conditions of prostatic obstruction where vasectomy is not to be recommended, there yet remains, I believe, ample scope for its employment in preventing the entire loss of an important function, and in relieving pain, and in prolonging life.

There are some points of much physiological interest which have to be more thoroughly worked out relative to the mechanical disconnection of the male genital and urinary systems in general, and to castration and vasectomy in particular. The former operation, it is probable, extinguishes both desire and power to procreate; vasectomy, on the other hand, appears, from some cases, only to bring the latter to an end through the mechanical occlusion of the seminal canals. It is well that patients should understand this before submitting to either operation whatever their ages may be.

In presenting this subject for further consideration I have endeavoured to do so with due regard to the fact that it is a recent innovation in the practice of surgery which will require revision from

time to time. I believe, however, that it represents a line of work which will add to our resources in the treatment of some disorders occurring at a time of life when operative surgery must necessarily be of a restricted character.

SACCULES AND POUCHES OF THE URINARY BLADDER.*

Among the interesting subjects to which the more advanced pathology of the present day has given prominence is the study, in reference to their treatment, of what may be called the diseases attendant upon conditions which in themselves are morbid either by reason of their structure or form. In the urinary apparatus more than one illustration of this aspect of pathology may be met with. In hypertrophy of the prostate, for instance, we have a structural change coincident with advancing years liable to produce various diseases in that gland, some of which are peculiar to the part itself, whilst others are in correspondence with what may be elsewhere observed, though, perhaps, in a somewhat modified form.

It is, however, to certain alterations in the shape of the urinary bladder arising out of injury or disease, and the disorders they are the means of originating or perpetuating, that I purpose to draw attention on this occasion.

* "International Clinics," vol. iii., fourth series.

In his lectures before the Royal College of Surgeons, Mr. J. H. Targett * did good service to the surgery of the urinary bladder by copiously illustrating by specimens and drawings the various kinds of distortion in the form of cysts and pouches to which this organ is liable. It is impossible to study these alterations without feeling that more might be done to remedy them, especially where they complicate other disorders, or are themselves the foci of more or less independent disease.

I shall not attempt to follow Mr. Targett in his reference to all the kinds of sacs and depressions which he includes under these headings, but will confine my observations to what are generally known as sacculations and pouchings of the bladder. Pressure on the walls of a reservoir like the bladder, acting from within, is capable of causing certain alterations in the contour of that viscus to which these terms have been applied somewhat indiscriminately.

By sacculation it is generally understood that a limited portion of the mucous membrane has become herniated or prolapsed through the interspaces of the muscular network supporting it. Thus, independent sacs of various dimensions and shape are produced. These have something in their structure similar to what may be observed in connection with intestinal herniæ. Sacculations of the bladder may occur at almost any point; they may be intra- or extra-peritoneal; they are met with at all periods of life from birth onward; they have little or no

* *British Medical Journal*, July 29, 1893.

independent means of exercising power over their contents through contraction of their walls, and they are capable of being called into existence and of disappearing in ways not unlike those which are more commonly illustrated by intestinal herniæ.

The causes of sacculation—which condition I shall speak of in contradistinction to pouching or mere depression of the entire thickness of the vesical wall —may be ranged under three heads—viz. (1) intra-uterine, (2) as arising from obstacles to micturition, and (3) traumatic.

First, as with herniæ, so I believe, as Mr. Targett points out, some sacculations of the bladder are of a congenital nature, and are explainable as the result either of intra-uterine pressure or of developmental variations which I shall not here stop to discuss. A case in point has been under my observation for some years past, and was first seen by me in association with the late Sir Andrew Clark. Though absolute proof of the existence of this condition is fortunately wanting, I may briefly mention some of the grounds upon which such a conclusion is based.

The patient is a middle-aged man who has suffered during the whole of his life from urinary troubles connected with micturition. There is no evidence of stone, stricture, or any form of urethral obstruction. The urine is normal, and all the difficulties connected with its voidance appear to be located in the bladder. Urine cannot be spontaneously passed until an interval of two or three hours has elapsed since the previous occasion. Much spasm, both in the bladder and rectum, is excited if the attempt is made prematurely, giving one the impression that the true bladder is really filled by an overflow which has to ascend from a non-con-

tractile sac. Alterations in position favour this view, and the catheter fails to remove the urine until the stated interval has elapsed.

Second. The most frequent causes of sacculation are those connected with obstruction either within the prostate or the urethra. When we consider the enormous pressure that is sometimes exercised by the bladder, especially when hypertrophied, for the purpose of overcoming an obstruction to the natural escape of urine, it can be readily understood how, in the process of time, the mucous membrane of the viscus may at one or more points be extruded in the form of a sacculus. The process and mechanism of sac-formation was well described some years ago by Dr. Decimus Hodgson,* and does not here require further recapitulation.

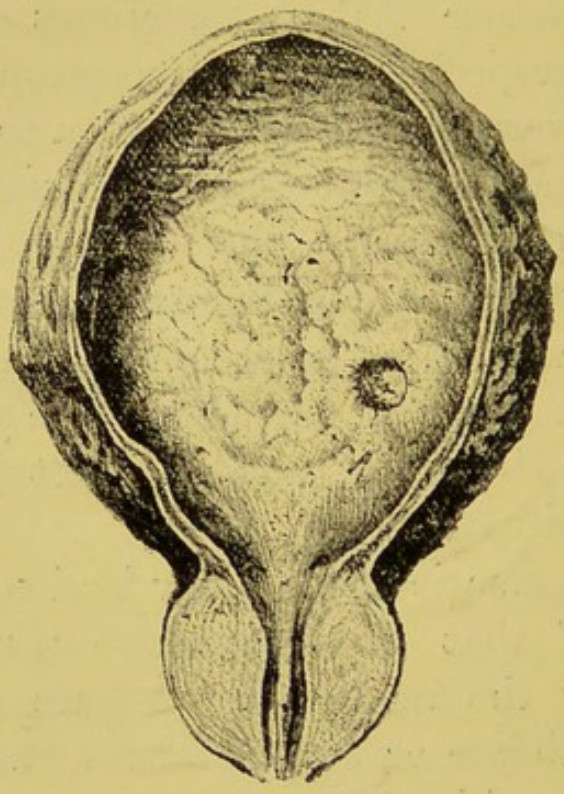
Third. Traumatic causes may lead to the sudden formation of that which is more usually slowly produced by the retrograde pressure of urine. I have met with one or two instances where I believe a sac was formed in this way.

Some years ago I saw a gentleman, about forty years of age, who had been suffering from cystitis of a chronic character, which originated under the following circumstances: A few months previously, when in excellent health, he was conscious of a sudden and violent muscular effort to prevent his falling off a restive horse, from which, after a struggle for some minutes, he was eventually thrown. He was not obviously hurt at the time, but was aware of something "giving way" about his bladder. Some weeks afterwards he consulted me for frequent micturition, for which there appeared to be no explanation. The urine was loaded with mucus and was ammoniacal. After many months' illness

* "Mechanism of Vesical Pouches," *Glasgow Medical Journal*, vol. iv., 1857.

the patient died from the effects of cystitis and chronic suppurative nephritis. At a post-mortem examination a suppurating sacculus was found on the left side of the bladder (Fig. 8) capable of holding over an ounce of fluid, and the bladder presented the usual signs of chronic cystitis. Though I did not at the time

FIG. 8.



Orifice of Saccule.

fully appreciate the significance of the sacculation in the light that I now regard it, I felt no doubt that it was the cause of the urinary decomposition which led to the more serious consequences referred to.

More recently I have met with an instance where not only similar symptoms were induced by a heavy fall, but remotely the sac served as a trap for catching renal calculi of unmistakable origin, which the patient had been for some years in the habit of passing.

That these sacculi may undergo acute inflamma-

tion and suppuration, either by reason of the decomposition of their contents or by becoming impacted with sharp fragments of stone, as after lithotrity, there can, I think, be no doubt. In this way pelvic cellulitis and the death of the patient have resulted.

The former condition is well illustrated in a case recorded by Dr. Beith,* where a large narrow-necked sac was found to be in a sloughy state and filled with fetid greenish fluid. The patient was one hundred and three years of age at the time of his death, from this apparently accidental cause, and otherwise was in excellent health.

As illustrating the trapping of stone fragments, Mr. H. C. Johnson showed a bladder, at the Pathological Society,† from a patient aged seventy-two, who had undergone the operation of lithotrity on two occasions at some interval of time. The patient died six weeks after the second operation, from continued cystitis and abscess in the kidney. After death a small sac was found filled with calculi of a triangular shape, and the communication with the bladder was very contracted. Here was the probable explanation not only of the stone recurrence but also of the fatal termination of the case.

I have also seen a similar instance where a piece of calculus, shaped not unlike a flint arrow-head, by its impaction in a sac caused the death of a patient after in all other respects a successful operation by lithotrity. The sac suppurated and sloughed, and

* *Trans. Path. Society of London*, vol. iii.

† Ibid.

pelvic cellulitis supervened. A suprapubic cystotomy would doubtless have led to the discovery and removal of the cause as well as the recovery of the patient. The case made a great impression upon me at the time, now some years ago.

The diagnosis of sacculation of the bladder is not always easily made. In some instances we have nothing to guide us but the fact that the movement of a catheter, preferably a soft one, may unmistakably indicate the existence within the area of the bladder of more than one distinct reservoir for urine. In one or two cases I have seen, not only was I able to recognise the probability of a sacculation in this way, but there was a marked difference in the appearance of the urine removed from the two reservoirs. Guthrie,* to whom we are indebted for a description of this condition, observes, "In one gentleman, the existence of one or more pouches of this kind became evident on injecting the bladder; twelve ounces of warm water could be thrown into it before much uneasiness was produced; but on drawing it off ten ounces only could be obtained, and rarely the whole twelve, even by change of position."

As showing the kind of evidence we sometimes have to weigh in diagnosing the presence of a sacculated bladder, the following extract from a case of stricture treated by external urethrotomy may be mentioned. In referring to this case, Mr. A. Vans Best† observes, "The singularity of the

* "Diseases of the Urinary and Sexual Organs," 1836.

† *Lancet*, April, 29, 1871.

case consists in the fact that after the patient has emptied the bladder he does not feel comfortable till, by pressing on the inner side of the left tuberosity of the ischium, he gets rid of two or three ounces more urine."

The record of an instance such as this points to the importance of recognising the possibility of the connection between pelvic cysts and outgrowths in this region and the bladder.

I saw a gentleman with Dr. James Andrews where, on a previous occasion, considerable doubt was expressed as to the nature of a tumour encroaching upon the abdomen. The diagnosis remained dubious for some time, when it was cleared up by the introduction of a soft catheter, when several pints of healthy urine were removed and the tumour entirely disappeared. The trouble for which I saw the patient was profuse hæmaturia, the blood doubtless proceeding from the interior of the sac. By draining the bladder by means of a retained catheter the bleeding speedily ceased.

Diverticula communicating with the bladder have been met with in operations for inguinal hernia, and the viscus has in this way been opened, and even portions of it have been removed. It is probable that further experience with the cystoscope will add to our resources in determining the presence and form of these sacs.

I will now pass on to notice points connected with the treatment of sacculation of the bladder. From a study of the life history of many of these cases, some sacs seem to have been discovered only after death, though these false receptacles for urine were capable of holding many ounces of fluid. In others, the communication between the true and false viscus

was of so free a character that it in no way affected the urine either in appearance or in chemical characteristics. Hence some of these deformities have been described as bilobed and trilobed bladders, and have been regarded, since there were no special symptoms, as errors in development rather than as examples of innocuous disease.

As I have already stated, these sacculi most frequently come into prominence as complications in connection with other disorders. Of these I may mention stone, stricture, enlargement of the prostate, and cystitis. Stone in the bladder complicated with sacculation represents a state of affairs in which, as a rule, the former should be removed by a supra-pubic cystotomy and the sacculation dealt with independently.* This is obvious, not only for the reason that it may render a complete lithotrity impossible, but further, as I have shown, it may be the means of causing complications, either in originating cystitis or trapping fragments, that may favour the recurrence of the stone, if not the speedy death of the patient.

As bearing upon this aspect of the subject, the following case is of interest. It was that of a gentleman, sixty-five years of age, who had been operated upon for stone by crushing about eighteen months before I saw him. Since the operation the urine, which was previously normal, has been habitually purulent, usually alkaline and singularly offensive, though not distinctly ammoniacal. The odour proceeding from the excretion was much worse than anything I can remember ever noticing, and was most distressing to a man of a very refined and sensitive nature. There

* I have recently (1899) sent a paper on this treatment to the Royal Medical and Chirurgical Society.

was also a considerable residuum of urine amounting to several ounces, which rendered necessary the use of the catheter two or three times in the twenty-four hours. In other respects the patient was in good health; all he required, to use his own words, was "a clean bladder." Various theories were suggested for this state of things which I need not here enumerate; the prevalent idea when he came under my observation was that there was a piece of stone concealed somewhere above the prostate which was acting as a sort of imperfect cork in the mouth of a sac or pouch. Though this seemed the most probable explanation, neither the sound nor the cystoscope warranted such a conclusion, though the latter showed that the bladder was extensively furrowed and trabeculated.

Under these circumstances I performed a suprapubic cystotomy, and made a full exploration of the interior of the bladder. No stone was discovered, but the bladder was found to be sacculated at two points above the prostate. On passing the finger into one of the sacs, which would just admit it, I ascertained that the depression came into close contact with the rectum; in fact, on introducing my other index finger into the bowel, the interval between the two seemed extremely small. I mention this circumstance as probably explaining the very offensive and peculiar smell of the urine, as previously noted, though at no time during my observation of the patient had either air or fæces been seen in the urine. The incision into the bladder was a free one, and would easily admit three fingers in the middle line of the abdomen. A double drainage-tube, after the practice of Guyon, was introduced through the wound, but, as is my custom, no sutures were employed, and the dressing was completed with iodoform and wood-wool pads to absorb the urine and so to keep the patient dry. Each morning after the dressings were removed a soft rubber catheter was introduced along the urethra into the bladder, and the latter was thoroughly sluiced through with a pint or so of warm boracic lotion, until it escaped from the wound perfectly clear.

For nearly a month this process was adopted either once or twice in the twenty-four hours, until at last it was rendered somewhat difficult and imperfect because the wound was granulating, and when the irrigation was discontinued the latter closed

rapidly. The offensive smell of the urine, which was the prominent symptom in this case of sacculation, was never once observed either during the treatment I have described or since. The patient completely recovered his health, he has had no recurrence of stone, his urine remains normal, and he has not since had occasion to use his catheter.

This case, in conjunction with others, presented to my mind several points of interest connected with the pathology and treatment of vesical saccules. In the first place it demonstrated that an offensive state of the urine which was actually poisoning the patient, apart from the serious obstacle these diverticula were the means of occasioning to normal micturition, was due to the retention and decomposition of urine in a confined area of the bladder, which was practically inaccessible to the urethra. No normal contraction of the walls of the bladder was capable of influencing the contents of these sacs, which to all intents and purposes might, so far as their relations with this viscus were concerned, be regarded as foreign bodies. Secondly, it presented a condition where it was absolutely impossible to submit the whole area of the bladder and its dependencies to that process of washing out and disinfecting which is now adopted with so much advantage in many morbid states of this viscus. Thirdly, it illustrates that in those cases where the removal of the sacculi, as I shall presently refer to, is impracticable, efficient drainage is the only method with which we are acquainted of permanently improving the shape of a bladder that may thus be distorted.

In several instances of chronic suppuration con-

nected with the bladder, where there were good reasons for believing that this symptom was due to sacculation, though this point may not have been in every instance ocularly proved, I feel sure that prolonged drainage, either by the perineum or the suprapubic route, was the means of bringing about a shrinkage and disappearance of the sac by simply keeping it constantly and continuously empty.

I have very little doubt that some of the advantages accruing from lateral lithotomy, especially the greater immunity from recurrence of stone after this operation under these circumstances, is due to the fact that the shape of the bladder is often much improved by the somewhat prolonged and incontinent urine drainage which necessarily follows upon the selection of this procedure.

Further, as bearing upon the treatment of these cases reference may be made to a case recorded by Dr. Alexander,* where an extra-peritoneal pouch protruding from the vulva, and from which a stone had previously been removed, was subsequently ligatured and cut off. It is stated, "the wound healed up in about three weeks, except a small spot where the ligature had been applied." The patient did well, and left the hospital at her own desire. It is subsequently recorded that the woman returned, complaining of a small fistulous track at the seat of ligature.

Additional light is thrown upon such a proposal by reference to some cases which were brought for-

* *Liverpool Med.-Chir. Journ.*, July, 1884.

ward in connection with a paper by Dr. Michels,* in which he recorded a case of extra-peritoneal vesical hernia:

> In this instance, in operating for the radical cure of hernia in a man forty-eight years of age, what appeared to be an empty hernial sac was tied at its neck and cut away, the stump being put back into the abdomen and the inguinal canal closed. Twenty-four hours afterwards the patient complained of pain in the hypogastrium, and the urine was mixed with blood. This led to the conclusion that what had been taken for and treated as an empty hernial sac was in reality an extra-peritoneal diverticulum of the bladder. The abdomen was opened at once, the bladder exposed, and a wound discovered in its extra-peritoneal part, which was closed by a double row of sutures. A Jaques rubber catheter was passed into the bladder and retained for six days. The patient made an uninterrupted recovery.

This case presents conditions in every way analogous with what might be found by exploration in connection with symptoms due to a sacculation of bladder. Dr. Michels stated that he considered this an instance of congenital diverticulum. Mr. Targett also observes, in connection with two of the specimens illustrating his lecture, " the small size of the neck of the sacculus in both these specimens, and the fact that the ureters are not incorporated in their walls, suggest the possibility of radical treatment by ligature and excision."

The cases of sacculated bladder which have come under my observation in practice and as specimens removed after death have for the most part belonged to the extra-peritoneal variety. These by their position seem the more likely to complicate other

* *Trans. Royal Med. and Chir. Society*, 1894.

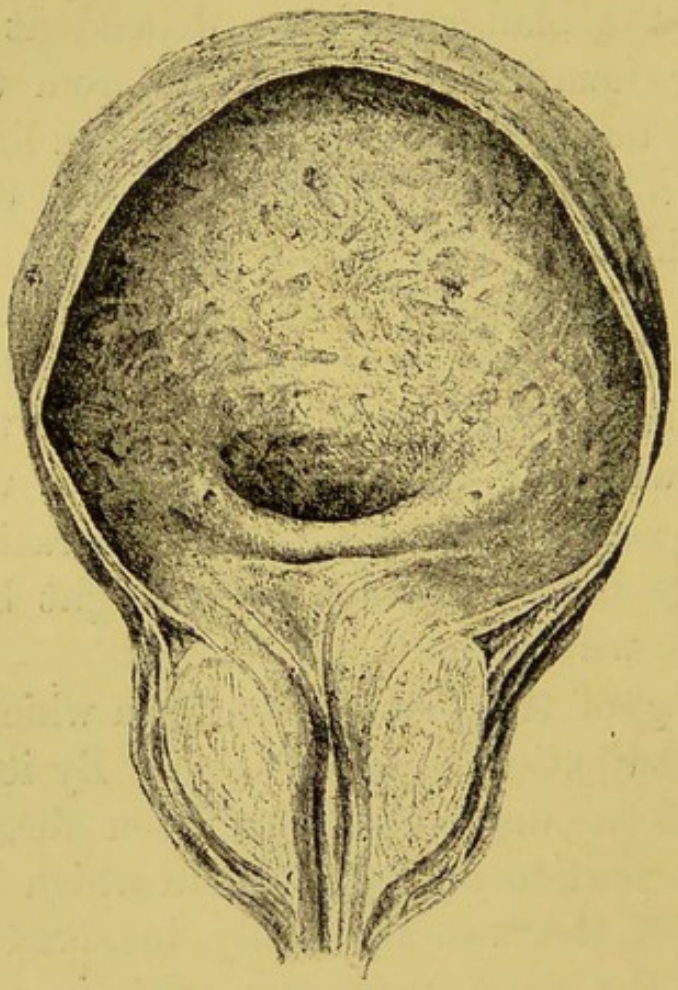
surgical disorders, to which reference has been made. The intra-peritoneal forms by occupying the fundus or abdominal aspect of the bladder seldom occasion inconvenience, and are often only discovered after death; a circumstance which is probably in some measure due to their opening into the general cavity of the bladder being a dependent one, thus rendering them less likely to suffer from the effects of urinary decomposition, as well as less liable to act as traps in the case of calculi or gravel descending from the kidney, or in respect to fragments of stone broken in the course of an operation for lithotrity.

To determine the presence of a sacculus in the bladder when there are sufficient grounds to demand this, and with the object of treating it upon such principles as referred to, I think exploration of the bladder by the suprapubic route might be oftener resorted to with advantage.

Pouching of the bladder is a term which is used in contradistinction to sacculation. By it is understood that a depression has been formed in a dependent portion of the viscus in which the whole thickness of the wall is equally involved (Fig. 9). It is for the most part met with in the senile bladder in connection with hypertrophy of the prostate, and occasionally as a consequence of the pressure exercised by the presence of a stone. As age increases, it is not remarkable that the tissues constituting the bladder should show signs of the wear and tear to which the organ has been subjected, as well as the compensating provisions which such changes are only likely to call forth.

It would be unusual if in this respect the urinary apparatus were to differ in its analogies from the other important systems of which the human body is made up. In early adult life the bladder may be

FIG. 9.

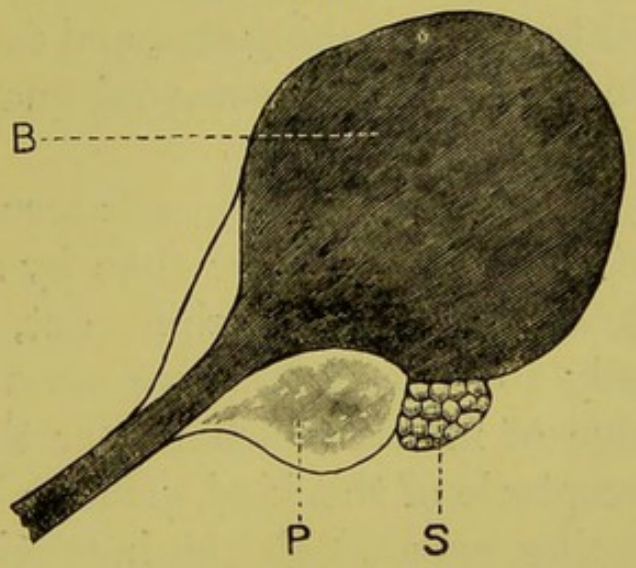


Orifice of Pouch.

regarded as an abdominal rather than a pelvic organ; as years advance it gradually sinks within the pelvis, whilst still later on it will often be found further depressed within the pelvic cavity. Coincident with this we have changes taking place in the prostate and adjacent parts; a pouch is in this way formed which cannot be emptied sponta-

neously, and thus we have the first stage in the development of what is known as the atonied bladder. Mr. Buckston Browne * has illustrated how this pouch may be the means of containing as well as concealing one or more stones. Some years ago I met with a pouch of this nature in a case where suprapubic cystotomy was successfully performed. A number of small tesselated stones

FIG. 10.



B, Bladder. P, Prostate. S. Pouched Stones.

(Fig. 10) completely filled the space, and were removed.

The long retention of a calculus in such a position frequently induces structural changes in the adjacent parts, which are seldom completely recovered from, however successfully the stone may be removed by the lithotrite. It is in cases of this kind that stone recurrences are frequent, and the necessity for the subsequent use of the catheter for removing residual and decomposing urine becomes permanent. In a

* *Lancet*, April 18, 1891.

previous paper * I have referred to these changes in the bladder wall and the post-prostatic pouch, in connection with some observations on "stationary calculi."

After what I have already said it is hardly necessary that I should add to my remarks on the principles of treatment. These pouches, complicated with stone and an enlarged prostate, not unfrequently render the selection of lithotomy a necessity. A pouch that has once held a stone for some time is seldom fitted to hold anything else, and consequently it should be got rid of by some adequate form of bladder drainage.

In referring to the treatment of sacculation and pouching of the bladder, other than by such expedients as catheterism and washing out, if proved experimentally to be beneficial, we must not overlook the value of means which render the stasis of urine in a receptacle of this kind wellnigh impossible. Some interesting papers † on the immunity of seamen from calculous disorders have been written, which contain points bearing upon this aspect of the subject. Though calculous disorders and sacs in the bladder have not necessarily any association, their concurrence is not infrequent. The author of the papers referred to quotes a passage from Aretæus, who flourished three hundred years before Christ, stating, "diet and anointing, and sailing and passing

* *Annals of Surgery*, June, 1885.

† "On the Comparative Infrequency of Urinary Calculi among Seafaring People," *vide Royal Med. and Chir. Soc. Trans.*, vols. ix., xvi., and xxi., by A. Copland Hutchinson, F.R.S.

one's life at sea—all these are remedial in diseases of the kidney." And further, Dr. Hutchison includes, in summing up the curative and preventive measures against calculous diseases, "the use of swings, either in a garden or elsewhere, active bodily exercises, &c."

Without wishing to lay too much stress on these points, I must bear my testimony to the great advantage that has followed a prolonged sea voyage in the case of some patients suffering from sacculated or pouched bladder, either after a stone has been removed from it or quite independent of that affection. I have known thick cystitic urine, due to the pollution of the general cavity of the bladder by the contents of a stagnant sac, entirely disappear when placed under these conditions. The explanation is not difficult to arrive at for this change. The constant movements of the ship both by day and night, and in whatever position the body may occupy renders stasis of any of the fluid of the body impossible, and this one element almost necessary to decomposition is removed.

Some years ago, when I was practising in Liverpool, I saw a gentleman of middle age who had been suffering much from recurring cystitis. It was suggested that he had a stone, and I sounded him, but with a negative result, as obtained by other surgeons. He told me that he was always better when "knocking about" in his yacht, a circumstance which seemed to corroborate the view that there was no stone. I remember, though I did not quite at the time see the connection, advising him to continue this healthy kind of amusement on general principles, as he was a man of independent means and much interested in yachting. This seemed to accord with his own view, and sailing was sub-

stituted for catheters and irrigation. I see him now occasionally, and he tells me that his urine is never thick, except sometimes when he is leading a perfectly quiet life on shore. I feel sure all his symptoms are due to the stagnation of urine in a pouch, which, when the body is quiet, influences the excretions much in the same way as do the portable rubber urinals which elderly persons wear in their trousers, unless these receptacles are most scrupulously cleansed and disinfected.

CASES IN WHICH A NON-MALIGNANT COMMUNICATION EXISTED BETWEEN THE BLADDER AND INTESTINES.*

I WISH to direct attention to some kinds of vesico-intestinal fistula which have come under my observation, with the view of eliciting opinions as to what is best to be done for them. In this communication I shall exclude those varieties due either directly or indirectly to malignant disease, and to the ordinary forms of stricture, as well as those rare instances of congenital communications between the urinary and intestinal viscera. I will introduce the subject by giving a brief account of the following cases :

CASE I.—A man, aged fifty-eight. Ten years before I saw him he was laid up for some weeks with acute pain in the lumbar region, which resulted in the discharge of pus into the bladder and its escape with the urine. On the sudden appearance of purulent urine the pain in the back ceased, and he rapidly convalesced. It was suggested to him at the time that the abscess was probably connected with the kidney, but I could now find no evidence of this. On going about again, after this attack, he noticed the sputtering of air at the close of micturition, and this at times has continued ever since, but has caused him no further

* The *London Medical Society's Transactions*, vol. xiv.

inconvenience. The particular symptom about which I was consulted was the occasional discharge of a colourless fluid from the rectum independently of defæcation. I did not see any of the fluid, but it was sufficient when it occurred to moisten the linen, and thus to make the patient uncomfortable. On examination of the rectum with the finger and speculum I could not detect anything abnormal except a little irregular enlargement of the prostate, but not such as is usually met with in ordinary hypertrophy of this part. It will be noted that the patient was rather below the hypertrophic age.

The urine was normal in composition, but contained a slight deposit which microscopic examination showed to contain elements of muscular tissue and vegetable fibre.

In this instance the sputtering of air at the close of micturition, the occasional discharge of what I believe to be urine from the rectum, and the presence of elements of food in the urine pointed to the probable existence for at least ten years of a communication between the bladder and intestines, dating from the pain in the back and the sudden discharge of pus into the bladder referred to. I would add that the sputtering of air, together with some irritability of the bladder, is always increased when there is diarrhœa. He has never noticed any discoloration of the urine with fæcal matter, a circumstance which may be due to the fineness of the sinus. I believe the patient is, with this exception, still in the enjoyment of good health.

Case II.—I saw a man in 1887, aged fifty, who two years previously suffered from some obscure abdominal symptoms in the region of the bladder, attended with acute pain, since which he has noticed fæculent matter in the urine and the discharge of air at the close of micturition. Examination of the rectum disclosed

nothing worthy of note further than that I was able by pressing on the prostate and posterior wall of the bladder to make urine mixed with fæculent matter exude from the orifice of the penis. In all other respects this patient seemed to enjoy excellent health, and there was no evidence pointing to malignancy. I have seen him on two or three occasions since in consequence of his suffering from an acute paroxysm of pain over the region of the bladder. Each time I found the pain was due to the blocking of the prostatic urethra with a hardened nodule of fæces and the rapid distension of the bladder with air. Immediate relief was given by passing a catheter, which afforded vent to some fæculent urine and a large amount of pent-up gas. This patient's symptoms are always intensified when diarrhœa is present. Though much annoyed at times by these local symptoms, he continues, I understand, to enjoy good health and to lead an active life.

Case III.—A man, aged sixty-one, was brought to me suffering from an irritable bladder and occasional attacks of hæmaturia extending over a period of seven years. The intervals between the attacks of hæmaturia were very variable; the bleeding usually continued for three days, and the last attack was four months before I saw him. Latterly he has had painful sensations when making water. The hæmaturia is invariably preceded by pain in the back. Micturition is unnaturally frequent both by day and night. During the last three months he has noticed that air-bubbles were passed frequently during micturition, and particularly at the close of the act. On one occasion he appears to have thought that fæces were present in the urine, but he never detected any odour of this kind. There was no prostatic enlargement. He was ordered half-grain cocaine suppositories to allay irritation. The urine was practically normal, and no deposit of any kind was detected by the microscope. Nine months after I saw the patient his medical man wrote to say that for some time he was the better for the treatment, when the old distress and frequent desire to micturate returned. The passage of gas by the urethra had also become of more frequent occurrence. Urine a light mahogany colour, depositing about one-twentieth. Acid. Odour strong; somewhat like fœtid pus. This patient has recently died, and his medical man informs me that kidney disease was the probable cause of death. There was no evidence of malignancy.

The occasional attacks of hæmaturia render the case somewhat different from the two preceding ones, though like them in that there was evidence of a communication between the bladder and some part of the intestinal tract. Whether the blood proceeded from the kidneys or the sinus it is impossible to say. The fact that the patient eventually died apparently of renal disease is not unlikely to be connected with the putrefaction of the contents of the bladder by admixture with fæcal matter, and the regurgitation of the products of decomposition, either gaseous or liquid, along the ureters towards the kidneys.

Case IV.—A man, aged about sixty. His last illness commenced a short time before I saw him with intense pain down the course of the right sciatic nerve which lasted for rather more than a week: then retention of urine supervened from enlarged prostate, in addition to some urethral stricture which necessitated daily catheterism. In the course of a few days the pain in the back and leg entirely ceased, coincident with the appearance of pus in considerable quantity in the urine. The urine as soon as it became purulent was rendered most offensive, in spite of the bladder being thoroughly washed out with suitable disinfectants. The presence of some degree of urethral stricture necessitated the use of a smaller catheter than otherwise would have been preferred. He appears to have experienced some difficulty in urinating for several years, a circumstance which was probably due to the contraction in the urethra. He had not lost flesh, and there was no evidence that seemed to point to the presence of malignant disease. He had always led an active life. The urine continued to be horribly offensive, as large quantities of gas and fæces were constantly mixed and discharged with it in spite of all the means that were used. He remained much in this way for about two months after I first saw him, and then lapsed into a comatose state, from which he never rallied. He was unwilling to submit to such operative

measures as were proposed for his relief. The patient stated that when he was about twenty years of age he suffered from an abdominal abscess of some kind, when it was believed that a communication had taken place between the bladder and intestines, as pus, and what he thought was fæculent matter, had been at times discharged with the urine, but never sufficiently to cause him inconvenience. He had occasionally passed air at the close of micturition, which he likened to the expiring efforts of a siphon soda-water bottle. In all other respects he appears to have enjoyed good health. His urine was on several occasions kindly examined for me by Sir William Roberts, and showed unmistakable evidence of intestinal contamination.

I am indebted to the late Mr. Weston, the surgeon with whom I saw the case, for the following particulars of the autopsy. The examination was only of a partial character. There was an opening near to the top of the bladder, looking as though it had always existed, lined with mucous membrane, not patent but contracted, and much resembling a miniature anus. No. 8 catheter passed easily through it into a cavity pretty well surrounding the descending colon. This cavity, or rather the walls of it, were firmly adherent to the surrounding parts and were with great difficulty separated. The cavity contained no fæcal matter, but was rough from inflammatory products and rotten in appearance. There were several openings from this cavity into the intestine, but in the hurry of making the examination the intestinal connections were a good deal disturbed. The colon took an unusual course; instead of passing down into the left loin it curved across the lower part of the abdomen in front of the small intestines and disappeared a little to the right side and under the bladder to its termination in the anus.

I will now briefly narrate the particulars of another example which has elsewhere* been more fully recorded, inasmuch as it seems to throw some light on the pathology of the subject.

Case V.—A man, about fifty years of age, whom I was asked to see in 1882. For six weeks he had noticed that his stools were

* *Liverpool Med.-Chir. Journ.*, Jan., 1884.

not formed, and were more or less loose. Three weeks previously his bladder became extremely irritable, and he often experienced severe pain in the lower part of the abdomen. He also observed that quite recently his urine contained a considerable quantity of pus, which he could only void with much straining. Shortly after matter appeared in the urine he noticed that the act of micturition terminated with a sort of fizzing sound and that bubbles of air were expelled. On examination with the hand there was a considerable swelling over the fundus of the bladder, hard and tolerably well defined, about as large as a cricket-ball. I passed a sound into the bladder, but could detect no stone nor anything abnormal to the touch. An examination of the urine showed a deposit consisting almost entirely of pus. In the course of a month the patient's condition considerably improved, though pus, air, and a slight amount of fæcal matter were present in the urine. About this time the patient passed by the urethra, after some trouble, a mass, the size and shape of a horse-bean, which he thought was a stone. Fortunately this substance was preserved for examination, and proved to be a fractured portion of the expanded end of a rabbit's leg-bone. From this date all the acute bladder symptoms subsided, and though for the remainder of his life the patient at times, particularly when the bowels were loose, passed small quantities of air and fæces with the urine, his general health in no way suffered from what has been described. There could be no doubt that the sharp piece of bone made its way from the gut into the bladder and left a small sinuous track between these viscera which never completely closed.

In reviewing cases of this kind, more particularly in reference to the question of treatment, we can divide them into two classes: (1) those where the inconvenience resulting is so slight as would hardly warrant the adoption of any important surgical interference; and (2) those where the inconvenience is an increasing one, either by a gradual process or by the intercurrence of acute symptoms, or where

the condition of the bladder by decomposition of the urine becomes such as to seriously jeopardise the health of other parts of the urinary apparatus, especially the kidneys. I think it will be found that the cases quoted illustrate in some degree these various contingencies.

That persons live for many years and enjoy good health who are liable to the escape of gas and fæces in this way I do not think there can be any doubt. I have had the opportunity of examining some of these cases which have been described under the term pneumaturia, implying that the urine or other proper secretion connected with the urinary apparatus had undergone some form of change by which gas was evolved and either expelled or temporarily retained. With one exception,* I have no hesitation in stating that they were all instances of vesico-intestinal fistula. I feel doubtful as to the true character of the case which seemed to form the exception, since I have been opening the bladder above the pubes and seen the ease with which air enters this viscus and is retained even when careful catheterism has been employed. It has been stated that air is met with in the urine in certain cases of glycosuria, and Dr. Guiard proposed the term "diabetic pneumaturia."† I am not aware, however, that this observation has been confirmed. Cases where the communication between the bowels and the bladder is evidently small, and is not increasing, may be kept in good health by careful

* "Surgical Disorders of the Urinary Organs," fourth edition.

† *La France Médicale*, vol. i., 1883.

attention to the digestion and by restraining a tendency to diarrhœa, which invariably aggravates any special symptoms that they may present.

Passing to the second class of cases, where the communication becomes gradually or suddenly enlarged, or where the urine is rendered so foul as to jeopardise the kidneys as well as other portions of the urinary tract, it is clear that some mechanical expedient in the shape of an operation must be considered. To do any permanent good under such circumstances it is obvious that the flow of fæces into the bladder should be prevented by causing them to escape by an artificial opening above the point where they are poured into the bladder, and thus to give the false passage a chance of contracting and closing. This is a proposition which on paper is an easy one to make, but in practice may be a difficult one to decide upon. And the difficulties in this respect are, in a large measure, due to the absence of those circumstances which may be said to determine us when we know almost for a certainty that malignant disease is connected with the lesion. It must not be overlooked that in many cases of vesico-intestinal fistula which appear to have taken their origin in an inflammatory condition, such as in several recorded by Mr. Harrison Cripps* in his interesting monograph on this subject, the viscus involved with the bladder was some portion of the small intestine. Taking, however, everything into consideration and the probability of

* "On Passage of Air and Fæces by Bladder," 1888.

our being able to distinguish when the latter is implicated, on the necessity arising, it is the safest practice to make the opening as high up in the large bowel as possible, and this will lead to the selection of some portion of the right or ascending colon. In one of the instances related I was much disposed, considering the condition of the patient, the state of his bladder, and the uncertainty as to where the false opening was, to give that immediate and safe relief which a supra-pubic opening into the bladder affords, and be guided as to the future by what this would have enabled the eye as well as the finger to discover.

A NEW OPERATION FOR EXTROVERSION OF THE BLADDER.*

The subject of the treatment I am about to describe is a boy, aged fifteen, who is the victim of a congenital extrophy of the bladder, and an epispadiac penis with the pelvic cleft. He first came into St. Peter's Hospital in July 1895 for the deformity mentioned. There was a considerable protuberance of the posterior wall of the bladder, upon which the orifices of the ureters were distinctly visible. The exposed mucous membrane was very sensitive, and readily bled upon being touched either by the hand or the clothes, and the thighs and legs were much excoriated by the constant dripping of urine from above. The patient's condition was a very miserable one, and he was much emaciated on his admission to hospital. Shortly after his reception he showed signs of having contracted scarlet fever, and was consequently removed to an infectious hospital. For some weeks after this his urine remained slightly albuminous.

On his re-admission, after satisfying myself that

* *Trans. Med. Soc.*, London, 1897.

both kidneys were in good working order and the urine healthy, in January 1896, I removed the left kidney by lumbar incision. The patient recovered rapidly and completely from this preliminary operation. With the view of allowing ample time for the purpose of enabling the remaining kidney to grow and to provide for the entire urinary excretion, the patient went home for some months, occasionally returning for observation.

He was again admitted to hospital in November 1896. His legs and thighs were still much excoriated by the constant dripping from the single ureter, and the protruding mucous membrane of the posterior wall of the bladder remained scarlet and sensitive. Having satisfied myself by repeated examinations that the excretion of urine had been effectually carried on by the solitary kidney during the period of nearly eleven months which had now elapsed since the preliminary nephrectomy, the right ureter was transplanted on December 5, 1896, in the following manner :

I first passed a flexible bougie up the solitary ureter so as to serve as a guide for finding the canal as it crossed the brim of the pelvis. I then made a small incision in the right loin on the same line as if for a lumbar colotomy. By a little deep dissection, and with Mr. Fenwick's assistance, the ureter was readily found and exposed. A carbolised silk ligature was placed upon it just below where it crosses the common iliac artery, and the tube was then cut across on the kidney side of the ligature, and brought out into the loin wound. To the latter

it was attached by one fine silk suture. There was very little bleeding, and the whole proceeding only occupied a few minutes. The loin wound was partly closed by a suture at either end, but not so as to occlude the ureter. Before the patient left the operating room urine was seen issuing from the transplanted ureter, so that it was at once evident our object had been attained. A pad of absorbent material over the wound completed the dressing. It was noticed that as the ureter was being transplanted retching and attempts to vomit became continuous. Mr. Braine called my attention to this.

The patient also vomited at frequent intervals for twenty-four hours after the operation. This immediately ceased at the expiration of this period, when, in the course of my usual visit to the hospital, I removed the little suture which attached the divided end of the ureter to the loin wound, and which had evidently been keeping up some tension on the former. The now disused and protruding posterior wall of the bladder was covered with lint and vaseline, and the patient was placed on a light but nutritious diet.

For ten days after the operation the patient's condition was in all respects most satisfactory, the discharge of urine from the loin wound being, as far as I could judge, free and normal. Then followed a series of high temperatures, which continued from December 16 to January 29. On December 23 the temperature was 105·3, whilst on December 24 it fell as low as 97·4°. These variations continued up

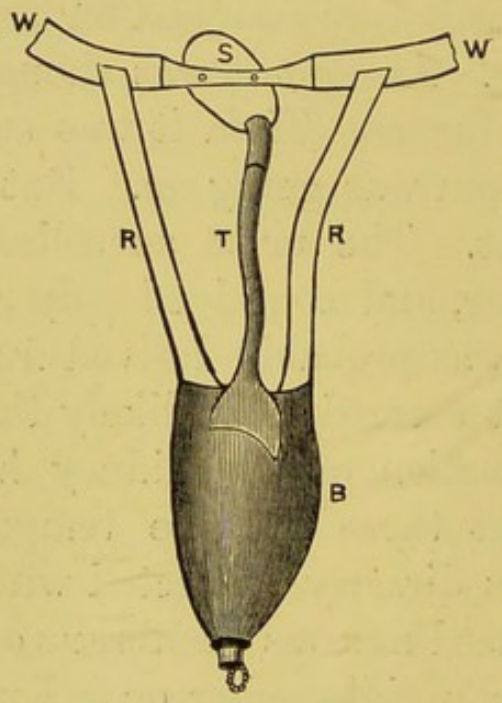
to January 29, when the normal level was again maintained. No rigors were noticed, though there was sweating and occasional vomiting. At times the patient was evidently drowsy, but he seldom complained of feeling ill, and was generally in good spirits and took his food with appetite. On January 7 he was allowed to get up on a couch, and from this date he steadily improved in every respect.

Different causes were assigned for these variations in temperature. At first it was thought that they were due to influenza. Then it was suggested that some suppuration was going on. But the evidence was insufficient. The urine as collected from the ureter was clear, and contained only a slight trace of pus, which was probably derived from the external wound. It seemed more likely that either the eliminating function of the kidney had been disturbed, or that these variable temperatures were due to changes directly connected with the absorption of the unused mucous membrane of the bladder, which was now rapidly going on. I regretted that at this stage no qualitative examination of the urine was made which might have thrown some light upon the point.

That the boy had greatly benefited by the change in the mode of urination there can, I think, be no doubt. He was now able to maintain the erect position, and moved about comfortably, being quite free from excoriations about his thighs, legs, and loin. His general condition also much improved. I am indebted to our late house surgeon, Mr. Pardoe, for the notes of this case, as well as for the following

analysis of the urine which was made on February 27, 1897, when the patient was convalescent. Sp. gr. 1014. Reaction neutral. No albumen. Urea 1·3 per cent. No casts nor crystals present. As he was growing he was only provided with an absorbent wool pad for the loin, which he changed every four hours, and

FIG. 11.



W, waist belt ; S, shield ; T, tube ; B, rubber bag ; R, supporting straps.

by means of which he kept himself comfortably dry. Later on he was fitted by Mr. Hawksley with an apparatus for collecting the urine as it escaped from the loin fistula (Fig. 11). Hitherto no attempt had been made to close in the bladder, as this appeared to be gradually undergoing a process of cicatrisation, as it ceased to be a mucous surface.

I would draw attention to the difference in the

condition of the urine trickling from the ureters in these deformities, mixed with the abundant glairy excretion of mucus from the surface of the exposed membrane of the fissured bladder, as compared with the excretion that escapes from the artificial fistula in the loin, as in the case under notice. In the former instance the excretion is irritating and offensive, with a strong tendency to form phosphatic calculi upon nuclei provided by the pubic hairs, whilst in the latter these characteristics are absent, and the presence of the patient ceases to be in these respects a cause of offence to others.

Though, in this instance, the treatment I have described was undertaken solely with the object of ameliorating the patient's condition, it is possible that a similar proceeding, or some modification of it, might be utilised in connection with the treatment of other forms of urinary disease. I refer more particularly to the extirpation of the entire bladder for malignant, as well as for some advanced forms of suppurative, diseases. Cases are occasionally met with in which, if it were possible to dispense with the bladder as a receptacle for the urine, its total removal might be safely and advantageously undertaken.

The patient lived for some six months after the operation, increasing greatly in height and weight, and the general condition being much improved. Constant care was necessary in keeping the apparatus clean, and as the ureter showed a tendency to contract it was dilated about once in fourteen days by means of Couper's lachrymal probes, followed by

flexible bougies up to No. 12, French scale. Early in June 1897 he was allowed to leave the hospital, his friends being fully instructed as to the necessity for scrupulous cleanliness and care.

He returned in a fortnight, emaciated, with a hectic temperature, the loin and thigh covered with an eczematous eruption from urinary soakage, and a large swelling filling the loin. The urine was only escaping drop by drop from the contracted ureteral orifice. On the insertion of a fine probe the urine spurted to a height of at least three feet, showing the great tension in the kidney. About ten ounces of urine were drawn off and great relief obtained. The urine was loaded with pus, ammoniacal, and depositing triple phosphates on the apparatus and skin. The patient never rallied, and died in a fortnight of suppurative nephritis, total suppression setting in about two days before death.

It was found on inquiry that the boy was looked upon with aversion by his family, and that no one had attended to him during his fortnight's absence from hospital. He had not been washed during this period. The fact that this patient lived six months after operation, and only died from neglect, makes it reasonable to hope that in such cases as I have mentioned the operation may add to the comfort of these unfortunate individuals without shortening their lives.

I first suggested a double proceeding of this kind in the last edition of my "Lectures on Urinary Diseases," published in 1893. This arose partly in consequence of having seen a patient, with probably

only one kidney, going about apparently with a single lumbar urinary fistula, where the urine was collected by a bag suspended to the loins, and partly because of the failure of other measures then in vogue to afford adequate relief in this class of deformities.

TREATMENT OF ALBUMINURIA BY RENI-PUNCTURE.*

KIDNEY TENSION AND ALBUMINURIA.

Recently, in connection with some observations I published† on kidney tension relative to albuminuria, I narrated the particulars of three cases in which albuminuria of some standing completely and, I believe, permanently disappeared after the digital exploration and puncture or division of the kidney capsule was practised. I will briefly refer again to these cases, together with some others to which my attention has since been called as bearing upon the point to which I desire to direct your attention on this occasion.

It is, however, only right to state that my cases were all instances where the kidney was explored and punctured, or incised, not with the intention of treating an albuminuria, but with the object of discovering some other co-existing morbid condition which, though previously suspected, was not on exploration found to exist. I regret that only scanty notes were kept at the time of these and some

* *Trans. Med. Soc.*, London, 1897.

† *Lancet*, January 4, 1896.

other cases to which I might have referred, arising from the fact that in the absence of what was more directly sought for, the existing conditions were insufficiently appreciated, whilst the good results accruing appeared at the time either unexplainable, or were referred to local states, such as the accidental fixation of a movable kidney, the division of a disordered nerve, or the moral effects of an operation. It was not until several instances had come under my notice in this way that I began to suspect that a different explanation for the total disappearance of one symptom of disease at least might with some degree of reason be offered. My cases are briefly as follows:

Case I.—In 1878 I cut down on the kidney from the loin in a youth aged eighteen, expecting to find a suppuration either within or around the organ. The patient was suspected to have had scarlet fever three weeks before this was done, and had since suffered from intense lumbar pain. He had had a slight rash, some desquamation, a sore throat, and albuminous urine with casts. I undertook the operation with some hesitation, and limited my incision so as just to enable me to put my finger on the kidney. It felt so tense that I extended my incision and opened it with confidence, expecting to find matter. This was not the case, and I closed the proceeding with the feeling that I had made an error in diagnosis. There was a full discharge of blood and urine from the wound for some days. The latter was lightly plugged with lint, and in the course of ten days or so healed soundly. After the incision was made the excretion of urine became far more abundant, and the albumen gradually and completely disappeared.

Case II.—In 1887 I operated upon a man, aged fifty years, who by nature of his occupation spent a large amount of his time under ground. Occasionally he suffered from hæmaturia in conjunction with colicky pains about the groins, and I came to the

conclusion that he was suffering from renal calculus. As, however, the symptoms were neither urgent nor confined to one kidney, the consideration of operation was postponed. In the course of a few months after I first saw him, and whilst he was continuing his work under ground, the urine became largely and constantly albuminous, and there was some pain referred to the right loin. I took him into the Royal Infirmary at Liverpool, where I was then residing, and explored the right kidney. The organ was found to be enlarged and tense. An incision of an inch in length was made through the cortex, and the pelvis was explored with the finger, but after careful examination no stone could be found. There was a considerable discharge of blood and urine which continued for a fortnight or so, a drainage tube being retained in the wound; on the withdrawal of the latter healing followed, and the urine became quite normal. I heard some time afterwards that the patient remained in excellent health, and was able to resume his ordinary occupation.

Case III.—This case is one that came under my observation in 1893. It was that of a woman, aged forty-four, who had suffered from slight hæmaturia at times for a year previously; occasionally the urine was albuminous. Shortly after I saw her she had a severe attack of influenza, which was followed by an aggravation of her renal symptoms. She complained of pain on pressure over the left kidney, and the albumen not only increased in quantity, but was constantly present in the urine. As she believed she had passed a small calculus some months previously, I thought it a proper case for exploration, and this was accordingly made. The late Mr. Durham saw the patient in consultation with me. The left kidney was found to be swollen and very tense. It was opened and explored with the finger, but no calculus could be discovered. There was a free drain of urine, with some blood which continued for about a fortnight, when the wound closed. The patient is now quite well, and the urine normal.

Looking at the three cases I have briefly related, I believe that the first was scarlatinal nephritis, the second nephritis from exposure to cold and damp, and the last subacute nephritis following most

probably upon influenza. Amongst other features, each case was characterised by the presence of albumen in the urine, which I am inclined to attribute to previous inflammation or its immediate effects.

Since these cases were published Dr. Newman, of Glasgow, has recorded two others where albuminuria ceased after the performance of an operation for fixation of the kidney. The cases are thus epitomised :*

Case A.—Right movable kidney, causing torsion of the ureter and leading to hydronephrosis, albuminuria, and tube casts in the urine. With the onset of paroxysms of pain, hydronephrosis was sometimes present; sometimes it was absent or not observable, but was attended by high specific gravity of the urine and albuminuria, and tube casts always appeared in the urine at the same time as the pain. Since the operation no albumen or tube casts had been found.

Case B.—Left movable kidney causing torsion of renal blood-vessels, albuminuria, tube-casts, severe pain and suppression of urine. There was no hydronephrosis, and operation was succeeded by recovery. The kidney was only freely movable, but no increase in size could at any time be made out. Commenting on these cases, Dr. Newman observes: "In the cases of occasional hydronephrosis, the presence of albumen and tube-casts was more difficult to explain. Why did the transient passive hyperæmia lead to the presence of tube-casts, the occurrence of which physicians were in the habit of regarding as of grave import and an indication of inflammatory trouble?"

Both of these cases appear to me to have an important bearing both upon the pathology and treatment of albuminuria. I am indebted to Dr. Hoeber, of Homburg, for the following particulars. He writes :

* Clinical Society of London. *Lancet*, January 18, 1896.

I have seen a very similar case to those you describe about two months ago. A man of about thirty-six years of age, very strong and otherwise perfectly healthy, got, after an attack of influenza, which did not appear very severe, most intense pain in the right lumbar region associated with slight albuminuria. As the pain lasted over a fortnight, and yielded to no kind of treatment, I sent the patient to a surgeon with the diagnosis of probable renal suppuration, particularly as there was slight feverishness. The incision brought a considerable discharge of blood, but no pus. The patient became rather anæmic, but lost the feverishness and albuminuria at once, and has had no return since.

SURGICAL TREATMENT OF KIDNEY TENSION.

From a careful consideration of these cases I do not think it is possible to avoid arriving at the conclusion that the disappearance of albumen from the urine was directly connected with the surgical treatment to which in each instance one of the kidneys was submitted. That the organs were in a state of tension in one class of cases as the result of inflammatory hyperæmia, whilst in the other from mechanical vascular obstruction, seems also to be a conclusion which is equally irresistible. Referring to the hyperæmia which exists in the initial stages of nephritis, Sir T. Grainger Stewart observes:* "Albuminuria is very often due to changes of an inflammatory character in the tubules and in the stroma of the organ, and in a very large proportion of the cases in which it occurs in practice it is dependent on this cause." That the changes which subsequently ensue as a consequence of nephritis, however commencing, by the substitution of a lower

* "Lectures on Albuminuria," 1888.

for a higher excretory tissue, as we see in the cirrhosed forms of Bright's disease, are due to the damage the organs received in the early and active stage of inflammation or congestion, seems by no means improbable. Sir Thomas Watson observed in his lectures: "The stress or congestion which befalls the kidney in cases of febrile anasarca may set on foot a morbid process that long works silently and unobserved, but at last declares its operation by symptoms."

Nor is there wanting evidence as to the high state of tension which is sometimes present in the kidney. I have frequently called attention to this at the time of operation for exploration of one of these organs. In one instance the degree would resemble that of a ripe or almost bursting plum, whilst in another the kidney was comparatively flaccid and unresisting on pressure with the finger. Yet these differences were not always at the time explainable.

That the relief of renal tension by direct surgical interference has been proved to be practical, and is under certain conditions indicated, is also supported by the cases I have cited. Surgeons have long learnt to recognise the disastrous and far-reaching effects of tension as it occurs in the human body, whether arising from inflammation or otherwise, and do not hesitate to negative any evil effects it may give rise to by means which render this very unlikely to happen.

Possibly my surgical experience has led me to exaggerate the disastrous effects of tension on the

tissues of the body, though for the most part it has been gained in regions which may be said to be less highly organised and delicate than the excreting apparatus of the kidney. It certainly seems somewhat remarkable at the present day that so many different views exist, or have been put forward, explanatory of the process by which albumen exudes so as to form a variable part of the urinary excretion. These various theories I shall not attempt to discuss in detail or to reconcile.

ANALOGIES FROM THE EYE AND TESTICLE.

I may briefly remind you of two analogous conditions. In the eye the most disastrous effects of intra-ocular tension are seen in "glaucoma." The recognition of the true pathology of this affection, and the adoption of mechanical treatment by iridectomy, or an allied operation for the removal of tension and the prevention of the degenerative changes thus initiated, as first practised by von Graefe, at once resulted in the saving of a large number of eyes, which, previous to this discovery, would undoubtedly have been lost.

In the testicle, when it becomes inflamed, we have not infrequently transient as well as permanent evidence of the damage that inflammation and tension are capable of bringing about in an organ which, relative to its secreting and investing structures, bears a resemblance to the kidney. The late Mr. Henry Smith was the first to draw attention to certain advantages that followed puncture or limited

incision through the capsule of the testicle in acute forms of orchitis. It was alleged, and I believe with a considerable amount of truth, that not only was the pain of tension in this way immediately relieved, but that permanent damage to the secretory structure of the testis was averted. In fact, sterility, so far as the organ involved was concerned, was by this means rendered unlikely to occur.

THE STRUCTURE OF THE KIDNEY IN RELATION TO TENSION.

The kidney may be said to be a highly organised gland surrounded by a thin fibrous capsule, and divided up into compartments or sections by barriers of a similar nature. It is capable of distension to almost any degree by a gradual force acting from within, as, for instance, the retrograde pressure proceeding from strictures which oppose the escape of its excretion, but from the nature of its structural constituents is incapable of adapting itself to sudden emergencies of this kind, as those usually arising in connection with the early stages of acute nephritis.

Assuming, however, that the means I have thus suggested for dealing with intra-renal tension, under circumstances to which I will presently refer, are applicable, it may be urged that as the kidney, as normally disposed, is a double organ, both glands must be directly submitted to the proceedings proposed, inasmuch as in the ordinary form of nephritis both kidneys are usually similarly involved. This,

however, does not necessarily follow, as the sympathies existing between the two organs are such as to cause impressions exercised upon one to be reflected on the other. Relief afforded to one kidney, as my cases illustrate, usually assists the other, whilst when the excretory power on one side is suspended or arrested, the opposite organ speedily takes up the whole of this work.

I might illustrate this point further in a variety of ways. The following case, however, seems to me to directly bear upon it:

It was that of a man aged thirty, whom I saw early in 1889, ten ays after he had received an injury to his loins by falling down in the hold of a ship and alighting on a case of goods. The right loin was ecchymosed, and from the presence of a little blood in the urine, which continued for some days after the injury, it was concluded that either one or both kidneys had been severely contused. The daily amount of secretion was considerably diminished, and the day I saw him it had only amounted to sixteen ounces in the twenty-four hours. There was pain on pressure over the right loin, which remained swollen, discoloured, and tender to the touch, and the temperature had risen and was variable. I thought it probable that peri-renal suppuration had occurred. I therefore exposed the right kidney from the loin, and removed some extravasated blood in the course of the incision. The kidney was found very tense and congested. I believed that suppuration had taken place within it, and therefore a small exploring trocar was inserted in two or three places, but without discovering pus. Further, at one point where it was very tense I made an incision into the cortex, but only blood and serum escaped. Considering that we had thus got rid of some of the products of the injury which were on the verge of suppuration, the wound was lightly packed with antiseptic lint and left open; there was a free discharge of blood and some urine for some days after, and all the symptoms which rendered the incision desirable

were at once relieved, and the patient made a good and complete recovery.

It was interesting to notice that the excretion of urine was more than doubled in the twenty-four hours following the operation, and the daily amount now remained normal throughout. Here the tendency towards suppression of urine was evidently connected with the intense congestion resulting from the injury in which probably both organs were involved, a condition of the circulation which was at once removed by the treatment described. We do not, I think, sufficiently recognise the high degree of vascular and tubular infarction that attends some grades of nephritis.

Some years ago I saw a girl, aged seven, who was suffering from scarlet fever of a malignant type. Almost complete suppression of urine was the leading feature in the case, and death took place in four days from the commencement of the illness. At the necropsy the kidneys were found to be so highly congested that I was not surprised at their being unable to excrete. I remember the passing impression arising in my mind that an incision into them appeared to be the only means that might have been effectual in restoring their function.

In a recent paper on "Scarlatinal Nephritis and its Varieties," Dr. Meadows Turner* remarks: "Out of the 5109 cases, 55 died with nephritis, either alone or complicated with other lesions. This number includes those who presented some symptoms during life, as well as some others in whom *post-mortem* extensive disorganisation of the kidney was found, though during life there were no sufficient symptoms for diagnosing such a complication."

* *Guy's Hospital Reports*, 1894.

CASES IN WHICH RENI-PUNCTURE MAY DO GOOD.

I will now endeavour to indicate the kind of cases of nephritis where it may seem desirable to adopt the practice I have illustrated. In resorting to such measures we cannot entirely, as I have already stated, lose sight of the fact in connection with the subject of albuminuria that its treatment as it at present stands cannot be regarded as entirely satisfactory or progressive. Commenting upon this point, Sir Grainger Stewart, one of our most modern writers on the subject, and whom I had the advantage of conversing with a short time ago in reference to the point that is now before us, observes: "Sir William Roberts and Professor Rosenstein have come to the same general conclusion as Dr. Saundby as regards the inefficacy of drugs in diminishing albuminuria, and I have satisfied myself by a long series of careful observations that we have no right to credit any drug with the power of directly diminishing the discharge of albumen."

The grounds upon which it may be desirable to give relief by surgical means directly applied to the kidney may be illustrated by some of those cases of nephritis which are seen as consequent on scarlet fever, though it seems to me that their application is not necessarily limited to these. In the larger proportion of cases of scarlatinal nephritis the kidney complication is only of a temporary character, and the disappearance of albumen from the urine is both gradual and complete. Under such circumstances surgical interference could not be regarded as war-

rantable. On the other hand, there are a considerable number of cases met with where this is not so. These may be ranged into two groups. The first includes those instances where the kidney complication is from the onset of the gravest nature, and death is imminent with more or less suppression of urine, as in the case I have previously referred to, where after death the kidneys were found in a condition of most intense vascular engorgement. In these cases a fatal issue usually ensues most rapidly, the duration of life being largely determined by the degree of suppression that is arrived at.

The second group of cases includes those where after a limited time the tendency, so far as the renal symptoms are principally concerned, is not in the direction of recovery. The amount of albumen does not decrease, tube casts as well as other evidences of disorganisation are found in the urine, and the latter in quantity is below that which may be regarded as an average. Though a physical examination of these organs, either from the loin or by abdominal manipulation, may fail to give any indication as to their condition, tenderness on pressure is often complained of. It is from amongst the cases represented in these two groups that instances will be found where I believe the measures advocated may sometimes be advantageously practised. It is in these instances that death either rapidly occurs or is brought about no less surely in the course of time by the more chronic forms of nephritis in conjunction with the cardiac complications which so frequently arise in connection with them.

That many cases of nephritis with high tension and subsequent structural deterioration must necessarily be attended with cardiac hypertrophy or enlarged powers of circulation is at once obvious. Diminished capacity to excrete can only be compensated for by increase in the force of the blood current. In the restoration of function we have the only safeguard against the development of this complication.

In conclusion, I will offer a few remarks on the precise nature of the surgical treatment of renal tension associated with albuminuria. It is hardly necessary to remind you that by anæsthetics and the antiseptic treatment as developed by Lord Lister we are now in the position, not only of exploring various organs of the body with perfect safety, but further we are enabled by these means to study what I would speak of as living pathology. It would not be possible for me to illustrate the truth of this observation more vividly than in the case of renal disease. Here by anæsthetics in combination with antiseptics a vast number of diseases have been brought, not only within reach of surgery, but with a degree of success which previously would have been unattainable. The operation of exploring a kidney by an incision from the loin, so as to enable the operator to examine this organ carefully and deliberately with the finger, and, if found necessary, to proceed further, has now been so safeguarded as to remove from the mind of any careful surgeon undertaking it the feeling that he is exposing his patient to any undue risk relative to the reason that is judged to demand it. I cannot say that I

ever saw any ill result follow the exposure of the kidney by an incision from the loin for the purpose of its digital exploration. On the other hand, we have seen in numerous directions the necessity for such a proceeding in many cases where, though recovery followed, a correct diagnosis had not previously been arrived at. Such instances include the presence of pus or fluid within the kidney, morbid growths requiring the removal of the organ, stones, undue mobility, and other abnormal conditions.

In the class of cases I am now referring to the kidney should be exposed by a moderate incision from the loin, so as to enable the operator to feel the organ distinctly both in front and behind, aided of course by pressure exercised on the kidney by the hand of an assistant from the front of the abdomen. If in conjunction with the presence of albumen in the urine the kidney is found in a state of tension, such as I have illustrated, three or four punctures may be made through the capsule in various directions; or should the organ be found in a higher state of tension, then a limited incision into the cortex may be practised. After one or other of these measures have been adopted, the wound should be lightly packed with gauze or a drainage tube substituted. In either case the incision should be dressed in such a manner as to provide for the free escape of either blood or urine, or whatever products may be exuded. For this practice I venture to think some reason will be found in the illustrations which have formed the text for these observations.

SOME SUPPURATIONS OF THE URINARY ORGANS.*

I HAVE selected for consideration some points which seem to arise out of the pathology of certain suppurative processes as observed in the urinary organs in relation to the more modern treatment of surgical lesions and infections as generally practised.

I shall first illustrate my observations by taking the most common, as well as the farthest reaching, cause of suppurations of the urinary organs, as occurring in the form of primary gonorrhœal infections in the male and the female, and as secondary developments in other parts of the genito-urinary system, as more frequently observed in the latter sex. The advances that have been made in connection with the bacteriology of the urinary organs in reference to the kind and extent of these infections have already led to some useful applications in the way of treatment which I will briefly notice. The investigations of Guyon, Janet, Hallé, and others of the French school, more particularly as regards the life-history and cultivation of these

* Read before the Medical Society of Brixton on June 10, 1897.

micro-organisms, are of much interest and importance. It is, however, to the practical aspect of the subject that I shall confine my remarks.

The first point that strikes one is that many of the cases spoken of as instances of chronic suppurative urethritis or gleet represent a far more extensive invasion than is generally supposed to be the case. In this lies, I have no doubt, an explanation of the difficulty that is not infrequently experienced in bringing cases of this kind to a successful and speedy termination. Many gleets are merely re-infections of the urethra from a bladder which serves the purpose of a medium for bacterial cultivation. So long as a gonorrhœa is confined to the area of the urethra as defined by that portion of the canal which lies in front of the compressor urethræ, or "cut off" muscle, the task of successfully combating the infecting suppuration is not usually a difficult one. The disease is within limits which can be readily acted upon by various agencies, administered either locally or by internal medication, and its course is generally limited both in severity and duration. When, however, these boundaries are exceeded and the bladder becomes invaded it is not easy to prevent re-infection taking place as if from an extraneous source. Hence the disease may be almost indefinitely protracted.

Nor is invasion of the bladder in this way uncommon or necessarily indicated by acute symptoms such as would unmistakably draw attention to the occurrence. In most instances of this the prostate is the only part of the urinary apparatus that may

show any active indication of contact with the septic products, the mucous membrane of the bladder, though harbouring them, being singularly insensitive to bacterial influences. That infection occurs in this way can be readily demonstrated. When the bladder has been thus involved the conditions of the urinary organs, particularly during the night, are extremely favourable for bacterial cultivations, a circumstance which may explain the constancy and degree of matutinal suppuration exuded by the urethra which is a prominent symptom in this class of cases.

It is rare, I believe, for gonorrhœal organisms to make their way up the ureters and to invade the kidneys—a fact which is no doubt due to the guarded manner in which these ducts enter the bladder and the constancy of the downward flow of the urine. That renal infection and urethral inflammation sufficient to cause a pyelitis of the former and a contraction or stricture of the latter can occur has been demonstrated as possible. Some years ago I examined the body of a middle-aged man who died from acute single pyelitis rapidly following upon a first attack of gonorrhœa. The ureter of the kidney involved was extremely dilated, a circumstance which was believed to be due to the patient having been in the habit for some years previously of passing renal calculi. The opposite kidney was much congested. Mr. W. G. Nash* has recorded a case of strictured ureter which was probably caused in this way. In the female the wide-

* *Brit. Med. Journ.*, April 8, 1893.

spread effects of the gonorrhœal infection are generally recognised.

Nor must it be forgotten in connection with the personal cultivation of infecting bacteria that the long moist prepuce covering the glans penis is frequently admirably adapted for this purpose. In this way a gleety discharge from the urethra is often maintained. Probably this may explain why Jews are more readily cured of these affections than Gentiles ; for this has certainly been my experience.

The suspicion, however, that the bladder may be infected with micro-organisms should be made a matter of proof, and this can generally be done. For this purpose care should be taken to obtain a specimen of the urine as it exists in the bladder, minus any contaminations it may pick up in its transit along the urethra. The first portion of the urine passed should be rejected as probably containing the flushings of the canal, the balance being separately collected as representing the constituents of what may be called vesical urine. When it is possible a catheter specimen should be obtained, in accordance with the directions of the Clinical Research Association, where there are reasons for believing that the bladder is infected. In this way gonococci may be detected in vesical urine in cases of gonorrhœa.

The mere fact that the urine is shown to contain bacteria does not necessarily imply that the individual is capable of inoculating another with gonorrhœa. Where, however, the gonococcus is discovered in the urine or the discharges of the

patient, as is not unfrequently the case, I do not think there can be any doubt as to the possibility of its communication to some one else. The bacteriological examination of these secretions may furnish important evidence in determining whether a person who has been comparatively recently infected should be allowed to marry. So long as these conveyers of infection can be detected in the urine or the discharges, so long may we expect that transference of the disease is liable to follow.

In these cases of secondary infection of the bladder, caused by extension from the urethra, I have for some time placed much reliance upon the irrigation of the bladder and urethra with antiseptics, as described by Dr. Janet,* with some modifications. The object is attained in the following manner. The apparatus consists of an ordinary hydrostatic bladder tank, holding about one pint of water and fitted with a nozzle to which a No. 8 Jacques' rubber catheter can be attached. The tank is elevated about six feet from the ground, and is filled with warm water containing thirty minims of Condy's fluid to a pint of the latter. For lubricating the catheter I use carbolised vaseline. The patient having emptied his bladder spontaneously is placed in the recumbent position and the catheter is then passed. Before the nozzle of the irrigator is connected with the catheter as it lies in the bladder the fluid is allowed to run off for a few seconds so as to ensure that there is no free air in the tube of the apparatus. Then the connection

* *Journal des Maladies Génito Urinaires*, Paris, 1896.

is made and the fluid is allowed to flow into the bladder by degrees until the patient is conscious of feeling distension. I generally use from twelve to sixteen ounces for this purpose, allowing it to enter the bladder in jets of about three or four ounces at a time. In this way the feeling of any sudden or extreme fulness is avoided, and the entire area of the mucous membrane of the bladder is unfolded and opened out, and thus comes in contact with the permanganate solution. When a sufficient degree of bladder distension is obtained the catheter is slowly removed, care being taken not to allow the fluid to escape. I then usually lightly palpate the bladder above the pubes with the hand before the patient stands up. This he should then do, and proceed to empty his bladder of its contents by his natural efforts. Thus not only is the bladder washed out, but the whole urethra is flushed in a manner that is impossible by any other artificial method. As the patient is voiding the contents of his bladder it is well to direct him to suddenly interrupt the outflow once or twice by pressure with the finger on the penile urethra. In this way the lacunæ of the canal are also distended and flushed by the irrigating fluid. This completes the process, which may be repeated once or twice in the twenty-four hours, until the urine and the urethral mucus are found free from organisms. Most patients, after proper instruction, will be able to carry out all these details. On the conclusion of each irrigation the patient should rest for a time in the recumbent position.

I have only referred to the permanganate of potash in great dilution as the flushing agent for use in these cases. Half a drachm of Condy's solution, as I have already mentioned, gradually increased to a drachm in a pint of water, has given me good results. In other instances the preparation known as "Sanitas," in the proportion of an ounce to a pint of water, has also answered equally well. Neutral sulphate of quinine (1 grain to the ounce) may also be used. More rarely I have employed nitrate of silver (one-sixteenth grain to the ounce) and perchloride of mercury. The last sometimes produces a good deal of pain, though only used in the proportion of 1 in 10,000 in strength to 1 in 20,000, and may even be still further reduced. I have no doubt for aborting infections the perchloride is the most effective. When used for the latter purpose in the proportion of 1 in 10,000, and after the solution has been spontaneously voided from the bladder as in the act of micturition, the bladder may be filled with a strained solution of albumin—say, that yielded by one fresh egg—in a pint of tepid or nearly cold water. If this is done and the albuminoid solution voided in like manner from the bladder, any pain, smarting, or spasm that the perchloride solution produces at once ceases.

Similarly, a weak solution of chloride of sodium, injected into the bladder after a solution of nitrate of silver has been used for this purpose, not only removes any irritation the latter may provoke, but coats over the inflamed mucous membrane with a thin layer of chloride of silver, which often affords

much relief when cystitis is present. Probably there is no better bactericide than nitrate of silver in these cases, but it requires to be used with the precautions mentioned, when good results may be obtained. In this class of cases where suppuration proceeds directly from infection, the internal administration of bactericides may be advantageously combined with the local treatment just referred to. In rendering the urine sterile and destructive to the life of the gonococcus there are no more effectual agencies than some of those which are derived from the vegetable kingdom. I refer particularly to the volatile oils which are so largely eliminated by the kidneys, of which I may instance sandal wood, copaiba, cubebs, and similar drugs. By these it is possible to so saturate the urine as to render the existence of certain forms of bacteria impossible. I shall, however, refer later to other methods of sterilising the urine which may also be utilised in the treatment of infecting forms of urethritis and cystitis.

I will now notice other varieties of urinary suppurations which may be best illustrated by certain cases of prostatic obstruction. Though the urine is in these instances usually purulent and charged with bacteria, the latter are not infective in the same sense as those I have previously referred to in connection with a specific form of urinary suppuration. On the other hand, it must be remembered that these micro-organisms are readily capable of transference from one individual to another through the medium of catheters and instruments of this kind, and thus they may be regarded as factors in the

causation of extensive and far-reaching suppurations in these parts. The principles of treatment in this class of suppurations are the same as those I have already mentioned, subject to certain modifications which I will proceed to notice. Putting aside the consideration of the precise means which these cases often require for mechanically emptying the bladder and thus preventing decomposition of the urine taking place, the restoration of the secretion to its normal state will be mainly brought about by antiseptics in the manner indicated. The more or less atonic condition of the bladder in these obstructive cases seldom permits us to employ the process of auto-irrigation as previously described, and we must therefore for this purpose avail ourselves of one or other of the methods usually practised.

In offering a few remarks on the toilette of the bladder I will do so in reference—(1) to the disposition of the parts requiring ablution; (2) to the mechanism employed; and (3) to the composition of the cleansing fluid. Most of us, I think, will admit that we are disposed to draw our ideas relative to the process of washing out the bladder from the natural state of the parts such as we see in anatomical plates. If, however, we select for our guidance the majority of pathological specimens illustrating the obstructive diseases of these parts, we shall at once recognise the difficulties that beset us in our endeavour to wash out these, as we should do, for instance, in the case of a pint vessel. Take, for example, the hypertrophied bladders, with their various saccules, pouches, and dependencies, which

are met with in connection with advanced urethral stricture in younger adults and in persons of more advanced age who are the subjects of obstructive prostatic disease. In many of these the bladder is no more like the natural organ than the interior of a glass bowl resembles the section of a coarse bath sponge. The contents of the latter you could hardly ever hope to wash out effectually, though you may succeed in soaking them out.

For washing out the bladder I almost invariably employ the hydrostatic tank which is now so generally used. It has, I believe, many advantages over syringes which I need not here stop to enumerate. When the bladder is much fasciculated it should be done in the recumbent position, with the object of opening out the mucous membrane as completely as possible without causing pain, the object being to reach irregularities on the surface which otherwise would escape contact with the lotion. When the bladder is much pouched it is a good plan, after filling it and before removing the fluid, to cause the patient to agitate his body from side to side so as to bring any dependencies there may be within reach of the antiseptic. In various ways such as these the process of washing out the bladder may be rendered more searching.

For washing out in ordinary cases of bacterial urine I usually prefer boracic acid or the boroglyceride. Condy's fluid, sanitas, and iodoform may also be similarly employed. As I have already said, a solution of nitrate of silver in the proportion of one-sixteenth of a grain to the ounce is often efficacious in

rendering turbid urine clear after other things have failed. The sterilisation of the urine by internal medicines is an important adjunct in the treatment of the class of cases I am now referring to. It is quite unnecessary to draw attention to the many obvious ways in which the urine may thus be altered. The specific gravity, the reaction, and the composition of this secretion may to a large extent be artificially influenced, and in these directions the course of suppurative diseases of the urine passages may be importantly and favourably acted upon. And this brings me to speak of some of the means at our disposal for rendering the urine sterile so far as the most important factors in suppurative diseases are concerned.

I have already referred to the sterilising influence that certain oils and essences, such as sandal wood and copaiba, are capable of exercising in this way. No less marked is the effect that boracic acid taken internally is capable of effecting in controlling bacterial life in the urine. Probably no better proof of this exists than in the results observed in connection with operations on the urethra, such as the passing of catheters and in internal urethrotomy. The late Dr. Palmer, of Louisville, showed many years ago that by the use of boracic acid beforehand the development of urethral rigors and fever, under these circumstances, was rendered highly improbable, and this has since been amply proved to be the case. Similarly the use of quinine as a prophylactic against urine fever has been shown to be most efficacious; salol and other like drugs are also well recognised

as urine sterilisers. Though boracic acid in doses of from ten to fifteen grains three or four times in the day is probably one of the most reliable sterilisers, it so often disagrees and causes dyspepsia as to interfere greatly with its use for the purpose.

Some years ago my attention was called to a preparation called borocitrate of magnesia, which was described by Dr. Koehler, of Kosten,* in Germany, as a solvent for uric acid calculi and gravel. In the communication referred to it is stated that it is prepared by dissolving boracite, a natural borate of magnesia which is found in Stassfurt, in citric acid. Whether it is actually a solvent for uric acid I am not prepared to say. Whilst testing it for this purpose I found that it frequently had a remarkable effect in sterilising and clearing up purulent urine and in favouring the expulsion of calculi and gravel by its flushing effects on the urine passages. For the latter purpose I have used it for the last ten years in conjunction with other means for preventing urine decomposition with considerable effect. I am in the habit of prescribing it in teaspoonful doses in half a tumbler or so of either warm or cold water two or three times in the day. It is extremely palatable to take, and readily dissolves.

We have other means for sterilising the urine by the mouth, which I will mention, as one method or one drug is not universally applicable. There is a combination of the salicylate of soda with the benzoate of soda, which possesses this power in a marked degree. I have frequently found urine

Berliner Klinische Wochenschrift, Nov. 3, 1879.

which has been rendered opaque by the presence of pus and was swarming with bacteria rendered clear in the course of a few days after the use of this preparation. I usually prescribe fifteen grains of both of these salts to be taken together three times a day in an ounce of chloroform water. The hyposulphite of soda in half-drachm doses has also in some instances effected the same object. I have also found urotropine very useful.

The principle of urine sterilisation may, however, be extended to other purulent or bacterial conditions of the urinary apparatus. I refer more particularly to some of those chronic suppurations resulting from the formation of abscesses in connection with the prostate and prostatic urethra, where the pus was originally discharged, sometimes against gravity, into the latter canal. These are often most difficult to heal by reason of the absence of a free and dependent opening. Yet, on the other hand, the opening of the perineum and the incising of the prostate to secure free drainage of the discharge is a proceeding that cannot always be undertaken without some degree of risk in elderly subjects. The thorough cleansing of these deep parts by the use of antiseptics in the form of auto-irrigation, as described in the earlier part of this paper, will be found efficacious in many of these cases of chronic suppuration. In some instances of prostatic suppuration it is almost impossible to flush a sinus connected with this part so long as a catheter of any kind is retained in the bladder. On the other hand, this object may be often readily effected by the spontaneous con-

traction of a bladder more or less distended with fluid. In the sinuses, for instance, arising out of tuberculous prostatitis this method usually proves very effectual.

Again, I have resorted to this way of flushing urinary fistulæ with some antiseptic fluid when the primary cause of them has been removed, as by gradual dilatation or after internal urethrotomy. Tortuous routes through the perineum may, by washing out through the medium of the bladder two or three times if necessary in the twenty-four hours, be thus healed.

A short time ago I saw a middle-aged man with a tight stricture in the deep urethra which only admitted a No. 4 bougie. In addition there were two chronic perineal fistulæ—one opening in the left buttock and the other by the side of the scrotum, through which almost the whole of the urine was passed at the time of micturition. The patient's condition was an extremely distressing one, as it was impossible for him to pass urine with any degree of comfort except upon a water-closet. I divided the stricture from within by Maisonneuve's urethrotome. A catheter was then tied in the bladder for forty-eight hours, and on its removal a No. 12 silk catheter á boule was introduced morning and evening. After washing out by means of this in the ordinary way the bladder was finally filled with about a pint of warm boracic lotion, which the patient was required to void naturally in the standing position on the catheter being withdrawn. The fluid escaped as in the ordinary act of micturition with this patient—namely, partly by the urethra and partly through the false routes. The proportion of the fluid coming through the urethra gradually increased, whilst that passing through the two fistulæ grew less daily, and in the course of ten days entirely ceased.

STRICTURE OF THE URETHRA.*

THE following classification of strictures is one which may be conveniently used for clinical purposes. First, those amenable to some form of dilatation; second, those found to be unadapted for such treatment and where other measures should be considered; and third, those which may have been regarded as impassable strictures. I shall limit my remarks to questions arising under these three headings.

The first class includes by far the greatest number and all strictures in their early stages. When this process of treatment proceeds satisfactorily, as it usually does, the patient is soon able to undertake the management of his own case after he has been instructed in the use of the appropriate instrument. For whatever is done in the way of treatment by dilatation or otherwise in the majority of advanced forms of urethral obstruction, the patient can seldom hope to entirely dispense with the passing of a bougie. When a person who is suffering from symptoms which may indicate stricture presents himself for the first time, much care is required in exploring

* The *Lancet*, April 23, 1898.

his urethra with a catheter or bougie. It is very easy to spoil a stricture and so lose the way through it. Thus future access to the bladder may be rendered rather more than less difficult. On making an examination of this kind our object should be to ascertain, without causing pain or bleeding if possible—(1) the presence and position of the obstruction, and (2) the degree of contraction which has been arrived at. It is undesirable to endeavour to pass an instrument into the bladder without knowing all this beforehand, otherwise we may easily select one too large for the purpose and so in the first attempt do more harm than good. The thinnest edge of the wedge must first be inserted, and then the dimensions of the contraction can be readily and accurately gauged.

In view of giving effect to these points I described fifteen years ago a flexible conical bougie or dilator which, so far as my experience of it goes, has superseded most instruments of this kind and has been the means of considerably reducing the number of what are called impassable strictures. These instruments are used both for locating and measuring all kinds and degrees of urethral stricture. They are about twenty inches long, commencing with a fine probe-ended extremity, which gradually expands in the opposite direction. They are made in different sizes, and are rendered extremely flexible when placed in warm water for a few minutes if necessary before using them. In this way they will readily coil up within the bladder. I much prefer the French make (Lassére's); I find them useful, not only for

the purposes I have mentioned, but for smoothing out a rough urethra and making the access to a stricture funnel-shaped so that it may be easily entered by almost any other instrument. The late Mr. Lund christened them "whips" when I first showed them and he adopted them, and they have since always gone by this name.

Bangs' filiform bougies, made on the same principle of the finest whalebone, are applicable to even more contracted forms of obstruction, such, for instance, as the eccentric pin-hole strictures which are occasionally met with. They may also often be used with advantage as pilots for the "whips." I can strongly recommend both of these instruments to practitioners who are liable to meet with stricture cases and have not hitherto given them a trial. Either of them will do duty in an emergency in relieving a retention of urine in the absence of a catheter by at once dilating the stricture to almost any extent by a single introduction of the instrument. On its withdrawal the patient is usually able to empty his bladder immediately by his own efforts. I have frequently used them in this way with prompt relief. I think they should be more generally known. No force can be exercised by them, otherwise they will double up and the object be defeated.

Passing to the second class of cases, which includes strictures found on trial to be unadapted for any form of dilatation, when for any reason a large amount of scar tissue has been imported into a stricture—as, for instance, in obstructions following

wounds and injuries of the urethra—it may be found impossible to sufficiently dilate the contraction which follows. This may proceed from some difficulty in connection with the access or entrance to the stricture, as when damage has been done to the interior of the urethra, from the inherent contractility of the tissue composing the obstruction, or from certain constitutional disturbances following attempts at dilatation even of the gentlest and most gradual kind. Let me briefly illustrate these three conditions.

Case 1.—A man, aged forty-two years, saw me in 1890 under the following circumstances. He was a great traveller, and though he had a slight stricture for which he occasionally used a bougie himself, he was not inconvenienced by it. About a year before I saw him he had had sudden retention of urine following a chill when he was in a remote part of Australia, and there had been much difficulty and bleeding in relieving him with a metal catheter. Since this happened he had never felt certain whether he would be able to pass his bougie. Sometimes it would enter and at others it would not. Though he continued to pass his urine in a fair stream, this uncertainty unnerved him and prevented him travelling abroad as an explorer, as he had been accustomed to do. In every other respect he was in excellent health. I examined him and found a short *cul-de-sac*, which was probably the remains of a false passage below the line of his stricture, and which occasionally caught the tip of his bougie and prevented it entering the stricture above. There was, in fact, a sort of valve arrangement. I performed an internal urethrotomy for him and divided the floor of the stricture, so, as it were, throwing the siding into the main line. He has since had no difficulty whatever, and has resumed his explorations in various parts of the world.

Case 2.—This was a man, thirty years of age, who in 1893 damaged his deep urethra by being thrown forward on to the pommel of his saddle. A stricture followed which proved most

contractile. There was no difficulty in dilating it up to a No. 12 bougie, but this was invariably followed by an attack of retention of urine in the course of a few hours. It was all the same whatever degree of dilatation was attempted. I advised an internal urethrotomy to be performed. A splice of new tissue was thus introduced, and he has since been free from all further inconvenience beyond occasionally passing a full-sized bougie for himself.

Case 3.—The patient was a man, aged fifty years, who had spent much time in Africa, and had contracted several malarial fevers. One or other of these was invariably roused up when he passed his bougie, in spite of large doses of quinine taken as a preventive. The fever necessitated his spending two or three days in bed on each occasion. The stricture was a very contractile one, and though the instrument passed tolerably easily, on its withdrawal it was firmly gripped, and then the constitutional symptoms followed. I performed an internal urethrotomy for him, after well sterilising his urine previously and taking other antiseptic precautions (as I shall presently note). The patient has since had no further trouble of this kind. It is curious to observe the effect of tension, and its removal, relative to the production and prevention of urethral fever and the other fevers which it resembles.

In cases such as these and the like we may do immediate and permanent good to strictures which will not yield to dilatation alone, and thus prevent the bad effects of back pressure gradually extending to the bladder and kidneys above, by introducing a splice of new material into the contracted portion of the canal, much on the same principle as we should expand a tight garment.

For these purposes I usually select Maisonneuve's instrument. It consists of a fine pilot and director upon which a small triangular knife dulled at the apex runs. It can thus only divide the contracted

portion or portions of the canal, and this it does by a clean linear longitudinal incision corresponding in depth with the size of the blade. As healing takes place, under the occasional use of a bougie a splice or interval of new tissue is introduced between the lips of the incision, and thus the calibre of the canal may be considerably increased in a short time. For forty-eight hours or so before this is done it is well to sterilise the urine with some boric acid taken by the mouth in small doses or with the boracite of magnesia, the preparation of which has been previously described (p. 131). The former sometimes produces indigestion, whilst the latter is both pleasant and reliable. The filiform pilot is then passed through the stricture into the bladder, the fine metal director following it. The urethrotome is next run along the groove in the latter and the stricture or strictures are divided from before backwards. Care should be taken not to run the blade farther than the last point of contraction, so as to avoid touching any fibres of the bladder sphincter. The latter is unnecessary and may cause some bleeding.

To make sure that all stricture fibres are severed and a clear interval is provided between the lips of the incision thus made, a short series of Lister's metal bulbous bougies (10 to 15, English gauge) should be successively passed before the patient recovers from the anæsthetic. The ordinary round-ended bougies are not suitable for this purpose, as they may catch in the lips of the wound. It is a matter of much importance to secure a perfectly smooth, soft scar. All metal instruments for use in

connection with a strictured urethra should be bulbous or olive-headed. The bladder is then emptied of any urine it may contain and washed out with a solution of perchloride of mercury (1 in 6000) until the lotion returns quite clear. An ounce or so of the solution is left behind in the bladder so that the first portion of the urine voluntarily passed is sterilised. This completes an operation which need not occupy more than a few minutes. Carbolised vaseline (three grains to two ounces) is used for the instruments. I rarely tie a catheter in the bladder unless—as sometimes happens—a chronic stricture has induced an atonic bladder, when a soft rubber catheter may be retained for forty-eight hours or so, otherwise we may have high temperatures until the viscus is artificially emptied. With these antiseptic precautions there is seldom any marked degree of urinary fever.

On the fourth or fifth day after a whip bougie is generally passed and the patient is instructed in the use of a suitable instrument. For many years Maisonneuve's operation has commended itself to me on the grounds of its simplicity, its adaptability to the most contracted forms of stricture, and the benign character of the scar tissue which usually results. I have therefore referred to some details to which I have learnt to attach considerable importance. The extension of the antiseptic principle to these operations has in all respects greatly benefited them.

Still more rarely there are cases of stricture met with where neither dilatation nor internal urethro-

tomy will cover the ground the contraction occupies. Instances occur when, by reason of contraction, abscess, and fistula, the perineum and urethral wall become matted together and converted into a hard mass of dense warty-looking tissue which can be only successfully dealt with by some form of perineal section. This, however, though the cases may be comparatively few, is a subject of itself and requires a consideration which cannot be included within the limits of these remarks. It must be reserved for another occasion.

I will therefore pass on to the third division of my classification—patients who present themselves for treatment on the ground that they are suffering from an impassable stricture. In my earlier days I was much impressed by the teachings of Syme, endorsed by Bickersteth of Liverpool in his practice, to the effect that such a term as "impassable" could only be used in a somewhat relative sense and was inapplicable unless the canal was structurally or if I may use the term, hermetically closed, as, for instance, when a urinary fistula coexisted. Syme thus refers to this point: "There is nothing of more consequence in the treatment of stricture than knowledge of the fact that this alleged impermeability has no real existence except in those rare exceptional cases where the urethra has been divided by violence and allowed to cicatrise with obliteration of the passage beyond the opening at the seat of injury. It is obvious, indeed, that if the urine is permitted to pass, no matter in how small a stream, there must be room for the introduction of

an instrument provided it be sufficiently small and properly guided."*

This is a high ideal to take and to attempt to follow, but it puts into prominence the first principle associated with the treatment of urethral stricture whatever form it may assume. Though we may fail to attain it, the possibility of doing so in a legitimate and scientific manner should never be lost sight of. If such a conclusion as this could have been arrived at in the time of Syme, how much more so is it within our reach in the present day, after what has been done in improving the construction of all kinds of instruments used for this purpose. Though much patience and tact is often required in obtaining access to the bladder through a contracted stricture, failure, I believe, need now but rarely occur.

Nor is the attainment of this a matter of indifference relative merely to the adoption of one out of two eligible courses. Experience shows that as there are strictures which need not be cut merely because they may seem in the first instance to be impassable so far as a bougie is concerned, so are there strictures which though passable in this sense are yet found to need cutting. No sufficient answer can be given to the important question that is thus raised until a stricture has been fully explored, and this, I believe, can be generally done. For an impassable stricture I do not think there can be any better alternative than the one associated with the name of Mr. Wheelhouse, where the contraction is

* "On Stricture of the Urethra," second edition, 1855.

sought for by opening the perineum. It would, however, not be difficult to find many surgeons largely engaged in operative work who have never availed themselves of this proceeding, on the ground that a stricture had resisted all legitimate efforts to enter the bladder along the urethra.

SOME ADVANCED FORMS OF URETHRAL STRICTURE TREATED BY A COMBINED EXTERNAL AND INTERNAL URETHROTOMY.*

In some previous clinical remarks on the commoner forms of urethral stricture I reserved for separate consideration certain instances where the methods of treatment then referred to were unlikely to prove of much benefit, for the reasons that either the obstructions were too "burn-scar"-like and contractile to dilate or too tough or extensive to divide from within the urethra. In addition to such characteristics these strictures are not unfrequently complicated with fistulæ or tortuous routes in the perineum and scrotum through which both urine and pus escape. Hence the discomfort of the patient is often greatly added to. Cases answering to this description are generally regarded as being best treated by some form of perineal section or, as it is sometimes called, external urethrotomy, and it is to this point I desire now to confine myself.

As a contribution to this subject I published a

* The *Lancet*, June 11, 1898.

series of cases* where the usual operation of perineal section as undertaken for stricture in the deep urethra had been greatly simplified, and its safety and efficiency increased by combining with it internal urethrotomy. Strictures of the class now under notice are but rarely impassable to some form of instrument, and as by reason of the urinary fistulæ which so often complicate them they are seldom urgent in their nature, time is allowed not only for effecting an entrance into the bladder by the natural way, but also for ascertaining what may be the outcome of some kind of dilatation. Assuming that the former is accomplished, though dilatation proves futile, the combined operation probably offers the best solution of the difficulty. In describing it, together with such modifications as I have adopted since the publication of my first paper on this subject, I will take in illustration two typical instances in which it was employed :

Case 1.—A man, aged fifty-one years, whom I saw and operated upon in 1890, had been the subject of a stricture with a strong tendency to contract for some years, and had undergone no less than six operations for it, including a divulsion by Holt's method, and five internal urethrotomies at various intervals and places. For some months before I saw him the stricture had been contracting and closing in spite of the patient's well-directed efforts with suitable bougies to keep it open. Straining to urinate was constant and prevented continuous sleep, and there was some cystitis with probably pyelitis. It was clear that a free relief must be afforded, as structural kidney complications appeared imminent. I performed an internal urethrotomy with Teevan's modification of Maisonneuve's instrument, as I thought that the latter might not stand the strain put upon it by the cartilaginous

* *Brit. Med. Journ.*, July 18, 1885.

character of the tissues which had to be divided. This being done, I passed a full-sized grooved staff (No. 12 English) into the bladder. As the latter was evidently gripped in the deep urethra I had the patient placed in the lithotomy position, and I divided in the median line from without inwards such contracted tissues as remained. I thus opened the urethra and found by passing my finger first into the bladder and then hooking it forwards along the urethra in the direction of the penile orifice, that the walls of the canal had now been rendered free and unresisting. A full-sized gum-elastic drainage-tube (such as I have elsewhere described and figured* in connection with the larger subject of bladder drainage) was passed into the bladder through the wound and retained. The parts were well washed out with a solution of perchloride of mercury (1 in 6000). The drainage-tube was finally withdrawn on the sixth day and the wound soon closed. Eight years have now elapsed since this operation was practised. The patient remains in good health, and suffers no further inconvenience from his urinary organs than having occasionally to pass a full-sized bougie for himself. I frequently meet him.

Case 2.—This patient, aged forty-five years, had a tough contractile stricture which had resisted dilatation, and was complicated with several urinary fistulæ of two years' standing. I operated upon him in 1892. He was treated in the same way as the preceding patient, and in addition the various fistulæ were opened up and scraped. The result was equally satisfactory, and is so far permanent.

Perineal section carried out on these lines has been found to present many advantages. In the first place it is easier to effect a division of the hard and condensed tissues of the perineum, such as generally surround strictures of this kind, upon a fairly large staff than upon a small one, or even upon the shouldered staff which Syme used for marking the commencement of the contracted portion of the canal.

* "Surgical Disorders of the Urinary Organs," fourth edition, and p. 173 (*seq.*).

The freedom or otherwise with which the large-sized instruments move in the canal is sufficient to determine the necessity for proceeding at once with the external section, as well as the precise locality and degree of the contraction which remains.

It may seem at first sight in combining these two operations that the magnitude of an ordinary perineal section is increased. This, however, is not the case, as the division of more or less of the obstruction from within the canal has not infrequently proved sufficient to completely clear the urethra, whilst it invariably tends to limit considerably the extent of any external section which may still be required. Further, it must be remembered that there is no kind of wound involving the deep urethra which heals so kindly or is so free from those constitutional symptoms which occasionally follow operations on this canal than that where a temporary drain is established for the urine.

Again, this point is importantly supported by the results following rupture of the deep urethra from external violence. Cases of this kind where a perineal section is performed and a temporary drain established compare most favourably, both immediately and remotely, with those where the treatment consists in the retention of a catheter, when this can be passed, the points of distinction being in the former class of cases the absence of septic symptoms of a serious nature and the more favourable character of the scar which results. There is no worse kind of stricture to manage than that following an extensive rupture of the deep urethra and its treatment by

what may be described as the closed method. It is on grounds such as these that I believe the combined operation proves of much benefit in the treatment of some of the most serious and complicated forms of urethral stricture.

Before concluding, I will briefly refer to a class of strictures which I have only incidentally noticed. This is the structurally impassable stricture—impassable alike to instruments and urine and associated invariably with an extraneous route for the urine, probably through the perineum. The latter condition is the result either of nature's effort to provide escape for the urine by abscess and fistula, or of the surgeon's, more promptly and directly, by incision. In endeavouring to restore a urethra of this kind, and to close a well-worn fistula, the surgeon will fully recognise the mechanical and physiological difficulties before him, not only in reproducing a portion of the canal which to all intents and purposes is obliterated, but in subsequently fitting it to take up the functions connected with the process of natural, or even aided, micturition. It requires no great amount of surgical ingenuity to establish the continuity of the urethra so far as instrumentation is concerned, but to secure a reasonable degree of control or influence over the restored portion of the canal is by no means certain. On the other hand, experience and trial have not infrequently shown that a good urinary fistula has proved an excellent substitute for a bad urethra.

SOME FORMS OF ACUTE URINE FEVER*

RESEARCH has made considerable progress since Civiale published his important treatise† on this subject, and we have to consider the pathology of urine fever from a bacteriological as well as a clinical aspect. It is to the latter I shall chiefly address myself here. Let me mention in a few words the type of cases I am referring to.

CASE 1.—A patient with a urethral stricture, but otherwise in good health and without any physical evidence of kidney disease, undergoes the comparatively slight operation of internal urethrotomy. Within a short time afterwards he is seized with a rigor, his temperature rises, and he perspires freely. This process, resembling a malarial fever, may or may not be repeated once or more, though the patient makes a good recovery.

CASE 2.—To take another illustration, such as one recorded by Mr. Mitchell Banks.‡ A man about thirty years of age had a small bougie passed through a tight and long stricture commencing at two inches from the meatus, having on previous occasions submitted to a similar proceeding. Half an hour afterwards he

* *Congrès Francais de Chirurgie*, 1892.

† "Nouvelles Recherches sur la Fièvre et quelques Phlegmasies spéciales qu'on observe dans les Maladies des Organes Génito-urinaires." 1860.

‡ *Edinburgh Medical Journal*, June, 1871.

vomitted, and a rigor supervened. The rigor was repeated, accompanied with a rapid pulse; a convulsive tremor followed, and death took place six hours and a half after the introduction of the bougie. Post-mortem examination records that, beyond the presence of a long stricture and some slight congestion of the kidney, all the organs of the body were healthy.

Case 3.—In 1886 I saw a healthy boy aged eleven years who had partially ruptured his membranous urethra by falling astride on his perineum. With a little trouble I passed a catheter and drew off over a pint of bloody urine. The catheter was retained. Forty-two hours after the injury he was seized with convulsions, which recurred at intervals, with much violence, attended with opisthotonos. He could not swallow though the jaws were not fixed, and he became comatose and died in eight hours after the convulsions set in; that is to say, fifty hours after the accident. An hour before death he had a temperature of 104° F.

These cases, I believe, all belong to the same group, though fatal instances are rare. That such effects are consequent on bacteria infection seems likely. This aspect has been well studied by Dr. Noel Halle,* and the results of his investigations in M. Guyon's laboratory at the Necker Hospital are worthy of careful attention. It is to the conditions which seem to favour or hinder septic infection that I wish to allude.

I was led up to making these observations by noticing the differences relative to the liability to a distinctive fever that existed between various kinds of lesions of the urinary apparatus. For instance, such an effect was rarely observed after lithotomy or perineal section for stricture, whilst in some degree it commonly occurred after internal urethro-

* "De l'Infection Urinaire:" *Annales des Maladies des Organes Génito-urinaires.* Paris: February 1892.

tomy. In a paper on this subject the late Mr. Teevan* referred to the frequency of rigors and fever after this operation as amounting to about two-thirds of his cases, a proportion much in excess of what is now observed where antiseptics are employed. Again, in accidental lesions of the deep urethra unattended with any breach of skin surface, as in those caused by falls on the perineum, it was frequently noted that rigors and fever supervened where their treatment was attempted by the retention of a catheter in the bladder by the side of which urine leakage took place, whereas in those instances where continuous urine drainage was provided by perineal incision such effects did not usually follow. Further, the occurrence of fever seemed in no way influenced by the slightness of the lesion, some of the most marked effects being noted after the passage of a bougie or catheter where the damage was extremely small, perhaps not amounting to more than an abrasion of the protective epithelium lining the urethra. Observations such as these appeared to indicate that certain distinctions in the mechanical construction of wounds were more potent contributory causes of what followed than mere textural limitations.

In view of such differences, and the frequency with which internal urethrotomy was then followed by varying degrees of fever, and also having regard to the more permanent improvement of the stricture, I altered my plan of procedure, and adopted the

* *British Medical Journal*, March 16, 1878.

method of division of the stricture with temporary bladder drainage, as described in the previous paper (p. 144).

The point upon which I desire to lay stress in connection with this proceeding is this—that the combination of internal urethrotomy with means for securing efficient urine drainage, independently of antiseptics, prevented rigors and fever such as were observed when internal urethrotomy was alone practised—any exceptions to this being traceable to faulty urine drainage. In twenty-three consecutive cases where the double proceeding was practised, neither rigors nor fever were observed, the elevations of temperature, which were rarely noted, being such as are often met with in practice. These observations corresponded with what was noted in connection with the treatment of accidental lesions of the male urethra from falls and blows on the perineum, where the conditions were similar.

There appeared to be only one form of rigor which was difficult of explanation by any septic view. This was the shivering which not unfrequently supervened, when, after lithotomy or perineal section and operations of a similar kind, urine was passed naturally along the whole length of the urethra for the first time, as happened in the following instances:

Case 1.—In 1892, when performing lithotrity for a patient aged forty-nine, with a urate stone, a large triangular fragment became so firmly impacted in the urethra in front of the prostate that I completed the operation by a median cystotomy, through which I readily extracted all the débris and retained a drainage-

tube for forty-eight hours. His temperature remained normal till the twelfth day, when he micturated naturally. This was immediately followed by a sharp rigor and a rise to 100·4° F. No further rigors were noted, and recovery proceeded without interruption.

Case 2.—In 1892 I divided the floor of the enlarged prostate of a patient aged fifty-three, who had been entirely dependent on the catheter for over a year. The latter became so irksome and painful that he determined to have the section made. This was done, and a drainage-tube introduced. No rigors or elevation of temperature followed. On the twentieth day the drainage-tube was removed, and he shortly afterwards micturated naturally for the first time for over a year. This was followed by a sensation of chilliness, headache, an elevation of temperature to 101·4° F., and a dryness of the skin with thirst. These symptoms declined, a free diaphoresis took place, and recovery was complete.

What is the significance of the latter manifestations? I believe their causation is distinct from those previously referred to. In the first place, the sensation of chilliness commences on the conclusion of the first act of normal micturition; it does not usually recur; there is no incubative period. I am not aware of any evidence to show that these symptoms, either immediately or remotely, ever proved fatal or even serious, nor have any indications of a systemic or an infective nature, such as suppression of urine or suppuration, been observed in connection with them. These observations seemed to justify the conclusions (1) that the occurrence of a distinctive variety of acute fever following wounds of the urinary apparatus was determined by defective urine drainage; and (2) that the fever following was toxic and not neurotic.

The employment of antiseptics in operations on

the urinary organs and the artificial sterilisation of the secretion, as referred to in a previous article on Urethral Stricture (p. 134), has limited considerably the necessity for employing bladder drainage as a part of the treatment of this affection. The latter addition is rarely required, and may be said to be limited to some old strictures with urinary fistulæ or chronic suppurative cystitis. The subject is here referred to relative to the light it throws on the pathology of urinary fever.

ON A MODE OF STRETCHING SOME URETHRAL STRICTURES*

In previous remarks on urethral stricture I have referred more particularly to its treatment by dilatation and by certain forms of urethrotomy or section. I have also described some instruments I usually employ with these processes. In an obstructive disease which presents so much structural variety cases are occasionally met with where, either from the urgency of the symptoms or the nature of the stricture, it will be found impossible to utilise these methods, and modifications of them may be substituted with advantage.

The rarer cases of advanced stricture to which I am now referring usually owe their urgency to being complicated with some degree of retention of urine which also calls for surgical aid. A man of middle age, I will say, has been suffering from a neglected stricture for some months or years. Eventually he is either suddenly seized with inability to pass urine at all or he becomes seriously inconvenienced by the increased tension of a never emptied bladder. Let it be assumed that the stricture is so hard, con-

* *The Lancet*, August 6, 1898.

tracted, or tortuous as to resist hot baths, opium, and catheterism with all forms of flexible instruments, and access to the bladder can only be effected by a fine metallic catheter. Possibly this even may require the aid of an anæsthetic. If such a catheter is tied in, it not unfrequently slips out during the night, and all the trouble of replacing it or substituting a somewhat larger one has to be repeated, and not always with success. Even if it is retained, it may not be possible to substitute a larger one, and thus the progress of the case in giving increased relief to the patient is either hindered or proves impossible. Nor is the retention of a fine catheter, such as No. 1, 2, or 3, in a septic bladder to be desired, even though some relief to tension is afforded, any more than a drainage tube which will not drain is of service with a putrid abscess. Unless the relief is sufficient in either case, sepsis is sure to follow if it has not already commenced. With a small catheter such as those I have referred to it is impossible to wash out and disinfect the bladder, and puncture or any forms of cystotomy or urethrotomy are not always advisable under these circumstances. It is in cases of this type, when the surgeon has succeeded in passing a small metallic catheter through a tight and difficult stricture into a more or less distended bladder, that the inability to expand the instrument at the same time, and so to stretch the stricture before withdrawing it, is not unfrequently experienced.

With this object in view, I described some years ago an instrument constructed on the lines of a Holt's

dilator (Fig. 12) which appeared to meet the difficulty, and I have since continued to use it with

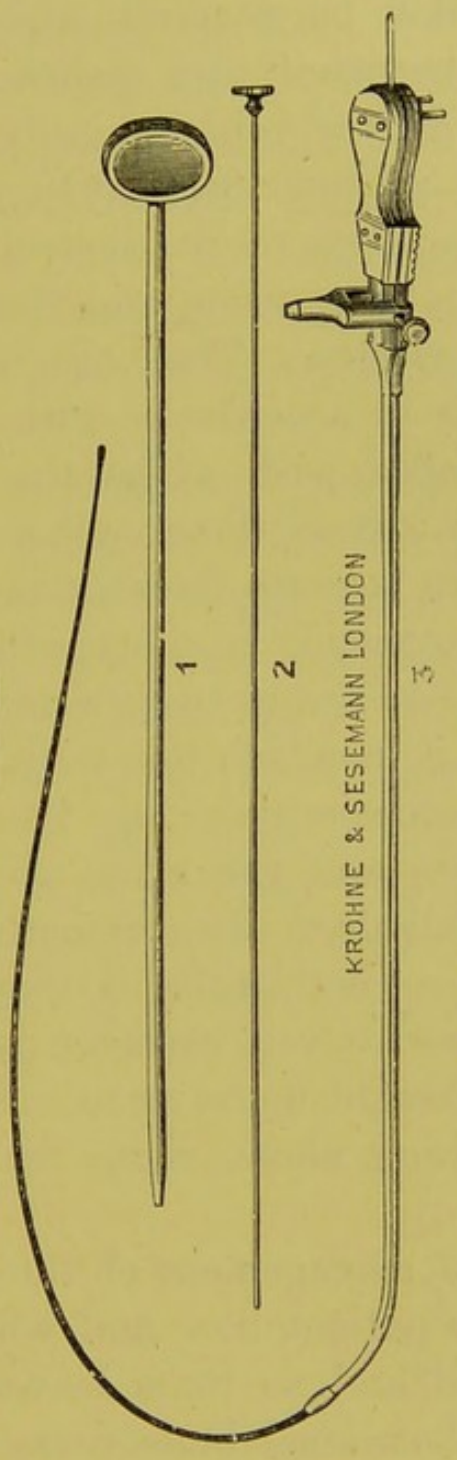


FIG. 12.

1. A dilating rod. 2. Catheter stylet. 3. Dilator.

advantage. It is provided with a pilot guide as well as with a screw top in case the former proves useless. It contains a fine test catheter on which the dilators run. It is fitted with a series of seven rods by

which dilatation may be carried from a No. 3 to a No. 12 (English gauge), and the introduction of the latter is controlled by a spiral spring which consolidates the instrument and makes it act as one piece. On the dilator being passed, as an equivalent to a No. 3 catheter, the stylet is withdrawn, and the correct position of the instrument is judged of by its transmitting urine and from its position relative to the rectum. Then the introduction of the dilating rods in accordance with their number and size is proceeded with whilst the anæsthetic is continued. This is to be done deliberately so as to stretch and not to lacerate the stricture, the process usually lasting, according to the rigidity of the contraction, from about ten to twenty minutes. When the largest rod is reached, the fully distended instrument, now representing No. 12 in calibre, is quietly withdrawn and the urine that remains is drawn off by a full-sized silver catheter, which may be passed easily. The bladder is then washed out and disinfected, and a soft catheter is tied in and retained for forty-eight hours or so. As the process is one of stretching alone, rigors or fever rarely follow.

The subsequent management of the case consists in instructing the patient how and when to pass a bougie for himself and so to endeavour to permanently maintain the normal dimensions of his urethra. It is hardly necessary to illustrate the kind of case to which this treatment is applicable, as it will readily occur to those who have had any practical experience of them. In proceeding to adopt it, the

only drawback which is likely to happen is the case proving, on trial with an anæsthetic, to be an impassable stricture. Under such circumstances, Wheelhouse's perineal operation would probably be selected as the alternative. Where, however, the dilator can be passed in the manner I have endeavoured to describe both patient and practitioner will be none the worse for knowing that the retention of urine has been relieved in such a way as will permit the introduction of a full-sized catheter into the bladder.

There is another class of cases where the instrument will be found of much service. I refer to instances where the difficulty lies in impeded access to a stricture otherwise amenable to dilatation. The canal may be puckered or crooked just at the orifice of the contraction sufficient to make the facile passage, even of the finest bougie, a matter of chance. The use of the stretcher as a preliminary to the process of dilatation with ordinary bougies usually permanently removes a difficulty due to this particular cause.

NOTES ON HÆMATURIA*

I AM taking as a text a hundred consecutive cases I have noted where hæmaturia happened to be a prominent and feature-giving symptom, excluding those instances where it was apparently of an accidental character, as sometimes occurs in connection with the use of instruments and the like. These cases appear to permit of being classified as follows and as indicating the probable source and nature of the bleeding:

Kidney stones	30
The enlarged prostate of elderly men	20
Bladder stones	14
Tumours of the bladder and prostate for the most part malignant	13
Urinary tuberculosis	6
Urethral strictures	5
Cystitis	3
The passing of oxalate or urate crystals	3
Injuries to the urinary apparatus or their effects	2
Filaria sanguinis hominis	1
Sarcoma of the kidney	1
Very doubtful origin	2
	100

* Clinical Lecture at St. Peter's Hospital.

It seems not unlikely, in this country at all events, that the order of frequency which I believe occurred in my practice represents a general experience in regard to this one symptom. I refer to place, as local conditions may have a considerable determining influence. For instance, if statistics were taken on a large scale in certain parts of the East, as in Egypt and elsewhere, it would be found that the hæmaturia due to a parasite situated in the urinary organs largely predominated. Again, in certain eastern parts of England the hæmaturia due to stone and gravel might be much in excess of that I have given, but taken as a whole, the proportions noted will, I think, be found fairly typical.

Hæmaturia may be regarded as a tolerably constant symptom of stone within the limits of the kidney or its pelvis. It is not invariably present. In the case of a man from whom I recently removed two stones from the cortical substance of the kidney this symptom was absent, the indications for operation being the severe loin and testicular pain from which he had suffered for some months, which were completely relieved by what was done.

The persistence of hæmaturia associated with symptoms of renal colic is sufficient to warrant the exploration of the suspected organ by an incision in the loins. A stone in the kidney which can maintain a bleeding is sooner or later likely to lead to the destruction of the organ.

In the thirty cases of hæmaturia due to renal calculi there were several where the expulsion of

the stones followed the use of the borocitrate of magnesia,* which will be found a suitable salt used in solution for flushing the urinary organs in cases of this kind. It will be time enough to proceed to remove a stone from the kidney by operation after such measures as these have been sufficiently tried.

Stone in the bladder was attended with bleeding in fourteen instances. Hæmaturia is not as a rule a constant symptom of this affection, though the circumstances under which it occurs are generally significant. When we hear of a person with an irritable bladder who cannot, for instance, take horse exercise, ride on an omnibus, or walk along a rough road without seeing blood in his urine, it may be taken as a hint that he has a stone in the bladder. At all events, in the absence of other indications, it is generally worth acting upon and suggesting that a sound should be passed if this symptom is not speedily cleared up. An acute hæmaturia, followed by irritability of the bladder, may sometimes indicate that though a stone has passed from the kidney it has not escaped by the urethra. This happened in two instances out of the fourteen tabulated, and in both a single crush with the lithotrite effected the immediate discharge of the fragments with no further inconvenience to the patient.

In three instances out of the hundred the passing of crystals, chiefly uric acid, was apparently responsible for the appearance of blood in the urine.

* "The Extra Pharmacopœia." By W. Martindale. Ninth ed. p. 7.

In none of these cases was the amount of blood considerable. Some persons never seem to be well unless they are passing large quantities of uric acid, and everything which tends to check the excretion appears to add to their discomfort. I believe the hæmorrhage that attends these discharges of uric acid is sometimes connected with the precise nature of the crystalline form, as a change in the shape of the crystal is often followed by a cessation of this symptom. It is under these circumstances and with this object that the waters of the Vosges, such as Contrexeville and Vittel, often prove of so much service. The youngest patient of the three coming under this category was a female child, a few months old, whose urine contained a large number of uric crystals which seemed to be the cause of the bleeding. The patient was fed on equal quantities of milk, barley, and Contrexeville water, under which the symptoms disappeared.

Senile enlargement of the prostate appeared to be responsible for twenty cases of hæmaturia out of the number. In the majority of instances the amount of bleeding was not large, but it would recur from time to time on slight causes, such as cold and fatigue. There are a good many persons with large prostates who get temporary attacks of bleeding much on the same principle as others do who suffer from piles. Dr. Frank reminded me that the term "prostatic pile" was a condition recognised by some German writers on this subject. I fully appreciate the force of the expression. When

the bladder is capable of emptying itself tolerably well this symptom is merely a temporary one and usually disappears with some restrictions in diet and a little purgation.

There is, however, one condition of the senile bladder which adds considerably to the trouble connected with this kind of bleeding. I refer to those instances where this occurs with a large prostate and an atonic bladder. A great safeguard against prostatic hæmorrhage is the power of the bladder to exercise pressure. This point is referred to again in the succeeding article.

Malignant tumours of the bladder or the prostate accounted for thirteen cases of hæmaturia. If the disease is in the prostate you can generally make it out with the finger in the rectum; if this is not the case, then you may have the significant fact that though from its nature the blood evidently comes from the interior of the bladder, you have no senile prostate to account for it; the patient may be, and often is, considerably under the hypertrophic age. Then there is another helpful point in connection with the diagnosis of malignant tumours of the bladder: they are as a rule more comfortable when bleeding moderately than when the urine is absolutely clear. I have often noticed this in cases which have been verified, either by operation or post-mortem examination.

It is also curious to notice how slow some malignant growths of the bladder and prostate proceed: there may be repeated attacks of hæmorrhage, but I have known such cases as

epithelioma of the bladder go on for four and six years, and really occasion but little inconvenience until the bleeding becomes profuse and unrestrainable, and the question will then naturally arise, What is to be done when the hæmorrhage from such a growth becomes excessive, and normal urination difficult or impossible? My belief is that when this stage arrives the best thing to be done, in the majority of cases, is to open the bladder above the pubes. I can hardly recall an instance where, by this expedient, a patient did not obtain a temporary respite from bleeding and the consequences that follow it. Even if the wound never heals the patient can be kept in a greater state of comfort than when he only had his urethra to depend upon. In the female the ready way in which the growth can be got at and removed is a strong reason for early exploration, and, if necessary, removal.

Hæmaturia is almost as constant an indication that tubercle has invaded the kidneys or ureters as hæmoptysis signifies that the lungs are tubercular. Urinary tuberculosis may be either ascending or descending. It is a good plan in tubercular subjects or in persons who are suffering from slight attacks of hæmaturia, with tubercular histories, to make a careful examination of the testes, the prostate and the vesiculæ seminales, with the finger. The detection of tubercular deposit in any of these positions, under these circumstances, will often throw light upon the bleeding.

It is important to know how to recognise the

shotty feel of the prostate when it is infiltrated with the early form of this deposit. In the breaking-down stages of urinary tubercle, the presence of pus as well as blood, not to say anything of the bacillus, adds considerably to the ease of making a diagnosis.

Stricture of the urethra is accredited as the cause of five cases of hæmaturia. In two instances the strictures were extremely tight, and it seemed impossible how the cause of the bleeding could have been overlooked. In every instance where the stricture had been sufficiently dilated the blood disappeared from the urine. It is curious to notice how some persons with really tight strictures, by the use of greater expulsive force, mitigate considerably the inconvenience the contraction would otherwise cause.

There is a patient attending the out-patient department to whose other symptoms I have often directed attention. He came complaining of loss of power over the bladder and lower extremities, from the loins downwards. There was diminished sensation and the reflexes were unnatural, and it was clear from his gait that he was suffering from an early stage of paraplegia. On examining his urethra it was found that he had a moderately tight stricture in the membranous portion, and as there was no other cause for the condition of his limbs, we regarded it as one of reflected paralysis, and commenced to dilate his stricture. Under this treatment it was observed that movement and sensation in the affected parts gradually returned,

and in three months all symptoms of paralysis had disappeared, the patient being able to walk several miles without fatigue.

Wounds involving the kidney may, in some remote way or other, cause blood to find its way into the urine and become mixed with it. Let me mention two examples. In 1888 I saw a patient in consultation with Dr. Glynn who was suffering from purulent urine. Six weeks before seen he had a very free attack of hæmaturia which lasted for some days. He had no symptoms of renal colic, but complained of a dull aching pain in the region of the left kidney. His history was as follows: Five months previously when at sea he was shot by his steward in two places, one ball passing through his thigh and the other entering his left side two inches in front of the posterior superior spinous process of the ilium. He was leaning over his assailant, who was on the ground at the time the bullets were fired. He was confined to bed for some time and suffered from urinary irritation and purulent urine. There appeared to be an increased area of dulness below the left kidney, and the part was sensitive to the touch. The bladder was sounded, but nothing abnormal was detected. The bullet was probably embedded in the left kidney, which I proposed to explore, but as the man was returning home to America, and was in fairly good health, this was not proceeded with. The other case of traumatic hæmaturia followed the escape of a pin by the urethra which had been swallowed by a gentleman fifty-six years of age, four months before it was

voided. These cases would now have been cleared up by the Röntgen rays.

Three cases of hæmaturia were associated with cystitis, which had occurred in males independent of a large prostate or urethritis. In one the cystitis followed an injury to the abdomen, where probably the bleeding was due to some slight laceration. In the other two instances it seemed to be connected with the violence of the inflammation, one of the patients being an extremely gouty subject with highly acid urine.

My list contains one illustration of bleeding due to the filaria sanguinis hominis. The presence of this parasite in the urinary system explains cases which were formerly described under the name of chylous urine. In referring to this parasite, Sir William Roberts* says: "Its local effects are supposed to depend on the formation of aggregations of filaria which block up the capillaries and cause by their active movements irritation and rupture of the blood-channels and lymphatics, and thus lead to the appearance of chyle and blood in the urine." In the case to which I am now referring, the urine was at one time quite chylous in appearance, whilst at others it was deeply coloured with blood and contained large clots. The presence of the parasite was in this instance detected both in the blood and urine by Sir William Roberts and Dr. Stephen Mackenzie, who were kind enough to see the patient. The administration of iodide of potassium in 20-grain

* "On Urinary and Renal Diseases," fourth edition.

doses, as first suggested by the late Dr. Harley, seemed to be followed by good results.

The list closes with two cases where it was impossible to form a definite opinion as to the precise source of the bleeding. It was probably derived from a kidney, but nothing physically abnormal was discoverable in either of these organs. A third case was in the first instance equally dubious, but three months later a large growth could be felt occupying a renal position, which, taken in conjunction with the occasional hæmaturia, indicated the probable diagnosis. It proved to be an inoperable sarcomatous kidney.

In the diagnosis of hæmaturia the positive and negative evidence afforded by the cystoscope has proved of value in all the varieties here referred to.

HÆMORRHAGE CAUSING GREAT DISTENSION OF THE URINARY BLADDER

Some instances of this kind that happen to have recently come together offer material for remark relative to the prompt and direct action which the bleeding usually requires. Cases of great distension of the bladder from this cause, independently of those incidental to malignant growths, are not very common and generally occur in bladders which are muscularly weakened either as the result of a chronic stricture or of an obstructing prostate. The pressure downwards exercised by the normal viscus is the great safeguard against retrograde hæmorrhage following certain operations upon these parts. I cannot remember seeing a severe case of bleeding after an internal urethrotomy for stricture, for instance, where the patient was in possession of the full power of voluntarily emptying his bladder completely. When atonied or weakened the latter is liable to yield under the pressure of bleeding proceeding from a lesion in front of it, and then serious and exquisitely painful symptoms may be the result. In some instances the distension thus produced will assume

the size of the gravid uterus at about the seventh month. The difficulty in dealing with such a condition is added to by the fact that in the instances referred to the urethra is more or less obstructed. The following cases which are briefly narrated seem to present some points of interest:

CASE 1.—The patient was a man, aged thirty-seven years, the subject of chronic stricture in the deep urethra, for which an internal urethrotomy was performed three years previously, and from which he derived so much benefit that he afterwards neglected to use a bougie regularly. Then the stricture began to re-contract, and eventually it was found impossible to pass even the smallest instrument. On June 21, 1898, an attempt was made to dilate under an anæsthetic and some progress was made, bougies up to No. 4 entering without much difficulty or bleeding. I saw the patient on the following day and found that he had passed only a small amount of blood-stained urine since and that his bladder was largely distended, reaching to a level with the umbilicus. He was in great pain and was sweating profusely. He was again placed under an anæsthetic and a small catheter was passed, but very little urine escaped. As it was obvious that clotted blood formed the main contents of the bladder, and that it must be removed without delay, the process of stricture dilatation was at once further proceeded with until a full-sized Lister's bougie could be passed. A large catheter-evacuator was then substituted, and a mass of clotted blood was withdrawn by the aspirator as used for litholapaxy. In this way the bladder was soon cleared. A full-sized rubber catheter was then tied in, and the patient speedily recovered. Though the full calibre of the urethra is restored, the partially atonic condition of the bladder continues, as there is a constant residuum of six ounces or so unless the catheter is used—the result of a neglected stricture, though in a young man. It would not have been possible to evacuate these clots in any other way except by opening the bladder either in front or from the perineum.

CASE 2.—A man, aged seventy-two years, with a large prostate, for which he used a catheter, was seen by me in June 1898, in conse-

quence of hæmorrhage into the bladder, the latter when seen being enormously distended. Some blood-stained urine had been drawn off, but without lessening the size of the viscus. Several large-eyed catheters were ineffectually tried. As the bladder was evidently full of blood-clots, the patient was placed under ether, and the evacuating catheter and powerful aspirator were used without avail. As it looked as if it would be necessary to open the bladder, I first passed a smooth-bladed lithotrite and broke up the mass of clots just as if it were a stone. In this way a hand-basinful of clots and urine was withdrawn and the bladder was cleared. A rubber catheter was tied in and the patient did well. This was the first time I had used a lithotrite for this purpose, but it answered admirably, and made the process extremely easy.

It was suggested that the hæmorrhage had in the last instance been caused by the catheter. I do not believe that this was so. I have seen many cases where old men apparently bled into their bladders instead of into their brains. I refer to instances of vesical apoplexy which are not uncommon. One patient, now aged seventy-five years, whom I have known for some years, has had his life prolonged, I believe, by this less dangerous substitute for cerebral bleeding. Hence in some of these instances, a "masterly inactivity" is often indicated. When, however, the bleeding attains the proportions stated in this case, interference becomes necessary. Failing with the lithotrite there did not appear to be any other alternative than that of opening the bladder above the pubes. The use of the lithotrite, however, proved to be the solution of the difficulty.

Case 3.—A man, aged forty-seven years, came under notice at the hospital in November 1898. For some weeks he had been attending as an out-patient for the purpose of having a No. 6 bougie passed for a contractile stricture in the deep urethra. On the day in question a No. 7 flexible bougie was passed. There was some tightness and a little bleeding followed. The patient returned at night with almost complete retention and with the bladder greatly distended, apparently with urine but, as it proved, more with blood and clots. The house surgeon succeeded in emptying it with an evacuating catheter and aspirator. On the following day the amount of distension and pain was as much as before. As the

bleeding was unchecked, and as it evidently proceeded from the strictured portion of the deep urethra, I had the patient placed under ether again. I passed a medium-sized grooved staff, and performed a perineal section, dividing the stricture in the median line. A large gum-elastic rigid drainage-tube was then passed into the bladder. About two pints of clots, blood, and urine were evacuated, and the bladder was washed out and the tube was

FIG. 13.

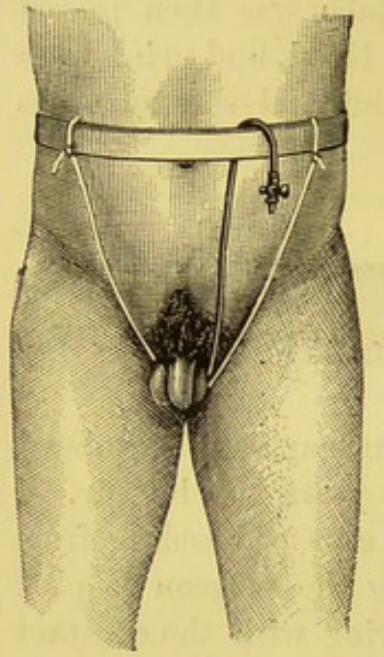
fastened in. For this purpose I use incompressible tubes * (Fig. 13), which were made for me some years ago by Mr. J. W. Wood, of Liverpool. Being rigid, in case of bleeding from the deeper portion of the section it enables the surgeon to pack round the tube with gauze without interfering with the constant flow of urine from the bladder. This was not necessary in this instance, as I took pains to make the section through the deep parts fit the selected drainage-pipe. The tube was removed in seven days, and the patient was able to leave the hospital in three weeks with the wound soundly healed. His stricture has been greatly benefited, and he now has a full-sized bougie passed when he applies as an out-patient. Here the single proceeding that was adopted at once stopped the bleeding at the spot from which it came, allowed the bladder to be emptied of a mass of clots which could not otherwise have been really disposed of, and considerably improved the condition of the stricture. Digital exploration of the bladder, as Sir Henry Thompson described it, has reduced to simplicity the old perineal section without restricting its application.

In connection with the last case I have described and figured an incompressible drainage-tube which I generally use in the first stage of perineal section requiring also bladder drainage. Should it be

* "Surgical Disorders of Urinary Organs," fourth edition, p. 104.

necessary to prolong the drainage for any reason, such, for instance, as to allow the healing of extraneous sinuses and fistulæ, I substitute a soft one with a tap to close it, and which can be used either continuously in bed, or so as to allow the patient to rise and go about as shown (Fig. 14). The latter tubes are made for me by Messrs. Gardner, of Edinburgh, after Professor Annandale's pattern.

FIG. 14.



I may here incidentally refer to a somewhat curious case of prostatic hæmorrhage and vesical distension recently seen.

It was that of a patient with prostatic enlargement who was entirely dependent upon the catheter. Whilst travelling to the North by an express train he had occasion to use his flexible catheter in the lavatory compartment attached to his carriage. Just as he had inserted the instrument, and as the train was passing over some points, he was thrown with great violence against the side of the carriage before he had time to withdraw the catheter. He felt hurt and faint, and considerable hæmorrhage by the urethra followed and continued with much distension. I was requested to go down to see him with his medical attendant a few days afterwards, and I found he had suffered most seriously from the injury. The distension had been relieved by the catheter, but the wound of the prostate, from which no doubt the hæmorrhage came, was followed by a sharp attack of epididymitis; the patient, however, made a good recovery. From the examination of the circumstances connected with the injury, it was a marvel that the patient escaped a ruptured bladder. The case is not without its practical aspect.

LARGE PELVIC HYDATID TREATED BY PERINEAL INCISION AND DRAINAGE*

THE following case presents some points of interest in connection more particularly with the treatment of pelvic hydatids in the male.

A well-developed man, aged forty-five, and above the average stature, came under my observation, at the suggestion of Dr. G. B. Batten, in 1893, with the following history. He had always enjoyed good health until the commencement of the present illness. In March 1885, when resident in Australia, where he had been engaged in business for some years, he suffered from retention of urine for the first time in his life. This occurred without the usual history of a urethral stricture, and apparently without any obvious cause. A silver catheter was introduced with difficulty and pain. It was retained for some hours and then withdrawn, considerably bent, as no urine escaped by it. After the catheter was removed, micturition was spontaneously performed, but with much interruption.

Commencing in this way, the subsequent symptoms

* *Med.-Chir. Trans.*, vol. lxxviii.

of the patient's long and continued illness may be briefly stated as those of loss of power lasting for some weeks in the left leg, and the greatest difficulty in voiding both urine and fæces. The pain and distress in this way occasioned quite unfitted him for business pursuits, and gradually led him into the habit of daily taking very large quantities of morphia. His symptoms resisting all kinds of treatment, he returned to England in 1893, being advised before he left the colony to have his colon opened to relieve the suffering that his constantly-obstructed bowels occasioned.

On his arrival in this country Dr. Batten, in sending the patient to me, wrote "that the pelvis was occupied by a large rounded swelling, which squeezed the rectum flat, and seemed to be a cystic tumour with thick walls," adding that he thought "something besides colotomy might be done to relieve the patient, and enable him to pass water and motions without the frightful agony which he suffers."

On examination I found the abdomen partially occupied by a tumour, about as large as a fully-developed gravid uterus, situated rather to the left of the median line, and evidently springing from within the area of the pelvis. It was extremely tense though uniform to the touch. On exploring with the finger in the rectum, which was a painful process, the prostate was obscured by a firm tumour, which, as already stated, completely compressed the bowel. On introducing a silver catheter into the urethra, it was found impossible to carry it further

than the prostate, but on substituting a long and very flexible instrument, the bladder was easily entered. It was obvious that the latter was pressed over towards the right side, so as to form a tolerably sharp angle with the deep urethra. It was also apparent that there was no stricture in the ordinary acceptation of the term. The urine was scanty and high-coloured, but otherwise healthy. As the patient stated that his fæces at times presented not only a flattened appearance, but were mixed with some viscid or gumlike material, they were carefully examined, with the result that the characteristic hooklets of hydatids were readily discovered. This recognition placed the precise diagnosis as to the nature of the cyst beyond all doubt. This great and prolonged difficulty under which both urine and fæces had been voided, taken in conjunction with the physical state of the abdomen, rendered it probable that not only were the intestines largely distended and impacted, but that the ureters and kidneys were in a similar condition. In fact, on the right side what I believe was a hydronephrotic kidney could be felt. The conclusion arrived at was that the distension was caused by an hydatid cyst, situated between the rectum and the bladder and below the reflection of the peritoneum which forms the recto-vesical pouch.

The patient remained under observation for some time, but was not at first disposed to submit to any operation; his symptoms, however, increasing, if possible, in intensity, he expressed himself as willing to acquiesce in whatever was advised. The late Mr.

Arthur Durham kindly saw the patient in consultation with Mr. Rand (Dr. Batten's partner) and myself, and concurred in the diagnosis that had been arrived at. The nature of the treatment to be employed was very carefully and fully considered, and relative to such measures as had been previously adopted in apparently similar cases. It was decided to open the cyst from the perineum, and to drain from this position. This conclusion was arrived at partly for the reason that it seemed somewhat hazardous to open a cyst which clearly had some slight connection with the intestinal track by any form of abdominal section, where the viscera generally were in a state of extreme distension and impaction, and partly because, from the long existence and size of the tumour, it appeared desirable to secure the evisceration and drainage of the cyst at its most dependent point.

The patient, on being anæsthetised, was placed in the ordinary perineal lithotomy position. To indicate the line of the urethra a flexible bougie was passed and retained in the bladder, as, for the reason already stated, a metal instrument would not enter. In order to give me sufficient space to manipulate in a somewhat deep perineum, I made the usual external incision as for lateral lithotomy, without, of course, opening either the urethra or rectum. I then made my way carefully with the finger and knife, between the bladder in front and the rectum behind, to the base of the cyst and exposed it. The latter was first punctured with a large trocar and cannula, but as nothing escaped I freely extended

the puncture wound with a probe-pointed bistoury and passed my finger within the cyst. The withdrawal of my finger led to the discharge of a large quantity of fluid and innumerable daughter cysts. The odour was most offensive. The clearance of the interior of the cyst was greatly aided by abdominal pressure exercised by Mr. F. Durham, who, in conjunction with his brother, Mr. Rand, and Mr. W. Braine, kindly assisted me during the operation. In this way, and by the use of forceps and a lithotomy scoop, the cyst was cleared of about half a gallon of contents. There was no hæmorrhage, and the operation was completed by washing out the sac as thoroughly as possible and fixing in a large drainage-tube.

The patient suffered a good deal of cramp in both legs after the operation. Large quantities of both urine and fæces were voided, though, as the bowels seemed to have temporarily lost all power, the discharge from the latter was assisted by enemas. In three weeks the patient was able to leave the surgical home and return to his residence, where his treatment was followed up by Mr. Rand and Dr. Batten. The sac was carefully drained and washed out; and by attention to the carrying out of this the success of the case was insured. In the course of the after-treatment a considerable number of daughter cysts, in various stages of disorganisation, were discharged by the wound.

The operation was not followed by anything remarkable in the temperature chart, or by what has been referred to by some as an "hydatid rash." His

long illness, extending over nine years, combined with the habitual use of morphia in large doses, rendered convalescence somewhat protracted. He called to see me four months after the operation, when he was in excellent health, the power both of urination and defæcation having gradually returned. There was an entire absence of any abdominal or pelvic tumefaction.

Two cases, very similar to the one I have narrated, have recently been published by Dr. Sawkins,* of Sydney, which I will briefly refer to. The first was that of a man who had retention and overflow of urine, though the bladder was only found, by the catheter as well as by suprapubic aspiration, to contain a little over four ounces of urine. He also had no rectal control. A tumour was detected by examination of the rectum, which was believed to be a greatly enlarged prostate. The patient further complained of inability to walk and pain along the course of the left sciatic nerve. He gradually sank, and died without operative treatment. An autopsy showed the existence of a large hydatid cyst filling up the pelvis, and pressing on the urethra and bowel. It was attached in front to the base of the bladder, which it invaginated, and behind to the cavity of the sacrum and wall of the rectum. The cyst itself was loosely adherent to the bladder, being directly in contact with the muscular layer. It was covered on its upper surface by the peritoneum of the recto-vesical pouch. There were numerous small cysts

* *The Australasian Medical Gazette*, November 1893.

attached to pelvic viscera, and in the liver and omentum.

In the second case recorded by Dr. Sawkins, in a man aged thirty-nine, the early history was that of retention of urine without previous evidence either of gonorrhœa or stricture. Examination by the rectum gave similar signs of a large cystic pelvic tumour, which, by an exploring needle, was demonstrated to be an hydatid. A suprapubic exploration was made, but as it was found impossible to reach the cyst, the incision was prolonged upwards, and the peritoneum opened. The contents of the sac and the endocyst having been removed, the opening into the envelope was stitched to the abdominal walls, and a drainage-tube inserted. The patient made an uninterrupted recovery in thirty-eight days.

Commenting upon the mode in which these tumours originate in this particular position, Dr. Sawkins, on the authority of the late Dr. Fagge,* states that they arise from the growth of an embryo, which has fallen by its own weight into the pelvic cavity after perforating the walls of the stomach. This explanation was also advanced by Dr. John Hunter,† who, it is interesting here to note, described the dissection of a case where, in a man, a pelvic hydatid proved fatal by causing retention of urine from pressure on the neck of the bladder.

* "Principles and Practice of Medicine," first edition, vol. ii.

† *Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge*, vol. i. London. 1793.

Mr. Targett, however, in his lectures at the Royal College of Surgeons,* takes a different view as to the origin of these tumours, which, Dr. Sawkins states, one of his cases substantiates. Mr. Targett observes: "An examination of all the specimens in the London museums has shown that these cysts were originally placed between the muscular coat and the sheath of the recto-vesical fascia. This fascia, besides enclosing the prostate and lower part of the bladder, forms a special sheath for the vesiculæ and vasa deferentia; hence the gradual enlargement of the cyst separates the fascia from the bladder, and thus detaches the vasa and vesiculæ, which henceforth may become incorporated in the wall of the cyst." Consequently, we can no longer regard these cysts as formed within the peritoneal cavity, but as deposited from the large venous plexuses about the base of the bladder, or by the burrowing of the embryo through the mucous and muscular coats. Most of these cysts are of secondary origin, some being furnished by the liver, whilst others, descending from the kidney along the urinary track, make their way into the cellular intervals in relation with the most dependent portion of the bladder wall. Some of these points are displayed in specimens which will be found in the Museum of the Royal College of Surgeons.

I will now briefly refer to recorded cases bearing upon the treatment these retro-vesical hydatids have received. In the first place it is not unlikely that a

* *Brit. Med. Journ.*, July 29, 1893.

natural cure has on some occasions taken place by the discharge of the contents of the cyst into the intestinal canal, and their escape in this way. In fact, Dr. Hunter, in the case I have referred to, and in the days before abdominal surgery was developed, observes: "When the presence of hydatids is suspected, it would appear to be of great consequence to procure them an outlet; but it must be obvious that, being generally seated in the abdomen, that business must be left entirely to nature." This probably happened, but to a very limited extent, in the instance I have narrated, as hooklets were found mixed with the fæces. The operative proceedings which have been adopted in this class of cases seem to have been of four kinds at least.

(1) Laparotomy, and the opening and draining of the hydatid sac, by attaching the latter to the abdominal parietes. This has already been illustrated in the case recorded by Dr. Sawkins.

(2) By puncture of the cyst through the rectum. Dr. Fairbank * records a successful case of this kind. The patient was seen ten years afterwards in good health and without recurrence. Tapping or aspirating an hydatid, though a simple operation, is by no means free from risk. Instances of a fatal and rapid form of septicæmia, which at one time led to the impression that under certain circumstances the hydatid fluid was of a poisonous nature, are not uncommon. This danger connected with simple paracentesis is frequently referred to in Australian literature.

* *Trans. Clin. Soc.* vol. xxiii.

(3) By a perineal operation. Mr. Bryant * has recorded an instance of a man aged fifty, where the circumstances connected with a pelvic hydatid were not very unlike the case which forms the basis of this paper. The symptoms of both retained urine as well as fæces were pressing and serious, and were evidently associated with a very large pelvic cyst. Puncture from the rectum in three different directions failing to give the necessary relief, Mr. Bryant cut down upon the tumour from the perineum. The cyst was exposed and opened in this way, and, to give more space for the withdrawal of the contents of the sac, the incision was carried backwards into the rectum. In this way upwards of three quarts of hydatid cyst were evacuated. Though the operation was successful in affording relief, granular disease of the kidneys proved fatal on the ninth day after the operation. It seems little short of a miracle that I had not also this serious complication to contend with in my patient's case, after his nine years' severe suffering from obstructed micturition. Fortunately, I believe the kidneys were uninvolved further than, in conjunction with the ureters, having undergone some ascending dilatation.

(4) Mr. Bond,† of Leicester, has advocated the opening of these cysts (I presume from whatever position they are most accessible), the withdrawal of the endocyst, and the immediate closure of the envelope without resorting to continuous drainage.

* *Trans. Path. Soc.*, vol. xvii.

† *Brit. Med. Journ.*, April 11, 1891, and January 26, 1895.

Still more recently he has further illustrated the success of this practice. Though it is a method of treatment which has been referred to by Dr. William Gardner, of Melbourne,* who has had a large experience in these cases, as the "ideal method for living cysts of the kidney," I hardly think it would have been applicable in the case I have narrated. The large extent and probable ramifications of the sac, its connection with the intestinal track, and the subsequent discharge of embryonic hydatids, in spite of the free irrigation, scraping, and cleaning that was practised at the time of the operation, all tend to indicate that continuous drainage was a necessary part of the proceeding. In the case of hepatic hydatids Mr. Bond's practice seems to have been most successful.

In conclusion, it appears to me, having regard to the nature, extent, and attachments of these pelvic parasites, as well as to the urgent and serious manner in which they obstruct both the discharge of urine and fæces, that the perineal method of dealing with them, followed by drainage, has much to recommend it. Even supposing, as it sometimes happens, that these cases are not confined to a single or bilobed pelvic cyst, but are complicated with others of visceral connection—as from the liver, the omentum, or elsewhere—the disposal of the pelvic cyst in the manner I have advocated would tend to remove the chief sources of difficulty to be apprehended in subsequently proceeding with a laparatomy, should further abdominal developments render this necessary.

* *Australian Med. Journ.*, August 1894; and *Intercolonial Quarterly Journ.*, August 1894.

URETHRAL IRRIGATION

In a small treatise,* now out of print, I drew attention to this subject in connection with certain points relating to the pathology and the prevention of urethral stricture.

The article referred to was largely based on the well-known facts: (1) That stricture, excluding examples of injury to the urethra where contraction of the internal scar eventually occurred, was usually the consequence of chronic urethritis of a specific character; and (2) That it was commonly located in the deep and less accessible part of the canal.

More recently, in my Letsomian Lectures,† the function exercised by the epithelial coat of the urethra in transmitting the urine outwards without risk of exosmosis, and the consequences that may ensue when this lining of the canal becomes damaged as the result of long-standing inflammation as shown by the endoscope, formed materials for consideration. The view advanced was that by a specific or gonococcal chronic urethritis the epithelial lining lost its

* "The Prevention of Stricture and of Prostatic Obstruction." J. & A. Churchill. 1881.

† *Trans. Med. Soc. of London*, 1888.

power of rendering the passage urine-tight, and that a slow process of urine exudation or soakage through the wall of the canal commenced. To limit this as far as possible lymph barriers are thrown out in the peri-urethral tissue opposite the spot or spots where this leakage is attempted. These becoming organised, eventually form areas of contractile connective tissue in immediate outside relation with the urethra. In this way the latter, in the course of time, is narrowed at one or more places where plastic exudation, and subsequently contraction, occurred.

These views appear to be supported by the following considerations: (1) That though the mucous membrane is the tissue chiefly concerned in the primary inflammation, it is only secondarily implicated in the actual stricture-forming process. It has been found after death that the dimensions of this coat are not necessarily permanently altered in a strictured urethra, as it is possible, with an instrument such, for instance, as a Holt's dilator, to rupture, or to push to one side, a stricture without injuring, apparently, the mucous membrane. Some years ago, when Holt's operation was much practised, I met with a specimen illustrative of this. Mr. Christopher Heath has also recorded two somewhat similar instances,* "where two different surgeons had the opportunity of examining the urethras of patients upon whom they had operated shortly before, and they found that the mucous membrane

* *Brit. Med. Journ.*, July 17, 1869.

was entire and that merely the indurated submucous tissue or stricture proper was torn." (2) The great variety in form in which stricture tissue is deposited, reminding us of patches being put on to give support to a weak part of a tube wherever they were wanted; and (3) The eccentric shape which organised strictures usually assume. The passage through a stricture is rarely central relative to the urethra.

In regard to the second fact upon which stress was laid in an early paragraph of this paper, it is generally admitted that most strictures occur at the subpubic curvature of the urethra. Various explanations have been offered for this, but the one favoured by Mr. Pearce Gould† seems the most reasonable, as it is at this point just outside the compressor urethræ, or "cut-off muscle," that morbid secretions are apt to gravitate and to help to maintain inflammation. Further, it is here that such local treatment as usually suffices when the disorder is in the anterior portion of the urethra not unfrequently fails. It is also in this region that bacterial life finds favourable conditions for its development, and where there is some difficulty in securing that degree of surgical cleanliness which is essential in ending it.

The apparatus first described in the article referred to, for irrigating or sterilising the deep urethra, consisted of a Higginson's syringe fitted with a small, flexible, back-flow, probe-pointed catheter or nozzle (Durham's), of sufficient length

† The *Lancet*, December 8, 1877.

to reach the part, by which a running stream of fluid could be maintained for some minutes in an outward direction.

A simple syphon arrangement with a portable glass tank (Fig. 15) holding a pint of water is preferred by some, as, in addition to other advan-

FIG. 15.

tages, providing a more equable stream than a syringe. For this purpose the tube is fitted with a regulating nozzle which may be used either with boracic or other medicated water, so as to thoroughly wash out the whole length of the urethra.

Various antiseptics and astringents, such as Condy's fluid, sulpho-carbolate of zinc, and others may be employed. Whatever is selected, it is well to use it in a more dilute form than when otherwise prescribed. For instance, in the case of the perchloride of mercury, which is a most valuable antiseptic for this purpose, it is better not to commence

with a stronger solution than 1—10,000. Cleanliness, obtained by the use of plain warm water in sufficient quantity, oftener succeeds than at first sight we are inclined to believe. Some of the details connected with the process of irrigation, as applied to the urethra, are much the same as those appertaining to the bladder, as already referred to (p. 120).

When the paper appeared (1881) which prompted this revision, our ideas of bacteria in association with suppurations were of a very limited nature, and much that was then obscure in pathology has ceased to be so. The difficulty now lies in ascertaining how we can best apply antiseptics to localised positions and varieties of suppuration, and it is to further this end that I have again ventured to refer to the subject.

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