On some points in the surgery of the urinary organs / by Reginald Harrison.

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ON SOME POINTS IN THE SURGERY

OF THE

URINARY ORGANS.

BY

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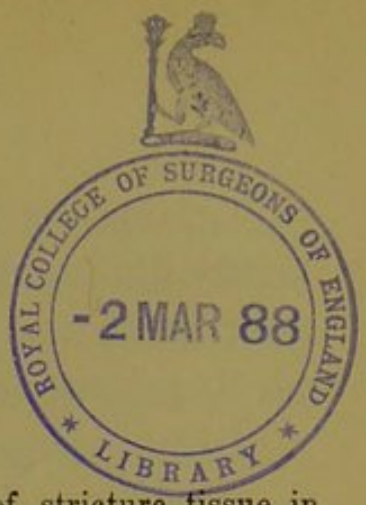

LECTURE I.

Urine fever and toxic urine — The formation of stricture tissue in reference specially to the treatment of urethral stricture,

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Mr. President and Fellows,

Let me, in the first place, thank you for permitting me to address your ancient and learned Society in the capacity of Lettsomian Lecturer for the present Session. At the same time, and with a full consciousness of my inability to approach you as I would desire, let me also ask your indulgence whilst I attempt to follow in the direction selected by many who, in preceding me in this chair, have so largely contributed to the practical advancement of medicine and surgery.

As I have already indicated, I propose making some observations relative to certain points arising out of the surgery of the urinary organs. It is now some years since my attention was directed to the circumstances under which fever was occasionally seen in connection with various lesions involving the urinary tract. It appeared to me that the subject had scarcely received the attention it deserved, and that a further knowledge of the etiology of what I would speak of as urine fever as opposed to ordinary wound fever, might be of service to us as practical surgeons.

Let me for the sake of clearness and comparison briefly illustrate in a familiar way what I mean, and then I can the more easily deduce the points upon which I desire to lay stress this evening.

In surgical practice we have long been accustomed to recognise, after injuries and operations, a form of excitement which is generally known as wound or traumatic fever. It varies in degree according to circumstances, it is generally attended with some elevation of temperature, and it usually declines without proving either serious or fatal. Since the due recognition of those principles upon which Listerism is based, the development of this kind of fever has been considerably restricted, if not entirely abolished.

In striking contrast with this we have a distinctive form of fever, not unlike ague in many important respects, which is alone seen in lesions involving the urinary tract. Let us take, for example, the simple operation of internal urethrotomy. Here an incision, limited to a few lines in length is made in the urethra, which the patient for some two or three hours is probably unconscious of. Then he is seized with a rigor, which terminates in fever and an elevation of temperature. As a rule, these symptoms decline in the course of a few hours, possibly to be repeated. More rarely the rigor and fever are followed by supression of urine, convulsions, and speedy death; post-mortem examination failing to discover any reasonable or recognised explanation for these phenomena. These symptoms, though, as a rule, in only slight degree, more frequently follow internal urethrotomy,

accidental wounds of the urethra, and the introduction of a catheter or a bougie. Even the last mentioned operation, simple as it usually is, has proved fatal in the course of a few hours, with little or nothing to shew in explanation. Here then, as I have said before, we have a train of symptoms resembling ague, which are only called into existence in connection with lesions involving the urinary tract. In order that I may be perfectly understood as to the phenomena referred to, let me briefly illustrate the kind of case alluded to by narratives from my own practice.

Some years ago, in a case of extremely tight stricture, I performed an internal urethrotomy on a young and otherwise healthy male; three hours afterwards he had a rigor, followed by high temperature, convulsions, and suppression of urine, and in forty-six hours he was dead. Post-mortem examination failed to prove anything except that the operation had been properly performed.

In the course of last year I saw a boy, eleven years of age, who, having ruptured his urethra by a fall, had retention of urine for thirty hours before I visited him in consultation. A catheter was then passed with some difficulty along the lacerated canal and retained, the retention being in this way relieved. On the following morning he was visited, and found to have passed a restless night, with a temperature of 102° Fahr. About four o'clock the same day his usual medical attendant, Dr. Davies, was summoned, and found the patient in severe convulsions, and absolutely unconscious. The temperature was then 105° Fahr. He

could not swallow; the fits recurred with much violence, attended with opisthotonos, and he became comatose and died at midnight, that is to say, about twenty-four hours after I first saw him and the catheter was passed.

I could not help observing that so long as this patient had retention he was comparatively safe; when, however, an opportunity was afforded to the urine of coming and continuing in contact with the laceration in the urethra by means of the retained catheter, then a process of acute poisoning seemed to commence, which speedily terminated in death.

In 1874, a healthy middle aged man was under my care for a tight urethral stricture, for which in the course of treatment preliminary to dilatation, a metal instrument carefully passed was followed by some very slight bleeding. Four hours after this he had a rigor, and his temperature went up to 103° Fahr.; this was followed by a succession of rigors, at intervals of from eight to twelve hours, with occasional vomitings. For over fifty hours the amount of urine excreted was only four ounces. During this period the pulse was quick and thready, the tongue dry and brown; there was a tendency to drowsiness, with occasional delirium, and death appeared to be imminent. After remaining in this serious condition for ten days, he ultimately completely recovered, though he complained of muscular pains and much prostration for some time afterwards.

Illustrations such as these, and others that I could quote, seemed to indicate that the presence of urine in a wound, under certain circumstances, was capable of

generating an aguish form of pyrexia, which I shall speak of henceforth as urine fever. I am aware that some authorities are accustomed to speak of all the phenomena I have just illustrated under the one name of urethral fever. Such a term I think is misleading, inasmuch as it seems to connect the symptoms produced with the precise part, rather than with the process, for wherever throughout the urinary tract urine can be placed under certain conditions, there can all the phenomena usually associated with the term urethral fever be produced. With the view of endeavouring to throw some light on the causation of this, I determined some years ago to investigate (1), the relationship between urine and a wound which leads to the development of urine fever; and (2), the probable nature of the influence or material producing it.

To the elucidation of these two important practical points I would now desire to direct your attention.

In the first place, it appeared to me that the development of urine fever might be traceable to the kind of contact that existed between a wound and the urine. I thought I would test it in the following way. Taking a number of cases of sub-pubic urethral stricture, which were unfitted for treatment by dilatation, I adopted the following procedure:—

Internal urethrotomy having been performed, and all obstruction being removed, so that a full-sized grooved staff could be passed into the bladder, the patient was placed in the lithotomy position, and a median cystotomy was performed, quite independent of

the previous internal operation, so as to admit a full-sized drainage tube, such as I usually employ for this purpose, to be passed into the bladder. By this combination of internal and external urethrotomy I treated a considerable number of urethral strictures of the worst type with results which time has already shewn have been eminently satisfactory, both so far as the immediate comfort of the patient was concerned and the permanency of the relief that was afforded.

After a number of trials of this kind, I soon found that as was my drainage, so was my freedom from fever: urine fever only occurred where the former was imperfect. When urine, even in very small quantities, was pent up in a recent wound, fever resembling ague invariably followed. When, on the other hand, urine was allowed to escape freely and continuously, as after a lateral lithotomy, no such symptoms were developed. But, further than this, in connection with the operative treatment of stricture, it was observed with much uniformity that, in cases where it was impossible to obtain perfect urine drainage, the urine might, so to speak, be sterilized by local or general measures. This tended considerably to prevent the urine undergoing changes and yielding products which were calculated by their absorption to produce this special kind of fever. For instance, I found that after an internal urethrotomy, certain antiseptic precautions, directed towards the wound as well as the bladder for the purpose of acting upon the contents of the latter, considerably reduced both the frequency of these

attacks, as well as their severity. This was chiefly noticeable in connection with the use of solutions of corrosive sublimate for irrigating the wound, as well as for retaining within the bladder. Further, it was impossible not to recognise the importance of certain drugs, which by their elimination in some degree through the urine, seemed to render the latter less capable of exciting a specific fever where it remained in contact with a recent wound. This was most marked in the case of quinine, which is so largely eliminated by the urinary apparatus. In some cases of internal urethrotomy that were observed, the production or not of urine fever could be largely influenced by the administration of quinine. As bearing upon the sterilization of urine in connection with operative procedures on the urinary apparatus, I will refer to a passage from a recent writer * who, in bearing testimony to the value of boracic acid as a prophylactic against urethral fever, states that in some forty urethrotomies, he had had but one case of urethral fever, and that occurred in an instance where the precaution of sterilizing the urine by the administration of boracic acid had been accidentally omitted. The consequence of this was a violent chill on the third day after the operation, with a high temperature. These observations, then, taken collectively, seemed to me clearly to indicate that the kind of contact between fresh urine and a recently made wound was in itself sufficient to determine the occurrence of urine fever as a consequence.

I will now pass on to notice, in the second place,

* Dr. E. R. Palmer, *American Medical Practitioner and News*, August, 1887.

the probable nature of the influence or material by which the fever is actually produced.

During the last few years some important investigations have been made relative to the development of animal alkaloids, both in the dead and living, by Messrs. Gautier, Peter, and Bouchard in France, and by Drs. Lauder Brunton and A. M. Brown in this country. An address of much interest on this subject, in its relation to practical medicine, has also been recently delivered by Sir William Aitkin. To all these gentlemen we are indebted for much valuable information. From these investigations I do not think there can be any doubt in coming to the conclusion that the secretions of living beings are capable of forming leucomaines, alkaloid bodies having poisonous properties, and that many phenomena connected both with health and disease may thus be accounted for. For, as Gautier remarks,* "Of all the extractive composite residua, the alkaloids of animal origin are worthy of the deepest interest. It is only now that they have become familiar to us. They claim our special study from the fact of their constant presence in normal secretions, and must be classed with the most active agents known." From my observations in connection with the surgery of these parts, it seems probable that the development of urine fever is really due to the absorption of some such poisonous compound as an alkaloid which is derived either from urine, or tissue, or wound decomposition,

* Professor Armand Gautier's Introduction to the Animal Alkaloids, by Dr. A. M. Brown.

or from all combined, and I would base this conclusion not from any chemical discovery that, so far as I know, has hitherto been made, but from the following deductions which seem to be warrantable from what I have already stated :—

(1.) That the presence of urine in relation with a recent wound is necessary for the production of what I have spoken of as urine fever.

(2.) That mere contact of urine with a wound is not sufficient for its production.

(3.) That the retention of fresh urine within the area of a recent wound is almost invariably followed by its development in a greater or lesser degree.

(4.) That where urine is placed under such circumstances as have been last mentioned, the liability to the development of urine fever is greatly diminished when it is sterilized by local or general means.

(5). That the retention of fresh urine, blood, and the debris of damaged tissue in the confines of a recent wound for a certain time, at a temperature of somewhere about 100° Fahr., could hardly be possible without chemical changes taking place in the constituents referred to.

(6.) That there is a common origin for urine fever is rendered probable by the uniformity of the symptoms attending it, which, though differing in degree, are identical whether following a surgical operation or an accidental wound.

As some may not be prepared to accept from me, though fortified with the reasons I have urged, that urine or urethral fever is the product of a definite

poison introduced into the system, let me occupy your time for a few moments whilst I quote from the last essay * of one of the most original thinkers the medical world ever produced, I refer to the late Dr. Austin Flint, of New York.

"Analytical Chemistry," he observes, "carries investigation beyond the limits of microscopical observation. The latter, at the present moment, both in pathology and physiology, seems to promise most; but is it not a rational anticipation to look for future results from chemical analysis of the components of the body, in health and disease, which in brilliancy and practical utility may surpass those of the labours in this field of investigation during the past half century? The medical semi-centenarian can recall the enthusiasm aroused by the labours of Liebig. Histology is now in the ascendant, but is it safe to predict that before the lapse of another half century there will be another era in organic chemistry, and that light will penetrate dark recesses which histology cannot reach? . . . The supreme objects of study in pathology at the present time are the discovery of micro-organisms and their natural history. But these agents it is probable are pathogenetic, not directly, but indirectly, by means of the toxical products of their activity. What are these products, and how do they give rise to the phenomena of disease? We may ask the same question of certain of the poisons introduced from without the body. How is it that fractional quantities of morphia, hyoscyamin, strychnia, aconitia, atropia, and other alkaloids produce their lethal effects? It conveys no adequate information to say that they act upon the nervous system. This is merely the statement of a fact, not an explanation. For the latter we must look to the organic chemistry of the future."

* "Medicine of the Future:" Address written for the Annual Meeting of the British Medical Association, 1886.

But objection may be raised against the views I am advocating relative to the way in which urine or urethral fever is developed by the fact that it sometimes arises under circumstances where it may be difficult to prove that any actual breach of surface in the urinary tract has been inflicted. For instance, as I have already said in illustration, some degree of urine fever frequently follows the passing of instruments along the urethra, as in the treatment of urethral stricture. It would not be difficult to illustrate every degree of this complication, from the most transient rigor with slight febrile excitement, to the severest form of septic intoxication, rapidly terminating in death. And this leads me to speak of the influence of the epithelial lining of the urethra in making the canal water-tight, or, more correctly speaking, urine-tight. And out of this will necessarily arise some remarks on the pathology of urethral stricture and abscess with extravasation of urine. Let me take an illustration of what I mean by the protecting power of the epithelial lining. A patient with a stricture, I will say, has a catheter or bougie passed; this may be followed in the course of a short time with a rigor and some fever, and no further inconvenience is experienced. What has actually taken place is that the epithelial lining has been scraped off at one or more points, and this has permitted urine leakage and absorption to take place at the points injured. If further proof of this is required, take instances where prolonged attempts to pass catheters in cases of urethral stricture have been

made, and proved futile. Then, in consequence of the degree of retention, and as an alternative, an aspirator needle is introduced above the pubes, and the urine is drawn off in this way without coming in contact, or remaining so, with any portion of the urethra which may have been wounded by the attempts made to give relief by catheterism. I have never known rigors or fever follow the relief of retention by supra-pubic aspiration, though the amount to which the urethra has been lacerated by attempts at catheterism has been considerable as well as sanguinary. There can be no other explanation for the absence of characteristic rigors and fever under these circumstances than the fact that urine has not been allowed to come and remain in contact with a freshly made wound. And in connection with this point I cannot help remarking that in the protecting power which the epithelial lining of the urinary apparatus exercises we probably have an explanation of certain phenomena which have been observed but not accounted for. Some have concluded that the bladder is capable of absorbing some of its contents, whilst others, on the contrary, not only have denied the possibility of such an inference being drawn, but have pointed out how serious might be the consequences if there was any liability to such a contingency. It seems that both of these conclusions may be true, and the explanation I would offer is that by injury to, or disease of, its epithelial coat, the bladder may be rendered capable of absorbing what it contains, to the detriment of the individual, as we see in those cases now often referred

to by the name of catheter fever. In recognising the power of the epithelium to prevent or permit absorption I am in agreement with other observers, amongst whom I may mention Dr. London of Carlsbad, who has made some investigations upon this point.* Further, it is important to notice that when a urine fistula is transformed into a permanent urine channel, as after Cock's operation, we find the passage becomes lined like the urethra with epithelium and thus it acquires the power of transmitting urine without leakage. We could not have more positive evidence than this in support of the view that the epithelial coat is a necessary part of any canal which has to perform the function of transmitting urine.

Applying, however, these remarks to the pathology of urethral stricture, let us see how this is brought about, and how the protecting influence of the urethral epithelium may thus be demonstrated.

A stricture of the urethra is generally considered to be due to more or less prolonged inflammation of the lining membrane of the canal, which ultimately leads to the deposition of organised lymph in the peri-urethral tissues. This ultimately is converted into a dense connective tissue, which subsequently shows a remarkable tendency to become contractile. Thus the escape of urine from the bladder is interfered with by the degree to which these contractile masses prevent the expansion of the canal to anything like its normal extent. Now, all this may be very true on the whole, but it does not enter into details with which we

*Berlin Klin. Wochen. No. 11. 1881.

should be acquainted for the prevention and treatment of the disorder.

It will be convenient to take an illustration for the purpose of tracing more gradually the process of stricture-making, as a consequence of a specific urethritis or gonorrhœa, which is generally admitted to be the common cause of the former affection. The acute form of the disorder, unless care is taken, is very apt to become merged into the condition commonly known as chronic granular urethritis. By the latter term we are to understand that at one or more spots within the urethra the epithelium has become so damaged, as a consequence of the prolonged inflammation, that it ceases to render the canal urine-tight, and a slow process of escape of some of the constituents of the urine into the tissues comprising the urethra and surrounding it, takes place. As a consequence of this and to prevent urine soaking further into the tissues, inflammatory exudation is excited, and barriers of lymph, which ultimately become organized, are thrown out opposite the places where the leakages take place. Thus splints of plastic tissue are formed, corresponding with the spot or spots where the epithelium has been so damaged by persisting inflammation as to cease to discharge its normal function. In this strengthening of the urethra we recognise, in the first instance, a conservative action; eventually, however, as in other compensating processes, certain inconveniences follow which constitute, as it were, an independent disease. In addition to the careful observations which have been made

relative to the pathology of gleet, and the changes that are induced by chronic inflammation in the epithelial lining of the urethra by Dr. Oberlaender,* of Dresden, there are other considerations which seem to indicate that an excessive form of plastic exudation in the tissues around the urethra is probably excited by the intersticial leakage or exosmosis of some of the constituents of the urine through the walls of the canal.

Amongst those I would mention are: (1), that though the mucous membrane is the tissue chiefly involved in the primary inflammation, it is, as a rule, only secondarily implicated in the stricture-forming process. In many instances it will be found after death that the dimensions of the mucous membrane are not permanently altered, and that it is possible to split a stricture without necessarily damaging the lining membrane of the canal; (2), that the plastic exudation which makes up a stricture differs from other exudations provoked in other parts of the body by inflammation in the degree of its density and and tendency to contract. There is no tissue I am acquainted with in the human body, except perhaps that found after scalds and burns, where the original tissues are entirely destroyed, which is so tenacious and resisting as that constituting the usual form of urethral stricture, nor do I know of any other canal or duct which, either as a consequence of injury or disease, is liable to be involved in such changes as a strictured urethra represents; (3), the character of the

* *Vierteljahr: fur Dermatologie und Syphilis.* Wien, 1887.

cicatrix which is formed in connection with ruptures and lacerations of the urethra, unmistakably shows the effect produced in the healing process of a recent wound, which is constantly submitted to the action of more or less pent up urine. Here we have a cicatrix formed which of all strictures is the most resisting and contractile. At the present time, when we are so much occupied in devising means for the radical cure of hernia, one cannot sometimes help thinking and wishing that it were possible to transplant the process of tissue thickening and contraction, as observed in connection with the formation of traumatic urethral strictures, to the parts constituting the weak points we are desirous of consolidating in the abdominal parietes. Here it would be serviceable instead of being detrimental.

Further, the form in which stricture tissue is deposited, and ultimately exercises contractile pressure on the urethral passage, is strongly suggestive that in the first instance it served the purpose of strengthening the wall of the canal, and thus preventing further leakage of some of the constituents of the urine taking place at points where the epithelial coat had been more or less permanently damaged. Most strictures are the result of organised lymph which has been deposited in the sub-mucous tissue in an irregular form. An annular stricture is comparatively rare, except when due to traumatic causes, such, for instance, as an injury to the whole calibre of the urethra.

It may, however, be urged that the view I am

advocating is open to objection on the grounds that urine leakage is invariably followed by acute forms of inflammation, such as we see when extravasation has taken place. In reply to this, I would say that, so far as I have been able to observe, the process of urine transition through any portion of the mucous membrane of the urethra, which has been deprived of the protecting influence of its epithelial lining, is extremely gradual, and does not necessarily imply that all the constituents of the excretion are distributed amongst parts which are not prepared to receive them. Where a pathological process is slow, time is permitted for that adaptation which the human tissues are proved to be so capable of.

Some years ago, I recorded the following case which, at the time, seemed to me of much importance in suggesting that the exudation which a damaged epithelium may allow of does not necessarily mean that all the elements of the urine are thus brought into contact with the tissues under circumstances where the most active and destructive forms of inflammatory mischief must inevitably be aroused. It was as follows :—The case was one of stricture, with extravasation of urine, occurring in a person suffering from Bright's disease of the kidneys. Though the extravasation had come on suddenly, and had existed for twenty-four hours unrelieved, there were no signs of acute inflammatory action and commencing gangrene, such as are usually expected. However, the tension being considerable, I incised the parts involved in the

extravasation. As the fluid escaped from the incisions, I noticed that it had not the strong ammoniacal odour which is so perceptible in such cases. Subsequently I treated the stricture, which was exceedingly tight, and kept in abeyance the more threatening urinary symptoms. I was somewhat puzzled for an explanation, as I felt sure that the case was one of extravasation, and not acute scrotal œdema. How was it then that extravasated and confined urine failed to excite gangrene? I collected some of the urine as it trickled through the wounds and compared it with some subsequently drawn off by the catheter. I found them identical, and in both there was an almost complete absence of urea. This, then, to my mind solved the mystery, and explained that as there was no urea to decompose there was no source for the production of the ammonia by which the destruction of tissues in connection with extravasated urine is mainly effected. By the absence of urea the urine was rendered chemically harmless to the tissues with which it came in contact. In the same way, and by a process of leakage, I apprehend may be explained some of those rare cases which have been described as scrotal or perineal urinary cysts, where a urinous fluid with little or no direct connection with the urethra is retained within a fairly well developed envelope.

In illustration of the formation of stricture by urine leakage, due to epithelial desquamation or abrasion, I would point especially to those cases of multiple stricture caused by spots of induration in various parts of the canal. In a patient who was recently under my

care, almost the whole length of the urethra was strictured by a series of nodular deposits, chiefly in relation with the floor of the canal. These could only be explained on the supposition that the urethra had almost entirely lost its normal power of conducting urine in the course of a long gleet, and that these numerous centres of induration and contraction marked the spots where leakage of some of the constituents of the urine had been permitted to take place. It will not be necessary for me to extend these views for the purpose of explaining certain facts observed in connection with peri-urethral abscess and extravasation of urine, which in practice we are all familiar with. What applies to the plastic form of exudation applies equally to the suppurative. In this way, however, is explained the fact that in these cases when suppuration occurs, and the matter is evacuated by incision from the perinæum, the urethra is found passing through the abscess cavity, completely isolated, and without showing any direct connection with the suppurating focus. It is under these circumstances that the unsupported canal occasionally gives way under the expulsive powers of micturition, and the urine is first forced into the abscess cavity prepared to receive it, and subsequently amongst those tissues, where it may be the more easily extravasated.

There are one or two practical points relative to the treatment of stricture and injuries of the urethra arising out of what I have thus ventured to bring under your notice to which I should like to refer before concluding. In the first place, the

knowledge that certain relations between a wound and the urine may cause and keep up urine fever will prove of service to us in practice, as I will illustrate in the following way. Not long ago I treated a case of urethral stricture by Holt's method of rapid divulsion. Contrary to my usual experience of the operation, the patient had a severe rigor three hours afterwards, and a temperature of 105° Fahr. On the following day this was repeated, with, in addition, almost complete suppression of urine. As it appeared to me that the patient would die if he absorbed any more toxic material from the wound, I had him placed in the lithotomy position, and passing a grooved staff I performed a free median cystotomy, and put a drainage-tube into the bladder. I should add that there was nothing to indicate that suppuration had occurred, the time was too short for its development, the symptoms being clearly due to urine poisoning. After this was done there was neither rigor nor fever, and urine was again rapidly excreted. By thus suddenly altering the relations of the wound with the urine the whole complexion of the case was immediately changed for the better, and the patient made a good recovery.

In the next place, a due recognition of the function of the epithelial lining of the urethra shews that there is a right and a wrong way in making use of dilatation in the treatment of strictures I am sure that more good follows the daily introduction of a bougie which passes quite easily, than when a larger size is less frequently used, but where, in fact, the principle of the

mechanical wedge is aimed at by the process. In this way rigors and other inconveniences associated with the treatment of stricture by bougies is avoided. I have made a large number of observations bearing upon this subject.

Thirdly, when a stricture has become, or is, so contractile and dense as to render dilatation out of the question, if not impossible, then, I believe, the open method of treatment is the safest and affords the best permanent results. In fact, excepting the earlier forms of stricture which are satisfactorily treated by dilatation, the open method has furnished the largest proportion of permanent cures that have come under my observation in the collecting and noting of many hundred cases of stricture taken indiscriminately. And in reference to this point, I must take exception to a statement which is frequently made to the purport, "once stricture, always stricture." I could furnish many examples following the open treatment which are quite at variance with such a conclusion. In order that I may not be misunderstood in using the word "cure," I mean that a contractile stricture necessitating the constant use of the bougie has been so influenced by what has been done as to render any further use of this instrument unnecessary, and that after a lapse of time of some years duration the urethra can be proved both to be structurally and functionally normal. The majority of these cases have occurred where the perinæum has been opened for stricture complicated with abscess and extravasation of urine. Here it by no means unfrequently happens, if

the artificial drainage made by the surgeon is free and direct, that a healthy scar, such as we see after lithotomy, takes the place of the dense contractile stricture which has sloughed by the acuteness of the inflammation that has been aroused. I should meet with no difficulty in fully illustrating this point. By the open treatment of stricture, of course, I mean the perineal section of Syme, or a modification of it, to meet some special circumstances, such as the double operation of external and internal urethrotomy combined, as I have already described. It must, however, be borne in mind that a perineal section is seldom resorted to until the urethra is largely impregnated, so to speak, with old cicatricial tissue of a contractile nature. Hence, although you may put into the urethra by your operation a longitudinal splice of good, sound tissue, such as fills up the wound made in lithotomy, and so bring up the canal to its normal dimensions you do not succeed in removing the tissue which you have merely divided. This still remains behind to contract and to mar to some extent results which, under other conditions, would be obtained. Still, in spite of the impossibility of removing the cicatricial tissue by a mere section of it, the results of perineal section, so far as I have observed them in cases where dilatation was insufficient, have proved both safe and satisfactory. The conditions, however, which the operation must necessarily fulfil are complete division of the stricture and thorough urine drainage. The difference between the wound of a lateral lithotomy and a perineal section is only this, that in one case you operate upon sound

textures, whilst in the other they have been rendered permanently and almost hopelessly contractile. Still, on the other hand, when the conditions I have mentioned are fulfilled, the cicatricial splice of sound tissue which perineal section introduces into a bad stricture often proves of the greatest and most permanent advantage in cases suited for this proceeding.

Fourthly, that in wounds of the urethra, made either accidentally or in the course of surgical operations, which, by the nature of circumstances, have to be treated without due regard for urine drainage, means should be more systematically taken to prevent the development of urine fever, as well as the formation of a dense contractile cicatrix. I found, after repeated trials, in the case of internal urethrotomies, that much might be done by irrigation, locally and through the agency of drugs which were largely eliminated by the urine, in promoting these objects.

Lastly, we must remember that the prevention of stricture is within our scope. If, as I have urged, the dense cicatricial material which constitutes a stricture is the result of urine leakage occurring in the process of a chronic inflammatory affection in the interior of the canal in one instance, whilst in another it is brought about by the constant contact of the excretion with an internal wound, as in accidental rupture of the urethra, then the importance in one case of irrigation as a part of the treatment, and free urine drainage in the other, is at once evident.

It is, however, in connection with ruptures of the urethra, such as are caused by blows and falls on the

perinæum, where the canal is more or less lacerated that we see exemplified the most disastrous effects of permitting a wound to heal subject to the irritation that constant contact with pent-up urine is capable of exercising. Fortunately, as a rule in these cases, retention of urine for a time averts the liability to acute septic intoxication, such as I have already illustrated in an earlier part of this lecture. Though the future of these cases, relative to the kind and degree of stricture that follows, is in some measure determined by the character of the injury inflicted upon the urethra, whether, for instance, the canal is entirely torn across, or partially, either obliquely, longitudinally or transversely, I have not the least doubt, from a careful observation of a considerable number of these cases, that those do best which are treated by perineal section and drainage without reference to the question of extravasation. When a catheter can be passed under these circumstances, and there is no evidence of urinary extravasation, it is often, I admit, very tempting to be content with this procedure, and to wait until there are further indications as to the necessity for incision. Such a course is almost invariably followed by the formation of a stricture of the most dense and contractile nature. Where incision is practised, as in those instances where there is evidence of extravasation, and the laceration proves to be only of a partial nature, the wound heals with a scar which shows but little tendency to subsequent contraction. In these cases we have remarkable illustrations of the damage that the presence of urine under certain

circumstances is capable of exerting whilst the process of repair in a wound is going on. And what applies to the healing of wounds inflicted accidentally upon the urethra internally, applies equally to others similarly inflicted on the canal for surgical purposes. I have elsewhere stated that for many years past I have taken some pains in collecting and noting cases of urethral strictures with the view of estimating the permanency or otherwise of the treatment to which the patient may have been previously submitted by various surgeons. The testimony that I have thus gathered from the examination of many hundred cases is certainly not favourable either to the permanency or the character of the relief that internal urethrotomy usually affords. Amongst the worst cases of stricture that I have thus met with have been those which have been treated by an internal section. If there is any force in the observations I have brought before the Society this evening, I do not think there should be any difficulty in explaining how this happens, and in recognising the importance of applying to the treatment of wounds of all kinds involving the urethra those principles which are the basis of Listerism, namely, drainage and cleanliness. There is no part of the human body in which disregard of these conditions is more likely to be attended with disastrous consequences, whether we have regard to the present or to the future. In conclusion, gentlemen, most speakers commence their discourse with a text; I prefer finishing with one: urine can spoil tissue as well as blood.

LECTURE II.

The pathology of the enlarged prostate viewed in respect to its causation and prevention, and the treatment of some complications arising out of it.

I PURPOSE this evening to speak of the pathology of the prostate relative to some points in connection with the prevention and treatment of certain disorders arising out of it when it becomes hypertrophied. The causes of hypertrophy of the prostate have formed the subject of much careful observation, and I feel some hesitation in again referring to them. Still, on the other hand, though my views may not prove generally acceptable, I am inclined to think that a narration of the observations upon which they are to a large extent based may serve a useful purpose in indicating lines of thought which may result, sooner or later, through the investigations of others, in clearing up doubtful passages in the physiology and pathology of this part. In the first place I shall speak of the prostate as forming the retentive apparatus of the male bladder, under whose influence the urine is collected and held, irrespective of any glandular function which, by the nature of other structures it may contain, it is capable of exercising. And I think it will not be difficult to substantiate the proposition that, in the human species

at all events, this part may with greater propriety be designated "*the prostate muscle*," rather than "*the prostate gland*," for whatever function it may exercise intermittingly, relative to the process of generation in its latter sense, seems to be subservient to the physical part it is continuously playing as a portion of the retentive apparatus. In support of such a view I would draw attention to Mr. Ellis' important paper * "On the Muscular Arrangements of the Genito-Urinary Apparatus," wherein is remarked, "I would propose the name *orbicularis vel sphincter urethræ* for both the prostate and the prolongation around the membranous urethra, whilst I would confine the old term 'prostate' (without the word gland) to the thickened and more powerful part near the neck of the bladder. This orbicularis may be considered as only an advanced portion of the circular layer of the bladder, though it must have the power of acting independently of the vesical fibres." But if its muscularity is admitted we must conclude that it for the most part exercises its function in conjunction with the bladder in the form of a hollow muscle, for it would be against the nature of things for it permanently to exist in the shrivelled and contracted state it presents after death. We have been too much accustomed to regard the prostate from its post-mortem aspect, that is to say, as a mass of muscle of the size and form of a chestnut, in which is contained some secreting tissue. For concluding that it thus exists during life, I believe there are no substantial grounds, as it seems to me that under no

* *Royal Med. Chir. Trans.*, vol. XXII.

circumstances, save the rare and momentary one when the bladder is absolutely empty, does it present such an appearance. On the contrary, the muscular fibres are spread out like a funnel, with the apex downwards so as to form a strong muscular support for the bladder and its varying amount of contents, the degree of expansion being naturally relative to what the viscus may contain. Hence the action of the prostate may be said to be just as continuous as that of the heart. In reference to this important point it will be necessary that I should furnish some reasons for such a conclusion.

In the first place, the clinical examination of a healthy person with varying amounts of urine in his bladder affords no evidence that the prostate presents the contracted appearance we are accustomed to see; on the contrary, when the finger is introduced into the rectum, in the natural condition, the parts are felt to be disposed in the manner I have indicated, and providing a muscular floor for the bladder and its contents.

But the retentive function of the prostate is more strikingly shewn when we proceed to what I would speak of as actual demonstration. And for this purpose we have only to observe what follows in connection with certain surgical operations on these parts with which most of us are familiar. Incisions may be made into the male urethra, in any part of its course as far as that point which we are accustomed to call the apex of the prostate, without any incontinence of urine following. I have seen cases of litho-

tomy by the median operation retain full control over the bladder during the whole period of their convalescence, in spite of the dilatation to which the prostate has been subjected by the introduction of the finger and the extraction of the stone. And this remark applies equally to cases of external urethrotomy.

When, however, the knife impinges to any appreciable extent upon the prostate, as in the lateral operation for stone and the modified median operation which I have recently drawn attention to where the prostate is divided, from that moment incontinence takes place; the patient has no command over his urine; he can neither collect nor expel it, and in this condition he remains until the healing process has made considerable advance. We have here striking evidence not only as to the habitual function of the prostate relative to the contents of the bladder, but that the action of the part must be unceasing in its character, subject to the circumstances under which it has to distribute its force over the area it supports or brings into action. How completely the prostate forms the lower section of the bladder was demonstrated to me in a striking manner only a few weeks ago, and in a way that I had not previously noted. It was a case of lateral lithotomy in a young man where, ten days after the operation, there was some free hæmorrhage. As the bleeding did not proceed from any part of the perineal wound, I had the patient put under ether on the operating table, and suspecting where the bleeding came from I introduced the nozzle of a Higginson's syringe into the orifice of the urethra

expecting that the fluid would run out of the open urethra ; this it certainly did, but not until it had first entered the bladder, out of which the fluid escaped, together with some old clots which had evidently collected in the viscus, just as water would do out of the side of a cask in which a hole had been made. This I was able to see, as the wound was held open with retractors under a strong light. In addition, however, to testimony of this kind, I am convinced from a careful examination of the prostate, both before and after operations on this part, where the introduction of the finger into the bladder formed a detail of the proceeding, that the more usual condition of the healthy prostate is one of relaxation, and not of contraction as we are accustomed to see when death has taken place.

But further, when there are no such physical functions to perform relative to the contents of the bladder, the prostate, as a muscle, so far as I have been able to ascertain, only exists in a rudimentary form. I refer to those distressing abnormalities known as extroversion of the bladder, where, from the fissured nature of the structures, there is no receptacle for the urine which escapes from the ureter as it is excreted. Here, though the sexual sense may be normal, there is from the nature of the parts no necessity for any provision being made for the collection and retention of what the kidneys secrete. I have not been able to discover, though I have taken considerable pains to do so, that in these abnormalities hypertrophy of the prostate has ever been noticed. This seems to me to

be a point of some significance in connection with what has been already urged. But though in an argument of this kind I would prefer to substantiate my position from positive evidence rather than by a deduction from the negative, I cannot help remarking that, if the office of the prostate was solely in relation to the sexual act, the pathology of the part would tend to indicate this more than I believe it does. It is not very uncommon to meet in practice with cases of acute suppuration commencing in the follicles of this part, where one would think that irreparable damage must have been done, and yet we have evidence to shew that the individual has not necessarily been unsexed by this process. Nor can I assert, though the opportunity for doing so has now for some years been abundantly provided me in my operations, involving varying degrees of mutilating the prostate, that I ever extinguished the procreative powers.

In the next place, I would point out that adult man seems to require some special provision such as the prostate affords for the purpose I have just indicated, by reason of the exceptional degree of pressure to which the most dependent portion of his bladder is constantly subjected. And in making use of the words "exceptional degree of pressure," I do so in contra-distinction to what is found, so far as I have been able to observe, not only in the animal kingdom, but in other varieties of the human species which are not in exact correspondence with the type I have taken. As demand and supply in the disposition of muscular tissue are proportioned, it seemed to me that

we had hitherto failed fully to recognise and appreciate all the circumstances which rendered it necessary that the adult male bladder should, as I have already pointed out, be provided with a muscular apparatus of considerable strength at its most dependent point. But in what respects it may fairly be asked, does the adult male bladder differ from other varieties of its own species, and from those animals which in their higher organisation more closely approach it? I maintain that in man the perpendicular axis, of what I would speak of as urine pressure, falls directly upon the outlet of the bladder, whereas in the female, not only are there other means of supplying muscular support to the base of the bladder, but in consequence of the difference in the pelvic organs, a considerable portion of the weight of the viscus, especially in its more extreme degrees of distension, is borne by the pubic portion of the pelvis. Further, allowance must be made in the female sex for no provision being necessary for seminal ejaculation, in which function the muscular fibres of the prostate undoubtedly play an important but occasional part. In the higher mammalia, excepting, perhaps, in the case of dogs, the prostate is not so largely developed as in man. In reference to this point, Mr. Bland Sutton kindly informs me that, although he has conducted many thousand post-mortems yet, except in the doubtful case of dogs, he has never seen an enlarged prostate, at all events such a one as would cause obstruction to the flow of urine. In animals, it will be observed, that the perpendicular axis of urine pressure, when the

bladder is tolerably full, does not fall as in man on the outlet, but on the parts which support the bladder according to its varying degree of distension. In the dog, it seems to me not improbable that the exceptional degree of prostatic development is related to the somewhat peculiar condition under which, in this animal, micturition is performed. As my opportunities of examining the urinary apparatus in the lower animals have been few, I feel much hesitation in making reference to any observations I may have rather casually made so far as they related to the point under discussion. It, however, appeared to me, that where the habits of the animal, as observed in some apes and marsupials, necessitated the frequent adoption of an erect position, that the males had a much greater development of the prostate muscularly than was usually found in other kinds of quadrupeds. I regret very much that we have not at our disposal more abundant means for referring to dissections illustrative of the comparative anatomy of the body. I am sure they would prove of much assistance in investigations of this kind having relation to normal and morbid human anatomy. But, apart from this, if time permitted, it would not be difficult to adduce further evidence to show that in man the collection and storage of urine, if I may make use of such a term, implies a degree of muscular support to the most dependent portion of the viscus, for which no such complete provision has to be made under any other condition of life I am acquainted with. I should not, however, feel at all surprised if when "the missing

link" is discovered he is found paying the penalty for his assumption of the erect posture by developing in some degree an enlarged prostate.

But to proceed, if the prostate represents the chief means of retention, and support for the contents of the male bladder, is it necessary to pursue the argument for the purpose of explaining why it becomes hypertrophied? Does not one follow upon the other? Are not the circumstances of individual life sufficient to explain why it happens to one person and not to another?

Many of the facts connected with the natural history of hypertrophy which have been collected for us, or with which, in our daily practice, we are familiar, seem to me to support the view I have taken relative to the function of the part. In the first place, it is not met with during those periods of life which are most remarkable for muscular activity and development; on the contrary, it is called into existence where, pathologically speaking, quantity seems to supplement deficiencies in quality.

But, as with similar changes in other parts of the body, so may prostatic hypertrophy be shown to be exactly compensatory; whilst in others, by an excess of the process, it may be proved to be detrimental. And in reference to this point I would remark, that we have been too much accustomed to regard prostatic hypertrophy as necessarily a morbid and hurtful process. To such a conclusion I think exception may be taken on substantial grounds. It is stated by Sir Henry Thompson that actual

hypertrophy of the prostate exists in about 34 per cent. of men at and above sixty years of age; that it produces manifest symptoms in about 15 or 16 per cent. From this it would appear that the larger proportion of persons are not injuriously affected by the change, a circumstance which seems to suggest that the majority of persons with large prostates are in some way or other benefited by them; and this deduction is considerably borne out by every day experience. I am disposed to think from my own examinations, that the frequency of some degree of prostatic hypertrophy is thus rather under- than over-estimated. Though it is not easy to form an absolutely correct estimate of the size of these parts relative to standard measurements by rectal examination, my conclusion is that a far greater number of males over sixty years of age have some enlargement of the prostate, and are never in any way conscious of the alteration, than we should conclude from the figures I have just referred to. How frequently, for instance, when we are examining elderly persons, say for some disorder of the rectum, we make the discovery that their prostates are enlarged though they have no reason to be conscious of this change. I can at this moment recall many instances of this in my own practice where the persons are, in every sense of the word, in the enjoyment of the most perfect health, with an entire absence of any urinary ailment. Quite recently I was asked to examine a gentleman who, in the course of an acute bronchitis, had retention of urine for the first time in

his life. This patient had an enormous prostate, which must have been in course of formation for several years. Surely, under these circumstances, in the first instance the hypertrophic change must have been called into existence for a distinctly conservative object, and had been merely disarranged by the violence of the cough from which he was suffering.

But though prostatic hypertrophy is, as I have shewn, in the greater number of instances more or less compensatory, it may, as in others, be in excess of what is required, and thus prove detrimental. In the latter category, reference no doubt will occur to us of those examples where the prostatic mass is made up of projections, having a somewhat lobulated or nipple-like form, where the degree of irritation and obstruction excited is often very considerable, and apparently out of proportion with the cause. These I would speak of as being the structural upheavings of a frequently contracting muscular ring. In a muscle or part undergoing hypertrophic growth, and where the process is prompted by circumstances which are obviously liable to some degree of variation, tissue production may be excessive or become unnecessary. Such excess would naturally tend, under the contraction of the part, not only to protrude itself where the resistance was least, but to assume a more lowly organised form that that which in the first instance was developed. In this way, I believe, these masses of more or less degenerated prostate tissue are formed, which subsequently cause so much vesical irritation and irritability. And this observation, whether a large prostate still remains

almost entirely muscular, or has become largely converted into fibrous tissue, has an important bearing in practice in those cases where we have to express an opinion in reference to the probabilities as to whether the use of the catheter will be a temporary or a permanent expedient. For where there is evidence to the touch that fibrous tissue predominates largely over the muscular, the use of the catheter is generally perpetual; whilst, on the other hand, when the prostate is found soft and yielding to the touch, as when it remains muscular, a complete restoration of function may be anticipated. Thus, then, may the resistance which is constantly going on in the most dependent portion of the bladder, against that downward pressure which is exercised by the collection and retention of urine in the bladder, prove the common cause of its hypertrophy.

But this is not the only condition under which hypertrophy involving the lower section of the bladder can be studied.

In the examination of the bladder, both after death and in the course of surgical operations, it is impossible not to be struck with the altered relations which frequently exist between the body of the viscus and its neck or outlet. In early adult life the bladder may be 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 to have become further depressed within the pelvic cavity. In this way I have seen a prominence given to the floor of the prostate, which was really due not to the

development of more prostate tissue, but to the depression or partial prolapse of the posterior wall of the bladder. This artificial condition of obstruction I have endeavoured to show, in some instances, not only precedes prostatic obstruction, but, further, is followed by the development of a strong muscular buttress between the orifice of the ureters, which in many instances leads to the obstruction of what otherwise would prove, by the sinking of the posterior wall of the bladder, an inconvenient pouch. Thus hypertrophy of the prostate and the adjacent part may not only be due to the natural resistance of urine pressure, but also may be called into existence for the evident purpose of supplementing a structural defect of more or less accidental origin.

It is impossible to observe the function of micturition in the child and the adult without recognising that in the two conditions there are wide differences in the influence that the will exercises upon the merely mechanical act. In the child the process almost approaches the involuntary, the calls of nature are impulsive, and must be obeyed without hesitation. This may be illustrated in a variety of ways, in health as well as in disease. In adult man this is to a large extent changed, as we find the process becomes much more subservient to the will than perhaps at first sight we should feel disposed to admit. That there is a wide difference in our respective powers of continence in this respect I am willing to admit. In some individuals the function of micturition seems in health but very slightly removed from a purely volun-

tary act. Let me illustrate what I mean. A medical man, closely approaching seventy years of age, asked me to examine his rectum for some slight ailment. In doing so I found that he had a very large soft prostate. I mentioned this to him, when he remarked, "I could hardly believe it, as I have always had such excellent water works. I have been in the habit of not passing urine for eight or ten hours." Here then is an illustration of a man who submits his bladder to the same degree of urine pressure at seventy as he did when he was twenty-seven. Again, a captain of one of our ocean steamers in consulting me in reference to some urinary disorder clearly connected with a large prostate, in comparing his present with his past powers of retaining urine remarked, that in consequence of remaining on the bridge of his steamer for long periods of time, particularly in thick weather, without leaving it to pass water, he had acquired a power of retention which had gradually become constant. Is it remarkable that nature had thus substituted quantity for quality, and had made provision against the effects of a muscular strain which could not have been inconsiderable? We might from our daily practice multiply examples of this kind where persons, so far as was known, were not deriving anything but good from that excess of muscular tissue which we are accustomed to speak of as the prostate gland. If we admit that the muscular fibres, of which the prostate is so largely composed, exercise the function I have urged relating to the contents of the bladder, I do not think we

can be at a loss to understand how they become hypertrophied.

Let me, however, not be understood as implying that in the human species the prostate has no relation with the sexual act. Evidence is not wanting to show that, as a muscle, as well as by reason of its glandular element, it exercises purely physical functions relative to this important but casual process, independently of the continuous action I have laid stress upon in relation to micturition. The less important function of the glandular portion of the prostate has been, I believe, correctly described by Dr. Handfield Jones * in the following words :—"Its part in the generative function is probably not to prepare any essential element of the fecundating fluid, but merely an appropriate viscid material involved in which the seminal animalcules may be more securely transported on their destined route."

Passing to some considerations relative to the prevention of prostatic hypertrophy, and the complications arising out of it, I would observe that more care should be systematically taken to preserve the muscular power of the bladder, and to aid it artificially when the necessity obviously arises. If a man goes on using his bladder as he would a water bottle, from adolescence to old age, he must not be surprised if nature prevents it breaking down entirely by the process I have described. The timely use of the catheter has often, I am sure, provided the means for warding off changes which unfortunately

* *The London Med. Gazette.* vol. v, 1847.

do not always cease when they have become precisely compensatory. Nor is there anything exceptional in this, for as age advances we recognise the importance, and make use, of artificial assistance in a variety of ways which I need hardly particularise. In the clinical history of most cases of hypertrophy of the prostate we can generally trace a period when a weakness of the viscus indicated itself by a frequency in action, which was subsequently corrected by an overgrowth in the part. Unfortunately, the process of hypertrophy, as observed in the prostate, is not always precisely compensatory, but is not unfrequently in excess. In by far the larger proportion of these instances the individuals are able not only to keep themselves comfortable by the use of the catheter, but I question very much whether their lives are in any way shortened by the continued inconvenience they have thus to submit to. Many of us could record some remarkable example of longevity under these circumstances. But making due allowance for this class of cases, there are others whose lives, in spite of careful and efficient catheterism, are rendered miserable and useless by what they suffer in this way. For no sooner does urine collect in their bladders to any appreciable extent than they require to get rid of it. Many expedients have been resorted to, both in the way of drugs and operative procedures for the permanent relief of this condition, about which it would be impossible for me to speak in detail. Let me, however, refer to a case* which I reported some years ago,

* *Brit. Med. Journal*, Dec. 24, 1881; April 8, 1882.

where I tapped the bladder from the perinæum through the enlarged prostate, quite independently of the course of the urethra, and where a cannula was retained in this position for two months with great comfort to the patient. He was a man about eighty years of age, and had suffered much from almost all the complications that an enlarged prostate is capable of giving rise to. But the future of the case was perhaps still more interesting, for he completely recovered, and lived for several years, and in this I include the acquisition of the natural and unaided use of his bladder. Further, the explanation of this was found in the fact that during the time the cannula was retained in his bladder his prostate underwent a gradual diminution in size, which was noticed by all who had the opportunity of watching and examining him. His condition prior and subsequent to the operation proved a most remarkable and instructive contrast. I may add, that this process has been repeated not only by myself, but by others with very satisfactory results, and this tends in no slight measure to substantiate the views I have already advanced relative to the pathology of the disorder. And in connection with puncture through the prostate, I would like to say a few words in reference to cases where relief has been afforded under similar circumstances by an incision through the part similar in many respects to that adopted in lateral lithotomy. There can be no doubt that prostatotomy, which affords a free and incontinent escape for urine from the bladder, has proved of very great temporary and permanent service in this

class of cases. At the Meeting of the International Medical Congress at Copenhagen, in 1884, I took the opportunity of illustrating this method of treatment as an alternative in cases where the catheter was of no avail in affording relief. And I will again refer to this operation as sufficient time has now elapsed to enable me fairly to judge of the results obtained. The kind of cases to which this treatment has been applied are those of difficult micturition, due to a large prostate, which are not adequately relieved by the use of the catheter. This class, therefore, includes instances where there is unusual difficulty in introducing the catheter; where bleeding almost always attends the use of this instrument; where the withdrawal of the urine is followed by no sense of relief; and where the bladder, by the constant presence within it of pus and tenacious mucus, is converted into little else than a chronic abscess through which urine percolates. These, as well as some other forms of prostatic disease which might be included, are practically unrelievable by the catheter, and soon terminate in a painful death. For the relief of such conditions various expedients for establishing a more or less permanent communication with the bladder, other than by the urethra, have been practised, namely, puncture above the pubes, by the rectum, and from the perinæum, with the retention of a cannula or tube for the discharge of urine at these several points. Excellent in design as these proceedings are, they appeared to me to fall short in one important respect—in not dealing with the cause of the obstruction.

Two of these measures are open to objection on the ground that the artificial canals are inconveniently placed as permanent vents, for it would seem desirable that the urethra should, as far as possible, be utilized, and the external opening for the escape of urine be dependent. On considering various plans of treatment which had been applied under the circumstances mentioned to the obstructing prostate, it appeared to me that by combining Cock's well-known and safe operation for opening the membranous urethra with Mercier's for dividing the prostatic bar from within the urethra, as will be presently noticed, it would be possible to obtain precision with an increased freedom from risk. Such an operation was suggested by the late Mr. Guthrie, but I cannot find that he ever tested it in practice. The want of anæsthetics probably interfered with the progress of this as well as of other departments in surgery. Apart, however, from the operative procedure, it appeared to me from some experience I have had in lithotomy and other operations on the parts constituting the neck of the adult male bladder, that the means which had been subsequently adopted for rendering permanent the prostatic section thus made, were very inadequate. Further, I had been impressed with the advantage that followed the employment of suitable bougies as dilators in cases where the prostate threatened to obstruct micturition.* Influenced by observations of this kind I was led to attach considerable importance to the treatment immediately following section of the

* *The Prevention of Prostatic Obstruction*, Churchill, London, 1881.

enlarged prostate with the view of rendering it more permanent than had hitherto been attempted. The necessity for prostatotomy having been determined by the symptoms presented in each case, as well as by physical examination, I will describe briefly the operation and after-treatment employed. The former consists in opening the membranous urethra from the perinæum on a guide, and introducing the finger within the prostatic urethra, the obstructing portion of the prostate is then divided a little to one side of the median line, partly by incision with a curved probe-pointed bistoury from within outwards, and partly by divulsion with the finger when the latter is feasible, a large drainage tube is then introduced into the bladder. I attach considerable importance to the prolonged use of the drainage apparatus, as the object is to render the section of the prostate, not a temporary one as after a lithotomy, when no such provision is made, but permanent. Hence, I am in the habit of retaining these tubes for six, eight, or ten weeks. If, after such periods, on removing the tube I find that a catheter can be made to enter the bladder easily along the natural route, or if, as sometimes happens, urine forces its way, in spite of the drainage tube, along the natural passage, I regard these as indications that the object in view has been obtained. The perineal wound is then allowed to close. Let me briefly illustrate this by the narration of one of my earliest cases.*

A man, aged sixty-three, came under my care in

* *British Med. Journal*, June 9, 1883.

February, 1883, suffering from a large prostate, which was a constant source of irritation to him. The straining and forcing to urinate was but very slightly relieved by catheterism, and the only way he could get any sleep was by tying the instrument in, and this was generally followed by some cystitis. A fortnight after I saw him I opened the prostatic urethra by a median perineal incision, and incised the prostate laterally. In doing this I found that though the prostate was not very large, the orifice of the bladder was much obstructed by one of the nipple-like enlargements, which are sometimes more effectual in rendering micturition difficult and catheterism uncertain than some larger masses. A drainage tube was introduced and retained for four weeks, when it was removed, and the perineal opening allowed to heal. In this case, so perfect was the drainage that the whole of the urine escaped by the apparatus, and the patient was kept absolutely dry throughout. He remained under treatment for two months after the operation. Three months after he returned to report himself. There was a slight fistulous opening in the perinæum at the lower angle of the wound, though which urine sometimes passed in drops during micturition. He could now hold his urine for several hours. Some slight enlargement of the prostate could be felt from the rectum, but this did not appear to have increased. A full-sized catheter was easily introduced without any hitch or obstruction in the prostatic urethra, or at the neck of the bladder, being felt. This patient was seen at intervals for two years after the operation, and

remained perfectly well. He has since neglected to report himself. Though I advised him to pass a catheter for himself occasionally, I believe that he did not do so.

Taking the cases thus operated on, I have noted the following results :—(1.) The operation has merely afforded just such a temporary relief as the retention of a catheter or cannula would do as a drain, the condition of the patients, so far as recovery was concerned, being more or less hopeless at the time of operation. (2.) The establishment of a permanent vent for the urine through the perinæum. In two instances where this occurred the patients exchanged a life of misery for one of comparative comfort. The shorter route here proved most acceptable. (3.) The substitution of easy for difficult catheterism. In one patient I thus operated on, though he had to use his catheter afterwards, so long as I heard of him, which was for over two years, he never had any difficulty in passing the instrument, and the bladder continued to be far more tolerant of urine than it had previously been. (4.) The complete recovery of the patient, as I have just illustrated.

In discussions relative to the method of operation adopted, it has been pointed out that in some cases of this kind it must be absolutely impossible to explore the whole length of the prostatic urethra with the finger. This circumstance has never influenced me, or seriously interfered with my carrying out the object in view. I never met with a prostate of such a size or shape as to prevent a staff or guide being passed into

the bladder, and where a director will go a knife may safely follow.

But, to proceed, though a more or less permanent vent or opening for the urine, either above or below the pubes, may prove of value in some instances of urethral obstruction due to prostatic hypertrophy, where ordinary catheterism is useless so far as the amount of relief that is afforded, it is not applicable to all cases of this kind. For we must remember that in the former class of cases it is merely a matter of urethral obstruction that we have to deal with, whilst in others the symptoms are for the most part due to the irritation that is provoked in the bladder by the protruding masses of more or less degenerated prostatic tissue. The one is to the other, as well as to the bladder, as urethral stricture is to vesical calculus. The examination of specimens of hypertrophy in connection with their clinical history clearly points in some to the mechanical irritation which protruding masses of more or less prostatic tissue excite in the interior of the bladder. In connection with the treatment of such cases, where the lives of the individuals are not only absolutely useless, but most miserable, I am glad to see there are signs that something now may be systematically done for their relief. Heretofore we have been drawing for any experience we may possess in reference to this point upon what I would speak of as the casualties of lithotomy. There is much, however, in favour of direct surgical interference in these exceptional cases of grave prostatic obstruction and irritation, as the

nature of the growth, unlike cancer, renders a return of it improbable. I have now on three occasions deliberately removed by perineal section considerable portions of the hypertrophied prostate, with permanent relief to the patients, and I have no hesitation in recommending the adoption of this course in suitable cases, after, if possible, perineal exploration of the part with the finger. Now, three instances may seem very insufficient data for basing such a recommendation upon; but, it must be remembered, that this is an exceptional remedy for the purpose of meeting exceptional circumstances. No operation of this, or any other kind, would in my judgment be warrantable so long as a man can keep himself reasonably comfortable with the use of the catheter, and, therefore, the percentage of cases where more radical measures would seem to me to be indicated is really extremely small. But we must be provided for these, and, though they are oftener met with in the aged and feeble, with reduced powers of repair, whose chances of recovery from any operation are lessened, such means as I am referring to are not to be too hastily set aside in these days when the practice of operative surgery, especially in relation to the interior of the body, has been shorn of many of its dangers, and is altogether very different from what it was, even at the commencement of the present century. I am induced to make these observations partly because I think it would be a misfortune if operative procedures were extended to what I would speak of as ordinary forms of prostatic obstruction,

and partly because I think the risks attending the removal of protruding portions of the prostate have been somewhat exaggerated, and thus surgeons have been debarred from undertaking operations which, in proper cases, have afforded both immediate and permanent relief. So far, I have been able to do all I desired in the way of removing more or less of the obstructing prostate by proceeding from the perinæum, which I have always opened with considerable freedom. In connection with the subject of prostatectomy, or removal of portions of the prostate, under such circumstances as I have indicated, I would take this opportunity of expressing the interest with which I read the paper by Mr. McGill, and the no less instructive discussion which followed it, at a recent meeting of the Clinical Society. In this paper the author demonstrates by instances how portions of the prostate might be removed by scissors through a supra-pubic incision. I am disposed to think that this, on still further trial, will be found the best way to deal with such cases, for it places the operator in view of those projecting masses of degenerated prostate tissue which invariably protrude towards the cavity of the bladder, and which really are the cause of the distressing symptoms of irritation which accompany them. Care, however, will be necessary, as I have just urged, in the selection of cases for operations of this kind, it being distinctly understood that they are undertaken, not because the prostate is large, but because it has induced symptoms which cannot be alleviated in any other way. You may remove the prostate entirely,

but this necessarily renders the individual incontinent for life. Lobulated masses proceeding from an hypertrophied prostate and isolated fibromas in the part, may thus be dealt with with permanent advantage; but this is a very different thing to extirpating the prostate in its entirety, or seriously mutilating the muscular ring, which under all circumstances is essential to the integrity of the bladder as a urine holder.

The following instance, which I will briefly relate, substantiates the proposition with which I opened this lecture, and as it similarly bears upon the operative point now under consideration, I may consistently close my remarks with it.

In August, 1882, a patient, aged sixty-four, came under my care with symptoms of primary carcinoma of the prostate, which caused bleeding, continuous pain, and irritability of the bladder. As no treatment afforded relief, I did a free median cystotomy, and proceeded with my finger and a blunt gouge to enucleate the prostate and the growth connected with it. In this I succeeded, with the exception of a small portion in front which I could not get away. There was very little bleeding, and the patient made a good recovery, though he lost the power of retaining his urine. Some degree of retentive power eventually returned, but it became necessary to provide him with an apparatus for controlling the incontinent escape of urine from the bladder. He lived for fourteen months after the operation, and was able to return to his work as a stevedore. He eventually died from a recurrence

of the disease in the glands of the groin. I showed the specimen of what was removed at a meeting of the Royal Medical and Chirurgical Society (December 13th, 1881), in connection with a discussion bearing upon the subject.

LECTURE III.

The operative treatment of stone and tumours of the bladder in relation to some recent views and practices.

The surgery of the bladder during the last ten years will, under all circumstances, occupy a conspicuous position in the history of our art by the introduction of litholapaxy, the revival of the supra-pubic, or high operation, under somewhat altered conditions, and by an approach to a more systematic method of treating tumours and growths connected with the interior of this viscus. It has been my privilege to watch the progress of these several procedures, not merely as a passive critic, but as an active participator with others in all the advantages these measures have proposed to confer. Within the period mentioned a vast amount of experience has already been obtained bearing upon these various proposals, and I think the time this evening cannot be better occupied than in drawing some conclusions in regard to them which seem to me may now be fairly and advantageously done. And in referring to these several procedures I will endeavour in speaking of each to indicate what appears to me to be their strong as well as their weak points, and to what extent our present experience tends to show they have justified the anticipations with which they were

promulgated. In the course of these remarks I shall not trouble you with statistics relative to operative procedures, as I do not attach much importance to them. It seems to me that in drawing conclusions from figures of this kind, gathered from various sources, we are putting ourselves much in the same position as the individual who, to make sure about the weather, consults three different kinds of barometer, and is rewarded by finding them respectively indicating at the same time "stormy," "rain," and "very fine." From such variations as these most persons would be disposed to conclude, not that it was safe to go without an umbrella, but that at least two of the instruments must in some respect be faulty. On the other hand, to the collective work of individuals carefully recorded, with all failures and successes, the greatest importance is to be attached, as indicating, not only results, but how these were obtained.

In the first place, I will take a brief survey of the position that the crushing operation seems to occupy at the present day. Since the procedure which is justly associated with the name of Dr. Bigelow, of Boston, was brought under notice, exactly ten years ago this month, it has been applied to almost every condition under which stone in the bladder is met with in males, females, and children. Without entering into the history of the modern crushing operation for stone, or referring to discussions as to what led up to the important changes it represents, I think most persons will be inclined to admit that the lithotrity of

to-day occupies a very different position compared with what it did ten years ago. At the latter date there appeared to be a tendency to limit its application considerably, whereas now we have rather to fear its extension to conditions for which it could hardly have been intended. The removal of a stone at a single sitting without leaving behind any cause either for its reproduction or for cystitis, represented such a desirable combination of objects as to at once place the matter before surgeons in a light which it had not previously done. Let me stop for a moment to enquire how far this has been realized. In the case of stones of a moderate size, occurring in adults in other respects healthy, I think it will be generally admitted that to these lithotrity may now be applied with a degree of success which prior to this decade had never been obtained in the history of either the cutting or crushing operations. Nor can there be any doubt, excepting children, perhaps, that by far the larger number of stone cases requiring operation occur under these circumstances. But this, unfortunately, does not represent the whole truth, as lithotrity has been and is being applied to a class of cases where the anticipations formed in reference to it in its most modern form have not been realised; and this brings me to notice what I would speak of as the weak side of this proceeding. In corroboration of this, let me read a passage from a recent address by Mr. Cadge:* "Although," he observes, "the immediate and direct mortality of lithotrity is small, the recurrence of stone

* Hunterian Lectures, Royal College of Surgeons, 1886.

is lamentably frequent. In my own list of 133 cases there were 18 in which recurrence one or more times took place, being about 1 in 7. Sir Henry Thompson, with a much larger number of cases, gives about the same proportion. I am disposed to infer, however, that recurrence is more frequent than this, because it is not likely that all who get relapse apply to the same surgeon again. Patients may, and frequently do, apply to the same operator once or twice, but after a time they either apply to their own surgeon, or they decline further treatment, and too often their subsequent history is one of painful endurance of chronic bladder disease and gradual exhaustion. If, moreover, there be added to the list those numerous cases of phosphatic deposit or concretions, so frequently noticed after lithotrity, the relapses would I believe reach to nearly 20 per cent. This seems a heavy indictment to bring against lithotrity, but I am afraid there is no gainsaying it, and if so it would be wrong to pass it over or make light of it."

Though with very much less experience of lithotrity than that to which I have just referred, I became impressed some years ago with the conviction that in certain cases we could do something more than merely remove the stone from the bladder.

It will I believe be generally admitted that the state of the interior of the bladder relative to its shape, its power of contraction, and the presence or absence of inflammation has, without being more precise, a determining influence in the reproduction of stone. In the majority of instances this is merely a

matter of experience deduced from observation, whilst in not a few this tendency is not discovered until, as it were, the experiment of removing the stone by crushing and aspiration has been tried and failed. And in connection with this observation, I think, we have been rather too much disposed, if I may judge from a good deal of the literature relative to this subject, to allow the physical properties of the stone to determine for us, as it were, the selection of the operation, irrespective of the relative conditions to which I have referred. Though a large hard stone is, as a rule, best treated by lithotomy, this by no means implies that some small and soft ones are the less advantageously removed by a similar proceeding.

Let me take, for instance, the case of a stone in the bladder occurring in an adult, with some chronic cystitis and enlargement of the prostate. The probabilities are that for many months, if we look at the section of such a stone after its removal, the bladder has been engaged in encasing it in a mould of phosphates just as completely as if it were done by plaster of Paris. Now is it reasonable to suppose that you can suddenly stop this stone-forming process without leaving behind any contributing cause for its continuance. In connection with the subject more particularly of prostatic hypertrophy, I have examined a very large number of bladders, and, having regard to the distorted or pouched condition of the viscus, which so frequently accompanies this change, as well as to the condition of the mucous membrane relative to the presence or absence of phosphatic deposit upon

it, it has often struck me, not that lithotrity has its failures, but under these circumstances its successes are so numerous.

Reflections such as these induced me some years ago gradually to alter my mode of procedure in cases of this kind, where either it was clear that the stone was the effect rather than the cause of disease, or where this fact was demonstrated by the failure of lithotrity. I could not help feeling that the bladder, under these circumstances, was not unlike, in many respects, a chronic abscess with a stone in it, and that it was just as necessary to open and drain the one as the other. Let me briefly illustrate this by one of my earliest cases. It was that of a man of 60 years of age, who submitted to lithotrity on three occasions in two years, when large masses of phosphatic stone were readily removed. In the intervals between the operations he never was free from vesical irritation. He could not empty his bladder completely without a catheter, the urine was more or less ammoniacal, and, in spite of careful catheterism, he suffered much from urinary irritability. He had some degree of prostatic enlargement, and some pouching or sacculation. Two years after the first crushing I performed lateral lithotomy for him, and removed more phosphatic calculus of recent formation. I put a large drainage-tube into his bladder, and he was drained and washed for eight weeks, until he voided normal acid urine, when the tube was removed, and the wound allowed to heal, which it did in the course of a month. This patient has now been perfectly well for over three

years. I would refer to this and similar instances, not as being merely examples of successful lithotomy, but of successful drainage.

Three years ago I brought this subject* under the notice of the profession, and described at length my mode of operating and of draining; and to these points I would now briefly direct attention. So far as the method of operating is concerned, my object has been to remove the stone by such an incision as will permit the bladder to be readily and efficiently drained, hence the proceeding stands much in the same light as evacuating matter from a chronic abscess does to the important part of the treatment by drainage that is to follow.

In the performance of lithotomy in cases of this description, my aim is to make a wound into the bladder which is not likely to close up before the interior of the viscus is ready for the reception and continence of the urine. Hence I am an advocate for lateral lithotomy, which best fulfils the conditions that are required. But though the mode of opening the bladder is important, the process of draining, where the condition of the viscus or of the parts above it is such as to require this, is still more so. As a rule, cases of this kind require drainage to be continued from four to eight weeks. I have drained them as long as ten weeks before the state of the bladder, as evidenced by the urine, was such as to allow the wound to heal up. The drainage tubes I employ for this purpose are larger than those which have been

* *Annals of Surgery*, June, 1885.

used temporarily by some surgeons after lithotomy, and some care is required in fitting them to each case [Mr. Harrison shewed some specimens of his drainage tubes]. By their use, with the exception, perhaps, of the first few days after the operation, when some urine may escape by the side, I have been able to keep patients absolutely dry during the whole process of treatment, whilst at the same time, antiseptic dressings have been applied to the perinæum, but I do not attach much importance to the latter, so long as the urine drainage is perfect.

Let me illustrate this practice by another case of somewhat recent date. It was that of a gentleman seventy years of age, who for over four years had never passed one drop of urine except through a catheter, and who for the last two years of this period had absolutely lived with the instrument in his bladder, both day and night. I examined him in October last, and found that he had a stone in his bladder, but one that I could have quite easily removed by crushing and aspiration. However, in the presence of the symptoms mentioned, and guided by other experience of the kind to which I have referred, I selected to perform perineal lithotomy, and to drain. My colleague, Mr. Mitchell Banks, held the staff for me, and I removed three uric acid calculi of moderate size, coated with phosphates. I made, as I usually do, a very free opening into the neck of the bladder, and put in one of my largest-sized drainage tubes, with two or three superficial sutures in the wound to keep it in position. He was

drained continuously for eight weeks, when it was found, co-incidently with a much improved state of the urine, that the latter was occasionally forced out spasmodically through the normal channel of the penis. The drainage tube was then removed, and the wound allowed to heal. Though the function of the bladder has been in abeyance for four years, he has now complete control over his urine, and can expel it spontaneously without any assistance from the catheter, which he has entirely discarded since the operation. At present he has to pass his urine more frequently than is desirable, a circumstance which is probably due to the empty state the bladder has been in ever since he commenced to use the catheter continuously, day and night, two years ago. Notwithstanding this inconvenience which, I believe, will improve in time, it is remarkable that the bladder should have entirely recovered its power after such a long period of inaction as four years. Had I crushed, as I could have easily and safely done in this case, I feel sure that the power of the bladder would not have returned in the way that it has.

My friend, Mr. Cadge, in referring to recurrences after lithotrity, seems to think that in the matter of treatment we are placed somewhat on the horns of a dilemma, that is to say, if we crush there is a considerable probability of the stone recurring; whereas, if we cut, we adopt a harsh proceeding, and one more immediately perilous to life. As I have said before, I do not attach much importance to statistics, for putting aside what may be due to the accidents of litho-

tomy, to which we are all more or less liable, and which are really responsible for no inconsiderable amount of the mortality following this operation, the results will be largely determined by the attending circumstances of the individual case. If a patient comes to be treated for a stone in his bladder with dilated ureters, and with only about one-tenth to one-fourth of his normal amount of kidney tissue, and the balance made up of pus cavities, I do not think it makes much matter what you do to relieve the suffering caused by the stone, as the result will be the same whether you cut or crush. Putting cases of this kind aside as being entirely outside the question, just as they are beyond repair, and taking instances where the only objection against lithotrity is that the stones are likely to return or have been proved to do so, I have not observed that the perils of lithotomy are very great.

In analysing my experience of lithotomy, I can refer to fifteen cases where the process of opening the bladder was followed by a more or less prolonged system of drainage and irrigation, such as I have just described. Of this number, three terminated fatally in the course of from three to five weeks, by reason of the far advanced suppurative condition the kidneys were in. This was considered as probable at the time of operation, and was proved by post-mortem examination. I had no desire to operate at all in these instances, but the patients were in such a painful condition that I had no alternative but to do as they wished, and run my chance. However, as drainage

was employed after the stones were removed, I must in fairness include them. In addition to observing the relief that was thus afforded to these persons, I would further remark how importantly they illustrate the disastrous consequences that may ensue, when stone and cystitis are complicated with obstruction, or anything that interferes with the process of natural urine drainage, prior to the removal of the stone. In two of these cases, there was some enlargement of the prostate, whilst the third was complicated with an old urethral stricture. Further, they clearly point to the importance of drainage as a necessary part of the process connected with the removal of some stones. The remaining twelve persons so treated recovered, and remain well, or did so up to the time that I had cognisance of them. I think I should be pretty sure to hear of them if they had any recurrence. Three of these cases had been previously treated by crushing, to one of which I have already referred more in detail. In determining how long it is necessary to continue the drainage, I attach considerable importance to two points—first, to the condition of the urine, and, secondly, to certain muscular actions of the bladder, which become more apparent in those cases where atony pre-existed. So long as a patient goes on discharging ammoniacal or very purulent urine, so long must the drainage be continued, as to close the bladder under these circumstances is certainly to favour the reproduction of those local causes which contributed to the formation or growth of the stone. When the urine is becoming normal, one of the earliest indications that

the drainage tube may be withdrawn is the voluntary, or, I should rather say, the spasmodic, expulsion of urine along the natural passage. After three or four weeks drainage, according to circumstances, I have allowed patients to get up for a little, and sit in a chair, with a clip on the end of the drainage tube, directing them to remove it when they feel desirous of urinating. It is under these circumstances that urine is sometimes expelled independently of the tube along the natural passage. This I have found a sure indication that the power of the bladder will be restored in those instances where it had been lost to a greater or lesser degree. And it not only applies to cases where a stone is present as I have illustrated, but to others. This was evidenced in a remarkable way in the following case, which much impressed me at the time, in reference to what opening and draining is capable of doing. It was that of a man aged 68, who was under my care in the Royal Infirmary in 1883, for an atonied bladder and retention of urine, where the regular use of the catheter had become, in the course of time, extremely difficult by reason of the obstruction. After three weeks' trial of various plans of treatment, I performed perineal cystotomy, divided the prostate, and put in a drainage tube. This was worn for eight weeks, when it was noticed that a certain quantity of urine forced its way along the urethra. The tube was then withdrawn, and the wound gradually closed. After this, the patient never had any further difficulty in urinating, though the power of the bladder had been entirely suspended for some months prior to the

operation and drainage. Six months subsequently, he was seized with hemiplegia, which confined him to bed for the rest of his life, but I ascertained from his medical attendant that it had never been found necessary again to make use of the catheter. Other cases of the kind might be adduced in support of the practice I am now advocating.

In two instances, where the stones were very large, I had to divide both sides of the prostate. I could not help observing that these cases made very rapid progress. It is of much importance that the wound should invariably be made clean and straight, and the relations of the parts be not unnecessarily disturbed with the finger, as thus pouches are made in which urine may lodge. I should also mention that in one case the progress towards recovery was somewhat retarded by two or three attacks of secondary hæmorrhage, necessitating the use of a plug outside the drainage tube. However it was not sufficient to be of much importance. In another instance the patient had two or three slight attacks of orchitis, which was probably due to some imperfection in the drainage apparatus; where the prostate is very irregular this may happen unless care is taken in making the incision into the neck of the bladder.

In these remarks I have thus endeavoured to illustrate what appears to me to be the weak aspect of lithotrity, and what alternative seems to me, from some practical experience specially directed towards this point, best adapted to meet the difficulty. Fortunately, I believe these cases are not now so

frequent as they used to be owing, no doubt, in a great measure, to the better means we possess of detecting stone in the earlier periods of its formation, when it can be dealt with by crushing with the most complete success. To eliminate the cases which are not adapted for crushing is worthy, I am sure, of our most careful attention, and as a contribution towards this I must ask you to accept these remarks.

Turning to another debateable point, I would refer to the application of lithotrity to male children. Some valuable records, relating to this operation, have been furnished by surgeons practising in India, amongst whom I may mention Dr. Freyer and Dr. Keegan. The latter gentleman has more particularly demonstrated the great success that may be obtained in boys by the crushing operation, and his testimony has been to a considerable extent corroborated by Mr. Walsham and other surgeons. Having regard to the great success of lithotomy in male children, I should not feel disposed to extend the crushing operation in this direction materially, except in the case of some small stones. It has, I know, been alleged that lithotomy means emasculation, but I am not aware that sufficient proof of this has been afforded. If this were proved to be an occasional and unavoidable consequence, the reasons for crushing in boys would be materially strengthened.

The supra-pubic operation for stone owes its recent revival in a large measure to the observations of Garson, the practice of Petersen of Kiel, and the advocacy of Sir Henry Thompson. The fact that the

bladder is usually uncovered with peritoneum immediately above the pubes has for a long period been rendered available by surgeons for tapping with impunity in cases of retention of urine. To increase this area, and to permit the bladder to be opened and stones removed without injuring or wounding the cavity of the peritoneum, is the chief feature in Petersen's method of performing the high operation. Since the introduction of this method of operating considerable discussion has been excited in reference to the circumstances under which it is applicable, and much variety of opinion has been expressed. If, however, we merely content ourselves by taking the experiences of surgeons where this measure has been practically tested, we shall have no difficulty in determining its value.

In the first place, I do not think that any one would attempt the removal of a very large stone from the bladder by any other proceeding. We have already had several examples where large masses have in this way been successfully removed, which, judged from previous experiences of the kind, could not have been safely accomplished, even if it had been possible to effect their removal at all. And this applies equally to some cases of distorted pelvis, where the outlet is so contracted as to render perineal lithotomy impossible. I should have been very glad to have availed myself of this method of operating in one of my earliest stone cases some twenty years ago, where I performed lateral lithotomy for a boy with his hip ankylosed in an extended position.

In the second place, experience has already shewn us that the supra-pubic operation is well adapted for the removal of certain foreign bodies from the bladder more or less coated with phosphates, where it is necessary that we should be able to see as well as to feel, and direct what we are desirous of doing. Perhaps one of the best illustrations of this practice will be found in a case recently recorded by Dr. Gillon,* where a penholder, over five inches in length, encrusted with phosphates, was removed from the bladder of a man through a supra-pubic incision. Not only was the foreign body extracted in this way, but the operator was enabled to satisfy himself that no perforation of the bladder into the peritoneal cavity had occurred.

Thirdly, the supra-pubic incision may prove serviceable in some cases of stone in the bladder complicated with a protruding prostate, where the removal of some portion of the latter may be further contemplated.

In the fourth place, the high operation will prove to many practitioners an easier and, therefore, a safer access to the bladder than the lateral perineal route, and thus for this reason, and in the best interests of their patients, many will avail themselves of it under almost all circumstances. Are not these sufficient reasons for finding a place in surgery for this method irrespective of the value that most of us, I believe, still attach to perineal lithotomy? I have no belief in the decline of perineal lithotomy, as it seems to me to possess advantages as a ready means of entrance to as

* *British Medical Journal*, July 30, 1887.

well as exit from the bladder which no other method possesses.

In the controversy that has been recently raging in reference to the relative advantages between supra-pubic and perineal lithotomy, I cannot help thinking that much of the difficulty which some have associated with lateral lithotomy, or Cheselden's operation, is, in a measure, due to a wrong conception of the way this operation should be performed. The point where it seems to me some surgeons are at variance with the description laid down by authorities on this subject is in reference to the employment of dilatation with the finger as a means of entering the bladder. I contend that such a process, whether there are grounds for its adoption, so far as the literature of the subject is concerned, or not, is not only unnecessary, but dangerous. It is unnecessary because the opening into the bladder can be safely made with the knife, sufficient to permit of the finger being put, and not pushed, into the viscus; it is dangerous because the risk is not inconsiderable of wrecking the operation by rupturing the urethra, especially in young children, and by destroying with the finger the natural relations of the parts. It is a misconception of this kind which alone imports an element of danger, so far as the mechanism of perineal lithotomy is concerned. Of the advantage that the latter operation affords as a means of draining the bladder I need not again speak.

But though, as I have incidentally hinted, supra-pubic cystotomy will probably commend itself to some practitioners by the comparative facility with which it

can be accomplished, we must not be unmindful that experience has already shown us that it, like other proceedures having the same object, has its own difficulties and dangers. Instances have been recorded where a weakened bladder, under the pressure of distension, has given way, and death has then followed; and similarly the rectum has suffered in a corresponding manner, but without producing any serious consequences. To most of us the simplicity and ease with which lateral lithotomy can usually be performed, is such as strongly to prejudice us in its favour, in the absence of any special reason to the contrary, as I have indicated. Still on the other hand, as I have already said there are places for both the high and the low operations in the practice of surgery, which they can fill with relative advantage and without fear of clashing.

In the last place, let me say a few words in reference to the treatment of tumours, and growths connected with the interior of the bladder. And I would take this opportunity of acknowledging the important services Sir Henry Thompson has rendered, in both adding to and applying our knowledge in reference to this subject. In surveying the literature relating to the operative treatment of tumours of the bladder, and comparing it with some little experience of my own in cases of this kind, it seems to indicate the great caution that is necessary in the selection of cases suitable for operation.

Malignant growths connected with the interior of the bladder are, I believe, just as much beyond the

reach of surgery as those which are occasionally seen involving the cavity of the nose; I have in a few instances opened the perinæum and explored them with the finger, but beyond giving vent to offensive urine, mixed with blood, and the debris from the growth, I cannot say that I have seen any permanent good follow, and I am disposed to think with others they had best be let alone. If exploration with the finger from the perinæum indicates, by reason of the limited connections of the growth, the expediency of attempting its complete removal, if the mass is considerable, the supra-pubic incision may with advantage be proceeded with. The value of the perineal incision for drainage has already been demonstrated in several instances of this kind. Still, on the whole, the less intra-vesical malignant growths are interfered with the better, so far as concerns both the comfort and life of the patient. Of the remediable forms of intra-vesical tumour of the bladder, the flocculent papilloma or villous furnishes us with an example, and this has undoubtedly within the present decade been brought within the reach of surgery. In the cases of this kind where I have operated, I have been able to accomplish all that I desired by a perineal incision. The following instances illustrate some of the difficulties connected with the diagnosis and treatment of tumours of the bladder. The first was that of a young man I saw in 1883, who was suffering from hæmaturia. I opened his bladder from the perinæum, and removed a villous growth, which seemed to occupy the orifice of the left ureter: he was temporarily

relieved, but in the course of a month he died of exhaustion in consequence of repeated attacks of hæmaturia. After death, the left ureter was found dilated, the pelvis of the left kidney was also dilated, and contained a villous growth resembling that which I had removed from the bladder.

The other case was that of a middle aged man, who presented all the symptoms of calculous pyelitis of the left kidney. The pain was so severe, that I determined to open and explore the kidney, which I did in the early part of December, 1887. I found the kidney not much larger than natural, but it was simply a bag of pus. I could find no stone or other cause for the renal obstruction. The bladder was examined, but nothing abnormal was detected. The patient had a good deal of hæmaturia after the operation. He got gradually weaker, and died about four weeks afterwards. At a post-mortem examination, a small epithelioma of the bladder was found, which had completely occluded the left ureter, and had thus led to the disorganisation of the corresponding kidney. Such are illustrations of some of the difficulties which attend the diagnosis of tumours connected with the interior of the bladder; they certainly seem to indicate the great caution that is necessary in coming to a conclusion that their extirpation should be attempted.

I have now completed the task which you, in your kindness, have imposed upon me. It only remains for me to thank you for the patient and attentive hearing you have given me.