

**The operative treatment of enlargement of the prostate : based upon the records of upwards of one hundred and forty cases : three lectures delivered at the Royal College of Surgeons / by C.W. Mansell Moullin.**

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THE OPERATIVE TREATMENT OF  
ENLARGEMENT OF THE PROSTATE

THE HISTORY OF THE

REIGN OF THE

THE OPERATIVE TREATMENT  
OF  
ENLARGEMENT OF THE  
PROSTATE.

BASED UPON THE  
*Records of upwards of One Hundred and Forty Cases.*

THREE LECTURES DELIVERED AT THE ROYAL COLLEGE  
OF SURGEONS

BY  
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1892



THE OPERATIVE TREATMENT

# EXALTRICEMENT OF THE THROAT

BY  
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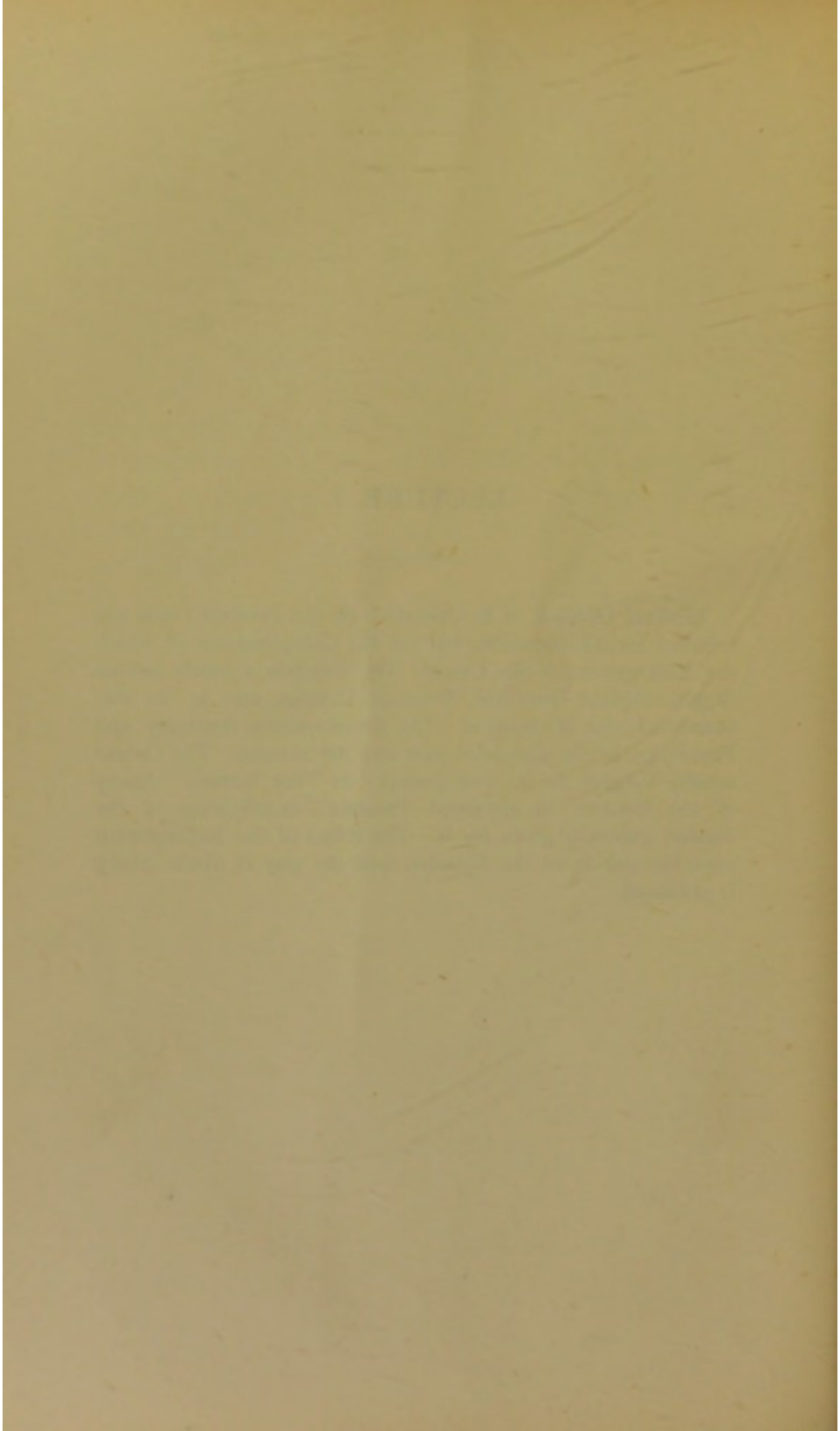
1890

## PREFACE

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IT has been my endeavour in these lectures to set forth the operations that have been proposed for the radical cure of enlargement of the prostate, and to compare the results obtained by them with those that follow the ordinary methods of treatment. Surgery in the last few years has been advancing in every other direction at a rate much more rapid than it ever has before, yet, strangely enough, but little has been done for this. It almost seems as if the number of those who are subject to this complaint and do not suffer from it, has obscured the fact that there is a large minority in whom the ordinary measures fail absolutely, and who die directly from the consequences of it, after the most intense suffering. For these at least I am convinced a careful examination of the cases I have brought together, and of the steady improvement that they show, will afford sufficient proof that a much more active line of treatment than that usually adopted will give much better results. It has been a work of time and of some trouble, and I cannot but express my most cordial thanks to the very large number of surgeons at home and abroad, and especially to the staff of the General Infirmary at Leeds, who have so kindly responded to my letters and given me permission to make full use of the notes of cases, many of which have not yet been published.

69, *Wimpole Street,*  
*Cavendish Square.*





MR. PRESIDENT AND GENTLEMEN,—The question of operation as a means of permanent cure in cases of enlargement of the prostate may be regarded as upon its trial, with the final decision as to its merits not yet given. On many occasions outlying portions of the gland have been removed in lateral lithotomy—sometimes by accident, sometimes by deliberate intention after the condition had been recognised with the finger. You yourself, Mr. President, have operated twice in this way, and fifteen years ago you placed on record the statement that you would advise that in all operations of lithotomy upon the aged, the condition of the prostate should be examined into with the view of the removal of such portions as may be injuriously enlarged and project into the bladder; adding that though you were not prepared to recommend the performance of cystotomy in all cases of chronic cystitis, the result of enlarged third lobe of the prostate, you would venture to suggest the expediency of its application in exceptional instances, believing that a clean cut into the bladder of a man with sound kidneys is not a very dangerous proceeding, and that the removal of a prostatic outgrowth with crushing forceps or scissors would not add greatly to the danger. Yet, for all that, although there has been very little advance in other ways of giving relief, and marvellous progress has been made in every other branch of vesical surgery, the weight of surgical opinion remains practically unmoved. Recently within the last few years—owing especially to the late Mr. McGill, of Leeds, who, if his cases were not absolutely the first in point of time, was certainly himself the first and chief in bringing the suprapubic operation into general notice, and in laying down the principles upon which it should be performed—it has become possible to collect together a sufficient number of cases operated upon under many different circumstances, and in many different ways to justify the attempt to draw some general conclusion as to its value.



No one, of course, pretends that operation is required for enlargement of the prostate pure and simple, or that it is to be recommended even when the bladder is to some extent hampered in its work, so long as the introduction of an instrument once or twice in the twenty-four hours can make life comfortable. But there are other cases besides these—not so numerous, it is true, but still sufficient to make the question a very serious one. Sometimes, after a year or two of comparative comfort, the bladder becomes irritable, and the catheter is required more and more often, until scarcely an hour can be passed without it, and rest at night is hopeless. Sometimes there is intense burning at the neck of the bladder, which is not relieved but rather made worse every time the instrument is used. In other cases, the irregular shape of the outgrowths, or the way in which the urethra is twisted and distorted, makes the introduction a matter of real difficulty. Every now and then patients either will not, or cannot, learn the manipulation for themselves, and certainly very few can be trusted to take all the precautions that surgeons regard as essential. In other instances, again, the amount of residual urine grows rapidly larger and larger, as if the frequent introduction of the catheter were destroying the muscular tone; or congestion, with its consequences, retention and hæmaturia, is repeatedly threatening. In many there is a marked tendency to the production of calculi, which form again and again, and in every one, almost without exception, there is a constant, ever-present risk of cystitis. This, perhaps, is the most serious danger of all. Its causes may be well known, and, probably, by taking the utmost care, it can usually be avoided, or, if not, at least prevented from assuming its gravest form; but it is very doubtful if it always can, for not unfrequently when the prostate has grown up into the bladder, it recurs again and again with such persistence that one is driven to the conclusion that there is something directly encouraging it, either in the growth itself or the conditions to which it gives rise. In speaking of this before the British Medical Association, McGill mentioned that he had seen a patient who daily for years had passed a gum elastic catheter which he carried in his hat, and which he never washed, and yet his urine was acid and he was in robust health; while, on the other hand, he had seen many in the last stages of prostatic cystitis who had previously taken every care; and similar experiences have occurred to many others. At first it may be a



mere catarrh, but if this once begins in a case in which there is a collection of residual urine due to overgrowth of the prostate, and for which it is necessary to pass a catheter at frequent intervals, it is a matter of the greatest difficulty to prevent it becoming chronic, and inflicting almost irreparable damage upon the wall of the bladder. It is for these, and such as these, in which atony or cystitis, or some other complication that will ultimately prove fatal under the most distressing circumstances, is threatening or has already broken out, that the question must be considered; and I believe it can be shown that without exposing the patient to undue risk an operation removing a sufficient amount of the obstruction can be made the means of saving many lives and preventing untold suffering.

To establish this it is necessary to prove that the enlargement is the original cause of the loss of power of the wall of the bladder and the cystitis. If this cannot be done, if the failure of the muscular coat and the accumulation of residual urine are prior to, or not directly dependent upon, the overgrowth of the gland, the whole case falls to the ground.

It must be admitted that at present the weight of authority is against the simpler view. According to Reginald Harrison, for example, the habit of partial retention frequently precedes the physical signs of prostatic enlargement; the sinking down of the posterior wall of the bladder is the prior change, and this, by a process of compensative hypertrophy, leads to the development of a strong muscular buttress between the orifices of the ureters, and then to similar changes in the prostate itself. Sir Henry Thompson, in his clinical lectures, writes: "I am entitled to require that if it does happen, or has happened, to any surgeon to divide or remove any part of an enlarged prostate for a patient who had previously been compelled to pass all his urine by catheter, say for a period of twelve months, and that after the division in question he was enabled to dispense with the instrument, or at any rate to pass, say, only half his urine by natural effort, the case ought to be seen and examined by others. I desire extremely to see such a result from any of the proceedings alluded to. I have long wished to see this sight, and have travelled considerable distances abroad and elsewhere expressly seeking it, but at present without success." While Guyon, and following him nearly the whole of the modern French School, maintain that the enlargement is in no sense a simple local process; that the bladder, and simultaneously all the other



urinary organs, undergo analogous changes, the source of which must be sought elsewhere, in structures absolutely unconnected with the urinary system—in other words, in general atheroma; and that, therefore, any operation upon the prostate with a view to a radical cure must be inadequate in its conception and futile in its results.

And yet, although of course the walls of the bladder sometimes do fail from intrinsic causes, independently of any change connected with the prostate, I think if the relations of the two structures are carefully examined, it can be conclusively shown that in the vast majority of instances the loss of power in the one is certainly secondary to, and consequent upon, the enlargement of the other.

*The prostate in its normal condition has nothing to do with micturition.*

The prostate neither acts as a sphincter, nor as a muscular buttress; it does not assist in the propulsion of urine, nor does it delay its exit; it is purely a sexual structure, developed around the first portion of the urethra, in connection with the sexual organs and with a well-defined sexual function. The comparative anatomy of this part of the urinary system, the method of its development and growth, its structure and physiology—all alike bear evidence of this.

The first portion of the urethra, as distinguished from the prostate that surrounds it, belongs, strictly speaking, to the bladder; the two are not merely continuous with each other, they are part of the same structure—the allantois—and are absolutely distinct from the rest of the genito-urinary passages. In the Monotremata they remain distinct; the penile part of the urethra never becomes organically united to the rest, or serves, as it does in the males of the higher orders of mammalia, for the transmission of urine; as is the case with the corresponding organ in the female it retains throughout life its purely sexual character. Even in man the same thing is sometimes seen in instances of arrested development, or so-called hermaphroditism, when the external orifice of the urethra remains in the perineum, and is not carried forward by the formation of the penis; and the same thing, under a different phase, is shown by one of the types of imperforate rectum, that in which the intestine retains its original connection with the urinary passages—the persistent



aperture of communication definitely marking the line of division between the two portions of the urethra—the one above formed from the allantois, and the other below developed in the front wall of the cloaca—the one which becomes so often the seat of overgrowth of the prostate and never of stricture, and the other which is so frequently closed as a result of chronic inflammation, and is never invaded by the gland from above.

A study of the anatomy of the part in the child and in the adult shows the same, so long, that is to say, and only so long, as the prostate retains its normal size and character. The true muscular sphincter of the bladder lies at the end of the prostatic portion of the urethra and at the apex of the prostate, not at the so-called neck of the bladder. Here, as Guthrie ("Anatomy and Diseases of the Urinary Organs") long since pointed out, there is no collection of circular fibres such as may be compared to a sphincter. The circular coat of the bladder ceases almost abruptly, without any conspicuous thickening, and the longitudinal bands in front and behind changing their direction, sweep round obliquely, and are lost in the fibrous tissue that invests the prostate. The arrangement of the first part of the urethra, above the opening of the prostatic utricle, is the same in the male as in the female, with three exceptions: one is the presence of the *caput gallinaginis*, which I take to be the rudimentary representative of the original intromittent organ, before the penis was developed; the second is the addition to its distal extremity of the penile portion formed out of an entirely separate structure; and the third the addition to its circumference of a sexual organ, the prostate, and because of the support it gains from this, the reduction in thickness and strength of its own proper wall.

If a transverse section is made through the prostate immediately below the neck of the bladder, in an infant, before the gland has reached maturity, the relation that it bears to the urethra cannot be mistaken. The canal lies in the centre, or a little in front of it, with a few longitudinal bundles of unstriped muscular fibre around it. Outside these is a very thin layer circular in direction, some of which appears to be muscular; a little below this vanishes, so that it probably is part of the circular coat of the bladder. The prostate itself forms two great masses, one on each side, composed almost entirely of ducts, with an indication of acini at their end, converging towards the central canal. In front they are connected together by interlacing



bands of stout fibres with large nuclei, spreading from a great transverse bar of stroma that stretches across the front of the urethra. Behind there is a similar smaller one. At a lower level the gland tissue diminishes in amount, and a few striped muscular fibres make their appearance in front of the rest. The prostate, in short, surrounds the urethra, supporting it, but forming no part of it; the canal runs down through the middle, and the gland is simply grouped around it.

The sexual character of the glandular part of the prostate is not seriously questioned; it can have nothing to do with micturition. Each separate system of which it is composed is formed as an outgrowth from the mucous surface of the urogenital sinus, on each side of the middle line, in close relation with the orifices of the Wolffian ducts. Probably, as is the case with the corresponding organs in some of the lower animals, the prostatic glands in man were originally developed one on each side in connection with the lining of these ducts themselves, and their apparent origin from the urogenital sinus is of late occurrence in the history of the race—similar displacements are not unknown elsewhere. The glands do not attain their full growth until the time of sexual maturity; in geldings and other castrated animals they waste and disappear until scarcely a trace is left; and like the other sexual organs in many animals, their size and the perfection of their structure rise and fall according to the breeding season. It is probable that their function is to assist in the production of a spermatophore by the secretion of a viscid material to hold the spermatozoa together, and perhaps, as suggested by Fürbinger (*Berl. klin. Woch.*, July 19th, 1886), maintain their vitality. On a small scale the product of the secretion of the prostate mixed with that from the testes may be compared with what Lataste has called the *bouchon vaginale*—a peculiar gelatinous body enclosing the spermatozoa found after copulation in the vagina of certain rodents, moulded to the irregularities of its interior, and resembling semen after ejaculation in becoming firmer, at any rate at first, on the addition of water, and liquefying on exposure to the air.

The stroma of the gland—the fibrous and muscular tissue which surrounds the first part of the urethra, and is held by many to be by its overgrowth the real cause of the increase in size in old age—stands on exactly the same ground; whatever may be its effect in pathological conditions, so long as it is normal it is purely sexual, and has nothing to do with micturition, either by



assisting or retarding it. Its origin is from the genital cord—a thickened mass of tissue which surrounds the Wolffian ducts as they course together to the cloaca, behind the stalk of the allantois, altogether distinct from the bladder. Its structure, which is very peculiar, from the large proportion of apparently muscular fibres it contains, is identical with the tissue of similar origin that surrounds and belongs to the vasa deferentia, and the vesiculæ seminales (fig. 1), and in the young subject, at least, is continuous with it. In eunuchs and geldings it shrinks and dwindles until there is nothing left of it but a small inelastic fibroid mass. Griffiths has shown that in many of the lower animals it varies, not only in amount but in the perfection of its development, according to the breeding season, just as the glandular tissue does. Women and children suffer no inconvenience from the want of it, and there is no evidence that after castration micturition is either assisted in any way or unduly prolonged. The urethra runs through it, between its two halves which meet in front and behind, unaffected by it, save and except that because this part of the primitive urogenital sinus needs but little expulsive power in comparison with that lying above, and because it is so well supported by the firm structure surrounding it, its own proper walls are greatly reduced in thickness, and the strong muscular layers of the bladder are not continued on to it. Its function is the discharge into the urethra of the fluid secreted by the glands, and possibly (from an observation of Anderson's) to some extent the ejection of the semen, which it prevents passing back into the bladder; but except for the passive support it lends the first part of the urethra, when the urine is flowing down it, it has nothing to do with the function of micturition.

This is true only so long as the prostate retains its normal character. If it becomes altered in shape, size, or consistence, the conditions are entirely changed.

#### *The True Nature of the Enlargement.*

I believe the only method by which an accurate idea of the true nature of the enlargement and the effects it produces can be obtained, is to study the growth at its commencement. Museum specimens, taken for the most part from the bodies of patients who have died when the disease was far advanced, after years of suffering, are of little or no use in this respect; they are exceedingly useful in showing that about the time that the effects



of the enlargement prove fatal, the growth has reached such a size, or has acquired such relations, that anything in the way of radical cure is impossible; but with regard to the earlier stages they teach little or nothing. Bearing this in mind, I have for some time past collected and examined a large number of specimens, taken from males of all ages, but especially between 40 and 50, and I believe that the conclusions at which I have arrived, and which differ in some important particulars from those current, will go a long way towards justifying more active treatment than that usually adopted.

I have not been able to obtain the least particle of evidence that either age, or compensative hypertrophy, or the presence of the prostatic utricle, or general atheroma (with possibly a few exceptions), has anything to do with causing enlargement of the prostate, or the failure in the power of the bladder that so frequently follows it. So far as my investigations go, the enlargement at its commencement is essentially a diffuse glandular growth, spreading chiefly in the mucous and submucous tissues, and later becoming considerably modified by secondary changes, and the failure in the expulsive power is, in almost every instance, the direct consequence of it.

Age alone, though it may not be without influence, certainly cannot be the cause, for two reasons, either of which is sufficient. In the first place prostatic overgrowth is not met with in anything like the majority of old men, and its degree bears no relation to the age they reach; and in the second it may occur, and does with very much greater frequency than is usually believed, in those who certainly do not deserve to be called old, whether the number of years or the condition of sexual power is taken as the standard. The time of life at which it makes its first appearance must not be confounded with the age at which the presence of residual urine is first ascertained; the growth may have been there for years before giving rise to this particular result; and the absence of any enlargement when the gland is merely explored *per rectum* is not of the slightest value as regards its extension in other directions. If vertical antero-posterior sections are made through the neck of the bladder and the urethra after hardening in spirit with as little disturbance as possible (and this is the only fair test for the vesical form of overgrowth; rectal measurements, the weight of the gland when dissected out, or the external dimensions however carefully they are taken, give very little information as to the vesical shape of



the gland, and none at all about its consistence), it is by no means uncommon to find a considerable degree of increase long before anything that can be called old age, whatever the standard. In one, for instance (fig. 2), there was a distinct median projection into the neck of the bladder, due to glandular overgrowth, at 49; and twice I have met with symptoms of prostatic obstruction that could not possibly be mistaken, in patients who were younger still. One who was only 48 was under the care of Dr. Henderson, of Highgate. For some years he had been unable to empty his bladder without a catheter, and at the time that I saw him he was suffering from a typical attack of prostatic retention. The other, who was sent up to me by Dr. Walters, of Reigate, was only 41, and although it is possible that in this case the mischief had been exaggerated by attacks of chronic inflammation, on digital exploration through the perineum a distinct median lobe was felt, projecting into the urethra, and was divided, with the result that though for months before the patient had been unable to empty his bladder without a catheter, six months later he had discarded his instrument altogether, and he could hold his urine for three or four hours without inconvenience. Nor is this experience of mine unique in any way; McGill has operated for prostatic obstruction upon patients at 53 and 55 years of age respectively, and found that even at that time of life the enlargement had attained very considerable dimensions. In another who was only 35 he removed and identified as such a certain amount of prostatic tissue that was acting as an obstacle to the outflow of urine. One of Teale's patients was only 54; Meinhardt Schmidt's at the time of the first operation was only 52, and the symptoms had already lasted a very considerable time. Packard writes to me that in one of the cases mentioned in his paper on supra-pubic cystotomy read before the American Surgical Association, there was a very large prostate projecting into the bladder, although the man was only 43. Belfield, of Chicago, removed a mass the size of a walnut from the left lateral lobe of a patient 49 years of age, and he mentions several others—Dunn's, for example, in which a tumour was excised from the lateral lobe in a man 45; Iversen's, in which the age was only 36; and one by Mudd, of St. Louis, who exhibited at the Association of Urinary Surgeons in June, 1890, an enormously overgrown prostate, proved by microscopical examination not to be the result of malignant disease, taken from the body of a negro at the very early age of 27.



Apart from the fact that has long been noted, that after a certain time of life there is no increase in the tendency to the development of enlargement of the prostate, but rather the reverse, the occurrence of these cases—all of which are quite recent, and the number of which, if more attention had been paid to the subject, would probably be materially increased—is enough to refute the idea that the overgrowth is in any way causally dependent upon senile changes.

It is still more difficult to understand the idea that the increase in the size of the gland is a condition of hypertrophy developed to compensate for the habit of partial retention. The sinking down of the floor of the bladder and the production of a post-prostatic pouch cannot be due to any change in the position of the bladder, or they would be of invariable occurrence; and certainly the enlargement, even when the stroma is the chief seat, and not, as I believe, the glandular part, is not caused by the over-production of muscular fibres. I agree with Griffiths that a great deal of the interglandular tissue and the bulk of the so-called myomata are not formed of muscular tissue at all; and even in those rare instances in which the muscular element distinctly predominates, the long fibre cells, so far as my experience goes, are always arranged in such a disorderly and irregular fashion that their contraction could serve no useful purpose, and certainly would not in any way compensate for failure in power elsewhere.

Neither has the tiny little diverticulum, commonly known as the uterus masculinus, anything to do with the overgrowth of the gland. It represents the vagina rather than the uterus, and is merely included in the prostate during its growth. It is true that there is a superficial resemblance between the tumours that are so often found in the prostate and the fibromyomata that develop in the walls of the uterus about middle life, but there is no real homology. That they can both sometimes be shelled out from their own surroundings as from a capsule, and that they consist of apparently similar histological elements, is no proof of the identity of the organs from which they spring. Shelling out in this way is merely an accident of the mode of growth, caused by the unequal rates of increase in contiguous parts of structures of considerable density, in which the tissue elements are not intimately bound together, and I have met with typical examples of it on several occasions in fibroid tumours and fibrosarcomata growing in other parts of the body. This in reality proves nothing.



Guyon's contention that the enlargement of the prostate is dependent upon general atheroma is equally difficult to understand. It is undoubtedly true that they are often associated together; that they are common to the same period of life, and that they not unfrequently occur in the same individuals; but having said this one has said all. Guyon and Launois appear to have entirely overlooked the primary change. They describe the slow and progressive substitution of fibrous tissue for glandular structure as the dominant feature, and attribute everything to generally disseminated arterio-sclerosis affecting not only the vessels of the bladder and prostate, but those of the kidneys and other organs not connected with the urinary system. Yet it is not uncommon to meet with men at an advanced time of life with enormous overgrowth of the prostate, who have never experienced the least inconvenience with their urine, whose arteries, although they may be tortuous, are not otherwise diseased, and whose kidneys are perfectly sound. The common variety of enlargement—that in which glandular tissue forms the chief part—certainly cannot be accounted for in this way; putting aside other difficulties, it is impossible to believe that general atheroma, which is always associated with defective nutrition, can cause the production of the masses of prostatic tissue that are met with from time to time, almost filling the bladder; but there is another variety much more rare, concerning which I am unable to speak so positively. In this the prostate is intensely hard, and almost entirely fibroid in structure; there is but little alteration in shape, and the size is but slightly increased, though its effects are serious in that it may give rise to a very marked degree of obstruction. On two occasions McGill, in operating upon such a case, was unable to remove a piece larger than a pea, and in one of them the operation was so unsatisfactory that although he included the case in his list of supra-pubic prostatectomies, not wishing to leave one out for any reason, he considered its position there a very doubtful one. Whether this particular kind can be in any way dependent upon a condition of arterio-sclerosis I am unable to say. I have not been able to find a specimen in a sufficiently early stage of growth, but certainly there is no positive evidence connecting the two affections together (except that a considerable number of old men suffer from both), and it is not possible to separate it by any hard-and-fast line from the glandular variety. Between the two there is an unbroken series



of intermediate forms. As Griffiths has pointed out—confirming my own opinion—all the microscopic evidence bears out the view that the fibroid transformation which undoubtedly does occur is not the primary change, but the result of secondary degeneration of glandular overgrowth.

Wherever I have found the beginning it has always been the glandular part in fault. This, with more or less of the stroma accompanying it, as it were breaks its bounds, spreads into and infiltrates all the structures near, and then sometimes, or in some places, disappears again and is replaced by dense fibroid tissue. It may extend backwards towards the rectum, or it may grow out in all directions, but in that form which more particularly affects the bladder, it spreads upwards in the mucous and submucous layers, extending more or less around the circumference of the urethra until it projects into the vesical orifice as a rounded nipple or collar. Whether a median lobe exists or not is absolutely beside the question. In fig. 2 there is to all appearance an outgrowth of this character which made the shape of the vesical outlet crescentic. In reality the alteration is due to the invasion of the mucous and submucous layers by a structure resembling a tubular adenoma. Fig. 3 shows a more advanced stage from a patient 69 years of age. In this the growth has spread, not only up the urethra but into the bladder, along the floor of the trigone, to its posterior limit, raising it in such a way that a post trigonal pouch is of necessity beginning to be formed. The microscopic character, as shown by fig. 4, which is taken from near the base of the trigone, is almost the same as in the other, but in places the growth has invaded the circular muscular layer, so that here and there, surrounded by masses of newly formed adenomatous tissue, are a few scattered bundles of muscular fibres. In the younger part of the growth there is but little stroma—merely a few long fibre cells with rather large nuclei arranged concentrically around the tubules; in the urethral portion, however, the texture is much more dense, and the glandular element has almost disappeared. The tubules themselves have a distinct lumen, and are lined with a single layer of low columnar cells resting upon a basement membrane; occasionally there appears to be a tendency to the formation of acini, and sometimes these are so large that they almost deserve to be called cysts, but nowhere is there any definite order or arrangement such as exists in a normal gland. In other words, in the cases that I



have examined, the primary change is the invasion of the surrounding tissues by a glandular growth, with more or less stroma, distantly resembling the normal structure of the prostate. Sometimes it spreads superficially, sometimes eccentrically; but wherever it grows the older portion always appears to be denser than the rest. Its rate of increase may be rapid and irregular, leading to the formation of outlying bosses and nodules, perhaps far away from the parent mass, and almost isolated from it; or it may be slow and uniform, so that the gland enlarges equally in all its dimensions. The one gives rise to the soft adenomatous prostate, with possibly cysts and distinct encapsuled tumours scattered through it; the other to the dense and but slightly enlarged variety. In either case the existence or not of an anatomical median lobe has nothing to do with the question; a new growth invades the walls of the urethra and spreads into the neck of the bladder, interfering with the relation that they bear to each other; from the first the affection is a purely local one, and therefore unless the operation is of too severe a character, or there are other reasons against it, there is nothing in its origin or causation to prevent its being dealt with by local measures.

*The Cause of the Loss of Power of the Bladder.*

The failure in power of the muscular coat of the bladder and the accumulation of residual urine are secondary to and consequent upon this enlargement, though I am willing to admit that other agencies may help.

Old age is certainly not the agent, any more than it is that of the overgrowth. I do not deny that it has a predisposing influence—an obstacle that in a young man might lead to muscular hypertrophy, would very probably in an older one tend to the opposite result—but this is the utmost that can be allowed. If age were the cause this disability of the bladder would be almost universal instead of quite exceptional. It is only met with in a small proportion even of those who reach the age of 60; the most vigorous and healthy in all other respects may suffer from it; and although it is much more common after 55 than it is before, I have already, in describing the nature of the overgrowth, mentioned many instances in which residual urine has occurred long before this.



General atheroma will not account for it. It is true the power of the bladder sometimes fails in atheromatous patients in whom the prostate is not enlarged, as it sometimes does in younger men whose arteries are sound; but it occurs in an infinitely larger proportion of those in whom the prostate is enlarged; and the connection with enlargement is very much more general than it is with atheroma. I admit that the structure of the wall of the bladder, as Guyon has pointed out, is very considerably modified in many of these cases; and that, especially in those in which it is thickened and fasciculated, the real change is not so much true hypertrophy of the muscular layers as condensation and hardening due to the accumulation of dense fibroid tissue; but this is the result of persistent chronic cystitis and not of any general arterial degeneration. If Guyon's view were correct it is exceedingly strange that this peculiar transformation should be limited to the bladder, and though the cause is practically universal, should never extend to unstriated muscular fibre in contiguous organs.

Moreover, the fact that sometimes after the obstacle has been removed the bladder does regain full power over its contents, is clear proof that the loss of it cannot have been due to either of these causes. In what proportion recovery takes place I shall discuss later; among the earlier cases it was said to be only in one-third of those in whom supra-pubic prostatectomy had been performed—a proportion that is not surprising if the previous condition of the patient is considered for a moment; but if it occurs at all it is sufficient for my contention; if the loss of power were due to any constitutional or general degeneration, removal of the obstruction would never be followed by recovery.

On the other hand, I believe the development of the post-prostatic pouch and the collection of residual urine are thoroughly accounted for by the altered relations induced by the overgrowth of the gland at the neck of the bladder. The mere fact that they are so frequently associated together, and that although enlargement of the prostate may occur without any dilatation of the posterior fundus, this is rarely or never found without the former, is almost sufficient of itself.

It is caused not by the median lobe—of the existence of which I have not been able to convince myself—but by the upgrowth of the glandular tissue into the neck. If the lateral lobes only are enlarged and are not elongated, but merely increased in thickness and density, the urethra is flattened into



a slit between them (like the trachea in many cases of goitre); the difficulty of expelling the urine is increased, the walls of the bladder become thicker and more rigid, and its cavity contracts in size. If, however, the growth spreads upwards inside the neck, so as to project either as a single median nodule or as a double one, or as a collar more or less surrounding the orifice; or if the lateral lobes are so much elongated that they raise up between them a fold from the floor of the bladder behind the urethral opening, the conditions are completely changed. The muscular mechanism by which expulsion is effected is thrown out of gear by the obstruction; the wave of contraction which normally spreads over the bladder and down on to the urethra in the act of micturition is broken; the orifice is closed before the cavity is emptied; a certain amount remains behind, and the contents of the prostatic part of the urethra, which often in these cases is dilated, being cut off from the muscular contraction behind, slowly dribble away of themselves. Then by degrees those bands of muscular fibres, whose function it is to draw forwards and empty the posterior fundus, being no longer equal to the task, begin to waste; the wall behind grows thinner and thinner, while meanwhile that of the rest of the bladder may be increased in thickness, and at length a definite pouch is formed.

Sometimes this change is gradual and almost imperceptible; occasionally it progresses by leaps and bounds. An attack of congestion sets in, the prostate suddenly swells to twice its former size; the difficulty of emptying the bladder is proportionately increased, and the strain becomes too great for the already weakened fibres, which stretch and give way, and perhaps never recover again; or inflammation sets in and gradually involves the muscular layers so that the fibres waste and the interstices are choked with lymph; or the shock of passing a catheter and drawing off the residual urine may prove too great. But whatever the accessory agents, the prime cause is the upgrowth of the gland; without this, in the majority of instances, the loss of power would never occur; under its influence, aided as it so often is sooner or later by attacks of congestion, thrombosis and cystitis, there is no change, however great, that the bladder may not suffer.



The first part of the paper is devoted to a general discussion of the problem. It is shown that the problem is of great importance in the theory of the differential equations of the second order. The second part of the paper is devoted to the study of the properties of the solutions of the differential equations of the second order. It is shown that the solutions of the differential equations of the second order are of great importance in the theory of the differential equations of the second order. The third part of the paper is devoted to the study of the properties of the solutions of the differential equations of the second order. It is shown that the solutions of the differential equations of the second order are of great importance in the theory of the differential equations of the second order. The fourth part of the paper is devoted to the study of the properties of the solutions of the differential equations of the second order. It is shown that the solutions of the differential equations of the second order are of great importance in the theory of the differential equations of the second order. The fifth part of the paper is devoted to the study of the properties of the solutions of the differential equations of the second order. It is shown that the solutions of the differential equations of the second order are of great importance in the theory of the differential equations of the second order. The sixth part of the paper is devoted to the study of the properties of the solutions of the differential equations of the second order. It is shown that the solutions of the differential equations of the second order are of great importance in the theory of the differential equations of the second order. The seventh part of the paper is devoted to the study of the properties of the solutions of the differential equations of the second order. It is shown that the solutions of the differential equations of the second order are of great importance in the theory of the differential equations of the second order. The eighth part of the paper is devoted to the study of the properties of the solutions of the differential equations of the second order. It is shown that the solutions of the differential equations of the second order are of great importance in the theory of the differential equations of the second order. The ninth part of the paper is devoted to the study of the properties of the solutions of the differential equations of the second order. It is shown that the solutions of the differential equations of the second order are of great importance in the theory of the differential equations of the second order. The tenth part of the paper is devoted to the study of the properties of the solutions of the differential equations of the second order. It is shown that the solutions of the differential equations of the second order are of great importance in the theory of the differential equations of the second order.

## LECTURE II.

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Palliative Operations. Treatment by Injections and Electricity. Urethral Operations—Mercier's, Gouley's and Bottini's. Prostatectomy in the course of Lithotomy. Perineal Prostatectomy and Prostatectomy. Methods. Difficulties. Clinical Results. Dittel's Operation.

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1881



MR. PRESIDENT AND GENTLEMEN,—The operations that have been proposed or performed for dealing with overgrowth of the prostate may be divided into two classes—palliative and radical. The former I do not intend to discuss, except in so far as they form a standard by which the others may be judged.

They consist for the most part of drainage of the bladder—temporary or permanent—over the pubes, or through the perineum. Supra-pubic tapping, and perineal incision into the urethra without directly interfering with the prostate, are the simplest, and are in common practice. Supra-pubic cystotomy, with the same object, was performed by Sir H. Thompson as long ago as 1869. More recently McGuire, of Richmond, has modified the operation by making the fistula run obliquely from the lower end of the vesical wound to the upper angle of the cutaneous incision (the channel bearing the same relation to the bladder that the spout does to a coffee pot), in order to check the tendency to leakage, and obviate the necessity for wearing a plug—an advantage which Nussbaum claimed might be obtained by the action of the recti alone; and Morris, of New York, has still farther improved upon the original by dissecting up a narrow flap of skin from either side of the wound, and transplanting it into the sinus at the time of the operation, suturing one end of each flap to the mucous membrane of the bladder, so that as it sinks down it shall carry them with it. These nearly all require a cannula to be worn permanently afterwards—a condition which, as pointed out by Bennett May, is not by any means well borne when there is an upgrowth from the prostate projecting into the cavity of the bladder. Exceptionally, it is sufficient for a catheter to be introduced into the sinus when required; and in a few instances—too few, unfortunately, to be of any value—the patient has been able to dispense with instruments almost altogether.

Perineal drainage through the prostatic portion of the urethra



is simpler still, and though as a rule it is only used as a temporary measure for the relief of cystitis, in some instances the benefit has been so great that the opening has been made permanent. Annandale, in particular, speaks very highly of it, and has devised for it an apparatus which is very simple, and which has been worn by some of his patients for upwards of four years with the greatest comfort. It is merely a soft, full-sized rubber catheter with a lateral opening, and strengthened at one spot about five inches down so that it can be secured by tapes without being compressed. At the other end is a small vulcanite stopcock. The amount of leakage around it is practically *nil*, and if it is desired to keep the bladder permanently empty the apparatus can easily be connected with a urinal strapped on to the leg.

Harrison is in favour of the more direct drainage secured by tapping the post-prostatic pouch through the gland itself—a practice that I have followed on several occasions with much benefit. A trocar and cannula is driven straight through from the perineum into the most dependent portion of the bladder, the index finger of the left hand being placed in the rectum as a guide; and the cannula, or a tube replacing it, is kept *in situ* until the urine begins to come of its own accord by the natural route.

The interesting feature about these cases, and one to which I shall have occasion to allude later on, is that in several instances the operation has been followed by a marked diminution in the size of the gland, much more than could be accounted for by mere subsidence of congestion, so that after wearing the tube for some weeks it could be withdrawn, and the bladder, having regained its tone, micturition could take place naturally again.

Of radical operations, or those which aim at the permanent and complete removal of the obstruction so that the bladder shall be able to empty itself thoroughly and at will, there is a still greater variety. The prostate may be approached through the penis, or by the perineal or the supra-pubic route. It may be divided, or more or less of it excised or enucleated; or it may be burnt out either with Paquelin's or the galvanic cautery. I shall not attempt to criticise or defend the titles that have been devised to distinguish these various proceedings; prostatotomy must, I suppose, be allowed to mean a simple incision into the substance of the gland; and prostatectomy, removal of a smaller or larger part from it; and these are practically sufficient. Two special names, however, those of Bottini and McGill, have become so



closely identified with particular methods that their use must be regarded as sanctioned by custom.

Besides these there are several other processes which have not obtained general acceptance, in spite of the eulogies of those who devised them. Heine, for example, recommended the interstitial injection of iodine. I have seen ergotin and sclerotic acid used in the same way, but without appreciable benefit. Newman, of New York, speaks very highly of the application of instantaneous flashes of the galvano cautery to the mucous membrane lining the prostate. The instrument, which is shaped like a catheter, has two copper electrodes running down the shaft, and a serpentine piece of platinum wire contained in a hollow at the bend. By means of an electric current (the strength of which has to be graduated empirically), this can be momentarily heated to a high red colour. Many sittings are required, and two or three flashes are given at each sitting, each flash producing a white film upon the surface of the mucous membrane, like that caused by the application of nitrate of silver.

Biedert first, and later, Casper and Roux, have apparently succeeded in effecting a considerable reduction in size by introducing the negative pole of a battery into the substance of the gland through the rectum. The patient is laid upon his side and the bowel washed out with corrosive sublimate lotion. The positive pole, in the shape of a large plate, is applied to the surface of the abdomen; the negative one, terminating in a platinum needle, insulated with varnish, is driven through the mucous membrane. Casper made use of a current of from twenty to twenty-five milliamperes, and prolonged the sittings for upwards of fifteen minutes, changing the position of the needle from time to time.

According to the account that he gives there is very little pain, merely a burning sensation at the end of the penis, but upwards of twenty sittings are necessary. Roux, of Lausanne, however, who employs a much stronger current, rising to seventy milliamperes, and who makes several punctures at different places during each sitting, describes the suffering as very severe. Biedert found great improvement in one case out of five. Casper claims to have cured two out of four, but the amount of residual urine, though diminished, appears to have been very considerable still, and one of the four was left with a rectal fistula. Of Roux's six patients, one did not return after the first application; in four, the gland diminished in size, and one



was under treatment still. It is to be noted, however, that in all of these cases other treatment was employed at the same time Casper, for example, not only made use of the ordinary measures adopted in such cases, but employed a stiff instrument to compress the prostate and force it down. Moreover, no evidence is brought forward to show how much of the reduction in size was due to permanent changes in the gland, and how much simply to the cessation of congestion and cystitis; and further, even if the diminution is proved to be the direct consequence of the puncture, it must always be remembered that it does not follow that the electric current was in any way the real agent—simple perforation, it is well known, is sometimes followed by the same result.

### *Penile Operations.*

The only ones that require mention are Mercier's and Bottini's: and of these the former has been so often described and discussed already, especially as regards the value of the result obtained by it, that were it not for the fact that Gouley, of New York, has recently attempted to revive it, I should pass it by altogether.

Mercier made use of two kinds of instruments, one shaped like an ordinary sound with a cutting blade concealed in the bend, for incising the prostate; the other for removing portions from it, made somewhat after the fashion of a lithotrite with a male blade sliding backwards and forwards in a female one, and with, in addition, a spear to transfix the portion seized so that it should not slip from the grasp of the instrument. Gouley's is practically the same, the main difference being in the greater inclination of the male blade to the shaft, so that when the instrument has been introduced into the bladder it can be drawn backwards over the obstruction more easily, and in the edge being flattened instead of sharp. With this it is possible to punch out a segment three millimetres by nine, the blood flowing out through a small channel in the shaft. Gouley has operated upon six occasions through the urethra, three by simple incision, and three with his special instrument. The former all relapsed within two years. Of the latter one died; the other two are stated to have regained control over their bladder, but no details are given. Gouley expresses himself decidedly as preferring the perineal route, and his own opinion as to the value



of the penile operation may be gathered from the directions that he gives with regard to after-treatment—an instrument is to be passed every five days during cicatrisation to dilate and depress the vesical orifice, and a catheter introduced every day for the double purpose of irrigating the bladder and maintaining the patency of the opening. Swinford Edwards—who, so far as I can ascertain, is the only surgeon who has practised this operation to any extent in England—has found it even more unsatisfactory. Six operations were performed upon four patients (in two cases it was repeated); no bad symptoms of any kind followed, and the function of micturition was restored in all, showing that the outgrowth was really the cause, and the condition of the bladder not beyond recovery; but the improvement was very transient, lasting for only a month, and in the two cases in which the operation was repeated, the old trouble returned even more quickly than it did after the previous sitting. Taking these facts into consideration, and also the circumstance that the operation—probably because it is done in the dark—is by no means so devoid of danger as it has been represented to be (in two cases at the Hôtel Dieu, Laugier met with very severe hæmorrhage, one patient dying in six days, probably from loss of blood, as it is stated the catheter was frequently obstructed by clots, and the other in a month), I do not think that the estimation in which the operation is usually held requires revision.

Bottini makes use of the galvano-cautery in much the same way, but always through the urethra. One of his instruments resembles Mercier's prostatome, except that instead of an edge of steel, two small platinum plates are fitted into the bend parallel to each other and one mm. apart. Each is  $\frac{1}{3}$  cm. in breadth, and two cm. in length. The ends that lie towards the beak of the instrument are joined together; the others are attached to two copper wires running in the shaft, which contains also a pair of tubes for the circulation of cold water. In the other instrument the cautery, which is bent round into the form of a loop, is concealed and insulated in what would correspond to the male blade of a lithotrite.

No chloroform is required and no water need be injected into the bladder, but it is as well that the urethra should have been accustomed to the use of instruments. When the point is in the bladder, it is turned downwards as in searching for a stone, and gently drawn outwards until it is felt that the beak is in contact with the obstruction. If there is any doubt, the exact



position of the instrument should be ascertained with the finger in the rectum. The current is then turned on and the point pressed against the hypertrophied tissue, a stream of water being made to circulate through the instrument so as to prevent the shaft becoming too hot. By gently elevating the handle the point can be made to burn its way slowly through, a hissing sound being distinctly heard. Then the end of the instrument is pushed into the bladder and allowed to cool down. If the scab sticks to it, it must be burnt off.

Bottini claims that he can produce an eschar one cm. in depth in one minute, and twice as deep if the application is prolonged for another. The scab usually separates about the tenth or fifteenth day. According to the latest account he has operated upon seventy-seven cases in all. Of these, two have died (it is only fair to say that they were among the very earliest); in twelve there was no result; in eleven some improvement; and in fifty-two, complete cure. In England the same method has been employed by one or two surgeons—Bruce Clarke, who describes three out of the four cases in which he used it as being cured, and Hurry Fenwick, who, on the other hand, failed to meet with any success.

Unhappily no definite account as to the condition of the bladder before and after the operation accompanies any of these statistics; it is merely stated that the residual urine ceased to collect, or was very greatly reduced in amount—a result which is not uncommon for a time without any operation, in patients who have previously neglected themselves, or who have been guilty of excesses. Nothing is said as to the final condition, the observations extending over a few months at the most.

Probably the method is somewhat better than Mercier's, though it shares with it the very grave disadvantage that the whole of it is performed without any definite information as to the size, shape or position of the obstruction. Certainly it is of no use in cases of advanced disease, in which Bottini recommends that the obstruction should be tunnelled, nor when the growth has spread into the bladder and become vesical—a form which frequently gives rise to the most intense irritation, so that the patient is often sounded time after time for calculus. If the obstruction is confined to the posterior wall of the prostatic urethra, just at its commencement, as in fig. 2, for example, and has not caused much enlargement of the lateral lobes or elongation of the canal, it can be dealt with successfully, so far



as immediate removal is concerned, provided, that is to say, the condition is diagnosed beforehand, and the bladder symptoms are sufficiently severe to require it, a combination of circumstances not likely to occur very often. But at the best it is very doubtful whether such a measure deserves to be called radical. The idea is that the cicatrisation that follows will by its contraction prevent any further protrusion of the middle lobe. I have shown, however, that the middle lobe, even when it does exist, is by no means the sole factor in creating the obstruction, and perhaps in many cases not the most important one; and certainly a short linear scar would never prevent the growth spreading into and invading surrounding structures. For a cure to be lasting, either the glandular tissue that is left must undergo fibroid transformation and cease to spread, or the amount removed must be sufficient to leave a channel too wide and too capacious to be closed by any ordinary form of overgrowth. It may almost be said of the penile operations, whether performed with Mercier's or Bottini's appliances, that they succeed best in the cases that require operation the least.

*Prostatectomy in the course of Lithotomy.*

The number of cases in which portions of the prostate have been removed in performing lithotomy is very large; nearly every surgeon of much experience in this operation has placed one or more upon record. In most the removal has been accidental—a pedunculated median growth being caught in the angle of the forceps behind the stone and torn away, as described by Syme, Fergusson, Paget, Cadge and others; or a rounded isolated mass shelling out from its bed under the pressure of the finger, as recorded by Bickersteth, who removed in this way a tumour the size of a hen's egg. In others, however, it has been done of set purpose after the stone has been removed and the condition recognised by the finger. One such instance, Mr. President, has been placed on record by yourself; Reginald Harrison has described another; Ashhurst, of Philadelphia, a third; Sir H. Thompson two more, and Landerer a sixth. More rarely the lateral lobes have been torn away, as in Dittel's case, in which, while extracting a calculus by the median route, at the third attempt he pulled out both, together with the stone; and in another of a somewhat similar character, mentioned in the "St. Bartholomew's Reports for 1885," where, on the patient



dying a year later, only a small cavity, lined with a thin capsule of prostatic tissue, was found to mark the site of the gland.

In a few of these cases there was permanent improvement in micturition, notably in Landerer's, in which the patient was enabled to dispense with the use of a catheter, which before had been necessary, and none seem to have been in any way the worse; but in the majority there was no difference one way or the other. Nor is this to be wondered at. In nearly all the part that was removed was either a pedunculated median growth, or an isolated tumour that was accidentally exposed and sometimes divided by the lateral incision; but it is quite the exception to find either of these conditions developed sufficiently to act as an obstruction, without at the same time great modification in the rest of the gland. It is true, as Thompson suggests in the account that he gives of his own four cases, that the muscular coat of the bladder may never have recovered; but certainly in most it never had the chance—the whole, or even the greater part of the obstacle was not removed.

#### *Perineal Prostatotomy and Prostatectomy.*

The perineal operation consists in opening the urethra at the apex of the prostate, exploring the canal from the interior, and then dealing with the obstruction according to what is found. It may be incised in the middle line behind with a bistoury, and then split open, down to the firm tissue beneath, by the pressure of the finger or a director; or it may be transfixcd from below and a V-shaped portion excised. Pedunculated outgrowths may be removed with an *écraseur* or twisted off with forceps. Isolated tumours in the substance of the gland may be shelled out as soon as they are exposed by division of the tissues covering them. Portions of the gland may be punched out with a prostatome, as practised by Gouley and Norton; and finally, as suggested by Watson, a channel of sufficient depth may be burnt through the obstruction with the galvano-cautery. It is plain at the first glance that an operation performed in this way must be much more thorough and satisfactory than either Mercier's or Bottini's. Some idea can be formed as to the size and character of the obstruction, and a much larger amount can be removed; but it is also true of this that it is only suited to a limited number of cases, and those not the worst, or requiring operation the most.

For anatomical reasons it must fail in a very large proportion;



the space is too small; there is not room for the necessary manipulation. A small pedunculated median lobe can be removed, or a V-shaped channel can be punched out or burnt out from the posterior margin of the vesical orifice; but this is the limit, and cases that require operation and present no more serious obstruction than this are few and far between. Nothing, for instance, can be done for the lateral lobes if they are much enlarged. Vesical outgrowths, which, as Fergusson long since pointed out, are often the most serious from the intense irritation they cause, almost as bad as that attending phosphatic calculi, are quite beyond reach. A median lobe of any size, even if it is pedunculated, can only be extracted through the narrow outlet in fragments, and as the urethra in such cases is usually compressed into a cleft by the growth of the lateral masses, this entails such an amount of manipulation and bruising that the rest of the gland is almost certain to slough, and either cellulitis sets in or the patient's strength is unequal to the task of repair. One case that was under my care proved fatal from this cause ten weeks after the operation. The overgrowth affected chiefly the lateral lobes; above and between them there was a fold that contained a certain amount of prostatic tissue; this was divided, but as the passage was not even then sufficiently free, an attempt was made to enucleate the lateral portions as well. No great amount of difficulty was experienced; upwards of a dozen rounded masses were shelled out with the finger and withdrawn; but the wound was never repaired; the cavity did not contract; the walls remained covered with sloughs; secondary hæmorrhage set in, although not to any very great amount, and the patient died from exhaustion.

The increase in the distance of the urethral orifice of the bladder from the surface of the body—the perineal distance, as Watson has called it—is another and more serious difficulty, rendering this method of operating simply impossible in a large proportion. If it is more than three inches the finger cannot reach the bladder, much less explore the interior around the outlet. It depends partly upon the condition of the perineum, whether it is rigid or loaded with fat, partly upon the extent to which the lateral lobes have grown up and carried the bladder before them. So long as the perineum is soft and yielding the prostate and the neck of the bladder possess a considerable range of mobility during life; they can often be pulled down within reach and quite half an inch gained. In two of the cases



in which I operated by this method I was very much struck by this. In neither was it possible at first to enter the bladder, but by passing a short, sharply curved sound by the side of the finger and hooking it against the trigone, the whole of the ring could be brought down and examined with ease. Unhappily, in the majority of cases of enlarged prostate, the rigidity of the tissues makes this impossible; and of course the lengthening that is due to overgrowth of the lateral lobes is unalterable.

Watson, in his admirable monograph on the operative treatment of the hypertrophied prostate, states that although his finger is of full average length, he must have failed to reach the bladder in at least one-third of the thirty cases which he has figured, and which he examined with this object in view. With regard to this, however—although I believe his conclusions are in the main correct (and he writes to me that now he is not nearly so much in favour of the perineal route as he was then)—I would venture to point out that the specimens upon which they were founded were taken from a museum, in which, presumably, they had been preserved because of the way in which they illustrated the final effects produced by enlargement of the prostate, and without any reference to their clinical history. It does not follow that operation was required or would have been advisable in all or any of these. Fully two-thirds of the cases of enlarged prostate, taken indiscriminately, never need any special treatment, and of the rest, a large proportion remain perfectly comfortable until the end of their lives with nothing more than the habitual introduction of a catheter. It is not the mere fact of overgrowth, however great this may be, that renders operation justifiable, but the obstruction and the irritability occasioned by it; and no conclusion, such as that drawn by Watson, is warranted until the perineal distance has been measured in a series of cases in which operation by one route or the other is considered advisable. For this reason, McGill's observation, that in only three out of his first twelve cases would it have been practicable to remove satisfactorily the projecting portion of the prostate by the perineal route, is of more value, and probably gives the true proportion.

The results obtained by the perineal operation are very difficult to estimate, owing partly to the difference in important details in the methods adopted, but much more to the exceedingly imperfect way in which so many of the cases have been reported; but on the whole they fully bear out the opinion



which stamps it as generally inefficient, with here and there—when the conditions are suitable—a brilliant success. Excluding those already mentioned, in which portions of the prostate were removed during the performance of lateral lithotomy (though as none of them proved fatal they would tend very considerably to lower the death rate), I have been able to collect particulars of thirty-eight cases. Of these three died—one 80 years of age, from uræmia, on the third day; a second from either iodoform poisoning or uræmia, on the tenth; and the third—the one I have already mentioned under my own care—from exhaustion and secondary hæmorrhage, in the tenth week. Of the rest, in one case the operation was not completed, and in another there is no note as to the condition of the patient subsequently. Seventeen are described as having been cured, and sixteen as benefited or improved.

These results, however, are capable of further analysis. Simple incision, or division of the prostate in the median line behind, perineal prostatotomy in the narrowest sense of the term, appears almost as useless as the urethral operation. The few instances in which it has succeeded by itself, without being supplemented by further measures, probably owe the benefit they have derived almost entirely to the engorgement of the gland having subsided, or to atrophy having followed. Nor could it well be otherwise. As soon as the neck of the bladder has recovered from its temporary distension, its natural elasticity and the action of the muscular fibres that surround it bring the torn or divided surfaces together again, and though a small amount of the growth may be lost by suppuration or sloughing, it is not enough to effect any permanent change for the better; the obstruction is soon re-established, and becomes as prominent as it was before.

The prolonged retention of a drainage tube, which is strongly recommended by Harrison as an accessory to division, is certainly more successful. Various instruments have been devised for the purpose, and Watson's may be taken as an example of one of the best. Its end occupies the lowest part of the bladder, and the eye is so placed that there is no *cul-de-sac* beyond. Its calibre is of full size; the shaft corresponds in direction with the posterior part of the urethra into which it fits, while its external portion is parallel with the bed when the patient is lying upon his back, and it is fastened by tapes attached to a plate, which is so arranged that while it can be pushed backwards and for-



wards upon the tube to accommodate itself to the difference in depth of the perineum, it will remain at any point at which it is placed. How a tube of this kind acts when retained for many weeks is a matter of opinion; it cannot be simply mechanical dilatation; possibly the more or less friable tissue of which the prostate is composed undergoes at first a certain degree of disintegration around it, and then slowly heals over so as to leave a canal of greater width; but undoubtedly it greatly increases the chance of success. Of the eleven cases in which there is mention of drainage for any length of time (and it must be for some weeks to be of any service, though the patient is not necessarily confined to bed), six are returned as cured and two as much improved. Two, however, were distinct failures; a third was very little benefited, and in one of the successful ones a small fistula persisted. Leaving this aside for the time, the cause of the failure is of some importance: it is not now the recurrence of the obstruction, but decay in the expulsive power of the bladder. A catheter could be passed much more easily; the route was and remained open; but the cystitis had lasted such a length of time that the muscular coat was damaged beyond recovery; the fault this time was not in the operation, but in the operation having been delayed too long.

The record as regards the final result in perineal prostatectomy is better still. Of the fourteen cases in which considerable portions of the obstructing gland were removed through the perineum, two (those already mentioned) died; one was a complete failure, the growth springing from the anterior wall of the urethra and reaching into the bladder (it was subsequently removed by the supra-pubic method with complete success), and the remaining eleven were practically cured. One, it is true, suffered from a small perineal fistula afterwards; but as he was 80 years of age, and was relieved by the operation both from the hæmaturia and the frequent and painful micturition which he had endured for years, the result cannot, I think, be considered a bad one; and one other could not empty his bladder thoroughly, although his condition was so far improved that the incessant dribbling was replaced by voluntary urination at intervals of three or four hours; but these were the only exceptions.

Compared with simple division of the prostate, or even with division followed by prolonged drainage, perineal prostatectomy is a distinct advance; but its application is still very limited;



the only cases in which it is likely to succeed are those in which the growth is of small size, and restricted to the median wall behind.

Occasionally, but not nearly so often as is usually believed, a small median outgrowth, acting like a valve, is found at the neck of the bladder, almost by itself, the rest of the gland being practically normal. Sudden and complete retention comes on in an old man who has not been conscious previously of any serious urinary trouble, although for some time he may have been in the habit of passing water more frequently than he used to do. A catheter can be introduced without any difficulty, showing that there is no great degree of congestion, but not a drop will come without an instrument, or at the most a drachm or two will dribble away by itself when the patient is not making a very serious effort. Sometimes, too, there is a history of the stream of urine having stopped abruptly, which in cases of enlarged prostate without calculus, is always worthy of note. Such instances are rare, but they do occur from time to time; they can be diagnosed from the symptoms they present, and they can be dealt with most successfully by the perineal route, the projecting portion being either twisted off with forceps or separated with an *écraseur*. One such I have met myself, and I do not think it unlikely that if the patient from whom fig. 2 was taken had lived (he was only 49 at the time of his death), the growth would have assumed this type with him.

Sometimes, too, the enlargement is so shaped that a wedge can be excised or punched out, or even burnt away from the posterior lip of the vesical orifice, giving complete relief, and occasionally both these conditions are met with together, the median outgrowth and the thickening underneath it; but this I believe to be the limit; anything beyond this cannot be dealt with satisfactorily by the perineal route. If the lateral lobes are much enlarged, either the urethra is compressed into a slit, through which it is difficult to force the finger, and impossible to manipulate it with any delicacy, or else its length is so much increased that even when the bladder can be pulled down to a certain extent, no idea can be formed as to the shape or size of the obstruction. Vesical projections are quite out of reach, and masses of any size, even if they are pedunculated, cannot be detached or extracted without inflicting a most injurious amount of bruising. Of the fourteen prostatectomies that I have been able to collect, certainly one of the two deaths and one failure



must be put down to the fact that the method adopted was an unsuitable one. Were these two subtracted the record of the rest is exceedingly good.

*Dittel's Operation, or Lateral Prostatectomy.*

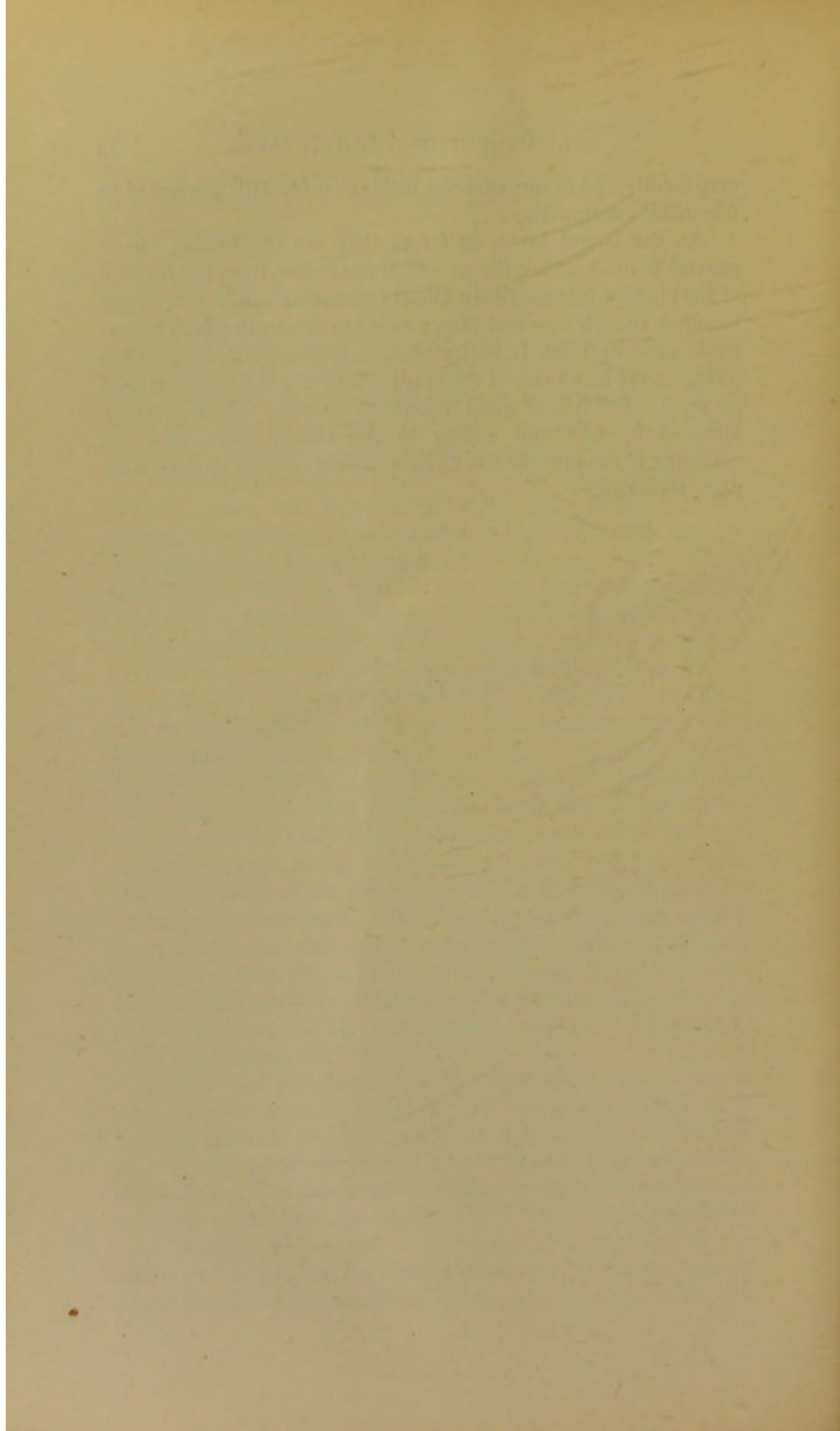
The difficulty of dealing with enlargement of the lateral lobes through the prostatic portion of the urethra, has given rise to another method of perineal prostatectomy which, though it is not likely to meet with general acceptance, deserves mention, as it has been practised with a certain degree of success by Küster upon three occasions. It was first devised by Dittel, who, however, only tried it upon the dead subject; and it consists in excising a wedge-shaped piece from the outer or posterior aspect of each lateral lobe, with the view of making their inner surfaces recede from each other and leave the urethra open. The patient may be placed either in the prone or the lateral lithotomy position. The bladder is emptied, a catheter tied in, and the rectum filled to establish its position and to avoid injury. The external incision is carried from the tip of the coccyx, around the sphincter ani, to the median raphe in front. This opens up the ischio-rectal fossa freely. Then the rectum is separated from the right lobe of the prostate, and the latter carefully exposed. A little further dissection beyond the middle line enables the same thing to be done upon the other side; and then as soon as the bleeding has ceased, and a good view can be obtained of the parts exposed, a wedge-shaped piece can be removed from each. This was proved by actual demonstration upon the dead subject to be capable of relieving prostatic obstruction when due to increased thickness of the lateral lobes; it allows their urethral surfaces to fall apart from each other, and restores the shape of the canal, which in such cases is practically compressed into a slit.

Küster has performed this operation upon three occasions with a certain measure of success. In one only was there much bleeding from the prostatic plexus; but in one the membranous part of the urethra was opened unintentionally (after an incision had been made in the prostatic portion); and in one the vesicula seminalis of the left side was cut into. The wounds were in all cases plugged with iodoform gauze and sutured a day or two later. In two instances (in both of which the urethra was opened during the operation) fistulæ persisted, though one, it is true, was

very small; and in one case the residual urine still amounted to fifty cubic centimetres.

As the lateral lobes, so far as they are obstructive, can in general be dealt with quite as well, if not better, from the interior of the bladder, it is not likely Dittel's operation will be frequently required, though now and then a case may occur in which suprapubic prostatectomy is indicated, and is practically impossible owing to the small size of the bladder and the rigid character of its walls. But it is of great interest as showing the importance attached by him and Küster to the lateral lobes, and the necessity, if the operation is to be a radical one, for dealing with them thoroughly.





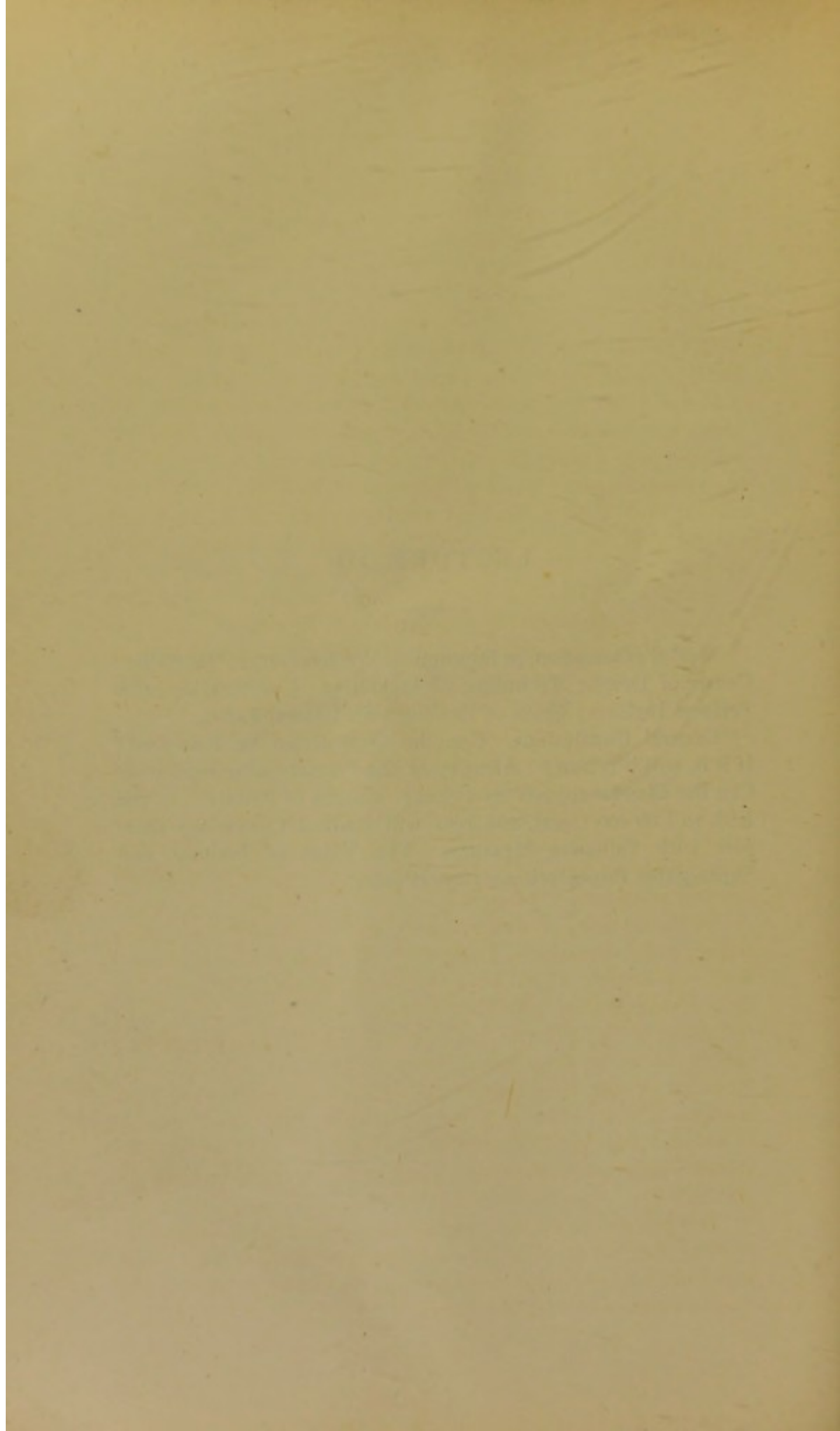


### LECTURE III.

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McGill's Operation, or Suprapubic Prostatectomy; Mortality; Causes of Death; Technique of Operation; Combination with Perineal Incision; Mode of Dealing with Lateral Lobes.

General Conclusions. Can the Obstruction be Removed? If it is, will it return? Atrophy of the Prostate after Operation Can the Bladder recover its Power? Causes of Failure. Is the Risk to Life too Great, and how will Radical Operations compare with Palliative Measures. The Value of Perineal and Supra-pubic Prostatectomy respectively.





MR. PRESIDENT AND GENTLEMEN.—The earliest record of McGill's operation or supra-pubic prostatectomy that I can find is in the year 1827, when Amussat is stated to have excised with a pair of long curved scissors a valvular median lobe that he discovered during an operation for lithotomy. Unhappily I have not been able to find anything as to the result, and therefore, though I have retained the case, more as a matter of interest than for any other reason, it cannot be numbered with the rest.

Of these the two first were performed by Dittel in February, 1885, and February, 1886, respectively. Trendelenburg came next in May, 1886, and Belfield of Chicago in the following month. Then Benno Schmidt in August of the same year and Belfield, Trendelenburg and Benno Schmidt again. McGill's first operation was in March, 1887, but with the exception of these, which may almost be called sporadic cases, there was no series of operations until the publication of his first three before the Clinical Society. To this and to the subsequent account given by himself and his colleagues at the British Medical Association in August, 1889, the operation owes whatever amount of favour it possesses.

Of the 94 cases of which I have been able to collect satisfactory notes, 19 have died—upwards of 20 per cent. It is often said of statistics of this kind that they are fallacious; all the favourable cases are published and not the others. This may be so, but in the present instance I feel sure that this charge cannot be made, for I have communicated not only with the Registrars of the Metropolitan and other hospitals, but with an immense number of other surgeons, both at home and abroad, to whom, for the trouble they have taken and the exceedingly valuable information they have given me, I owe a deep debt of gratitude.

The percentage appears exceedingly high, but it is worthy of note that while 12 deaths occurred in the first half, there were only 7 in the second, and further, the causes of the deaths may be considered with advantage.



One (No. 5), it is believed was from corrosive sublimate poisoning ; the patient at least was doing well until the eleventh day, when sudden uncontrollable diarrhœa set in. In a second (No. 20) the operation was of an unusually extensive character, involving resection of the symphysis pubis, and therefore might reasonably be placed in a category by itself. A third (No. 37) a man 80 years of age, died suddenly on the fourth day from what is called acute irritative urinary fever, the temperature rising rapidly and without any apparent reason to 106°F ; while three died from pneumonia or purulent bronchitis. Of the remainder, one (No. 32) died from hæmorrhage within 18 hours of the operation ; the rest either from exhaustion and continued suppuration, or from pyelonephritis and suppression of urine. With wider experience of the operation and of the cases suitable for it, it seems not unlikely that the mortality will be still further reduced.

The percentage of failure is more difficult to estimate. Taking the standard as absolute and complete control over the bladder, full ability to empty it entirely and whenever it is wished, without further trouble of any kind, no less than nineteen failed to attain it. But I am not prepared to admit that all of these are to be reckoned as failures in the ordinary sense of the term. In one, for example (No. 24), complete recovery, as thorough as could be wished, followed perineal prostatotomy performed a month or two later ; the division, owing to the urethral obstruction not having been sufficiently well considered, was not complete. In another (No. 61) the patient was 87 years of age and was suffering such torture that he begged that the operation might be performed upon the spot. Upwards of four ounces were removed, and no attempt was made to close the supra-pubic wound ; and four years later, at the age of 91, that old man, so I am informed by Mr. Buckston Browne, who performed the operation, is going about still, thoroughly enjoying his life. In a third (No. 74) in whom there was already a fistula owing to the previous removal of a vesical tumour, the communication persisted, but it was smaller than before the operation, and there was only a little pain occasionally in urination ; and in several other cases there were other reasons for which a certain amount of allowance must be made ; but the whole question of the value of the operation, as compared with palliative measures, and the causes of failure can be better considered with the conditions that render interference advisable.



As regards the technique of the operation there is but little variety. Trendelenburg advocates a transverse incision through the soft parts instead of the ordinary vertical one in the *linea alba*, but though this may prove advisable in cases of extremely pendulous abdomen, following the fold that overhangs the pubes, it does not really give more room or present any advantage in other respects, and it certainly increases the tendency to ventral hernia. Helferich in one instance partially resected the pubic symphysis, and Watson has written to me to the effect that if required he would not hesitate to adopt the same proceeding. Such a measure can, however, only be necessary in the very exceptional case of a small contracted bladder with a large intravesical growth.

McGill strongly advises enucleation of the prostate with the fingers, the mucous membrane over the projecting part having been snipped through first. In this way excessive hæmorrhage is prevented. A pedunculated middle lobe can, however, be removed by cutting through its base. Many operators have employed the galvanic or Paquelin's cautery, while some have used an *écraseur*, introducing it through the wound, or up the urethra, or through a special perineal incision according to the conditions of each case, and others again have simply pinched or twisted off projecting outgrowths. Keyes has made use of, what he terms, a "rongeur;" and I have devised a special instrument for suitable cases, probably, although I have not seen his, on similar lines—a pair of cutting spring forceps with the blades arranged after the fashion of a parrot's beak. The method in short, must be adapted to suit the circumstances of each patient; where nodular masses project under the finger, enucleation is the best; and often when it has once been started, further progress is very much easier than would be anticipated; where, on the other hand, the gland is hard and dense, either the cautery or preferably, as it causes less sloughing and enables the finger to appreciate better what has been done, some form of cutting forceps should be employed. The necessity for such an instrument is clearly shown by two of McGill's cases (Nos. 25 and 27) in which he failed to remove more than a small fragment the size of a pea, and that only with very great difficulty.

Serious hæmorrhage is rarely met with; and as a rule when it does occur it can be checked easily by the application of hot water, or by the cautery; but in one case (No. 32) it continued for eighteen hours without interruption, until at length



the patient sank ; and in another (No. 30), although it may not have been the immediate cause, it certainly helped.

No rule can be laid down as to the amount that should be removed ; each case must be judged upon its own merits ; McGill, in two instances, as already mentioned, removed a fragment only the size of a pea ; Buckston Browne (No. 61), on the other hand, took away upwards of four ounces by weight. There are, however, certain indications to act as guides. Clearly if, as in the last mentioned case, the immediate cause for the operation is the intense irritation due to the presence of what is essentially a vesical tumour, the whole of it must be removed. On the other hand, where the urgent symptom is obstruction, the formation of what has been well called a low level urethra, whether it is attained by enucleation, or the cautery, or a pair of cutting forceps, must be the prime object ; and in any case, whether there was before a tendency to calculus or not, owing to the liability there is afterwards to the collection of phosphatic *débris*, every endeavour must be made to ensure a smooth and straight route towards the orifice. It seldom happens, however, that the operation is required for one of these causes alone ; nearly always, even if one appears paramount, the others are present also ; and practically, if the operation is to prove successful, it resolves itself into removing the whole of the vesical mass, whether it springs from the lateral lobes, or is an upgrowth from the posterior wall, or is a detached nodule ; and then extending the exploration down the whole length of the prostatic urethra. On this point, Belfield, of Chicago, lays especial stress. One of the earliest cases (Meinhardt Schmidt's) failed, as already mentioned, completely. The patient was only 55 years of age ; the bladder was thick-walled and contained several calculi ; the urine was purulent and ammoniacal ; there had been complete retention off and on for three years. Supra-pubic cystotomy was performed and a broad-based lobe found projecting into the bladder. The projecting part was torn off ; the base was left, untouched. This was in February, 1888. In March, the catheter was stopped by the prostate as before and median perineal cystotomy was performed. A catheter was tied in ; voluntary micturition began to return the next month ; and in August, 1890, two years and four months later, recovery was complete.

The same thing almost happened to Belfield himself (No. 76). The patient was 49 years of age ; a catheter had been used irregularly for over a year, the introduction being very



difficult and often so painful that the patient neglected it. Supra-pubic cystotomy was performed, and a tumour the size of a walnut enucleated from the left lateral lobe. The finger-tip and the catheter then revealed an obstruction in the prostatic urethra inaccessible from the bladder. Perineal urethrotomy was performed; an incision made along the floor and the tumour detached and pushed into the bladder from beneath.

Wishard (No. 94), as I have already mentioned, met with exactly the opposite experience, and after performing perineal prostatectomy found, two weeks later, that it was necessary to open the bladder supra pubes; in it there was a great pear-shaped mass, overhanging the orifice, and quite inaccessible from below. Arguing from these cases, and from others, such as Guyon's (No. 63), in which the obstruction made its appearance again within a few days of the operation, Belfield points out the necessity, not only of removing all the vesical portion of the growth, but of stretching and thoroughly exploring the first portion of the urethra with the finger. Unless this is perfectly soft and devoid of resistance (which in such cases, where the growth has already spread into the bladder, is highly improbable), either a deep groove must be cut or burnt in the posterior wall, as was done by Trendelenburg, Helferich, Kümmell and others; or as Belfield prefers, an incision made in the perineum, and the exploration finished through that. As he points out, the addition of the *boutonnière* increases but slightly the injury to tissue and the time of anæsthesia, while it affords an access to the entire prostate which may convert an utter failure into a complete success.

It may be mentioned as a further argument in favour of this addition to the supra-pubic operation, that it very greatly assists the drainage of the wound. The bladder may be drained, as McGill and others have pointed out, nearly if not quite as thoroughly supra-pubes as through the perineum; when the tension of the abdominal wall is removed, the pressure of the viscera behind and above is sure to keep it empty; but this only holds good so long as the operation is confined to the bladder; the prostatic portion of the urethra will not drain itself in this way, and when the operation has extended into it, unless a perineal opening is made, it becomes a conical receptacle at the lowest part of the wound, forming part of the wall of the wound, filled with blood and decomposing urine.

The lateral lobes, when they are much enlarged, are quite as



important as the median part, and require in most cases to be dealt with as thoroughly if permanent cure is the object. One of the most common forms is that in which the sides of the prostate grow upwards, elongating the urethra and compressing it into a narrow slit, until they project into the cavity of the bladder, raising between them a bar which sometimes consists merely of a fold of mucous membrane, but more often contains an actual outgrowth of prostatic tissue. Under these conditions excision of the median obstruction alone is of little or no use. As McGill has shown, the projecting parts of the lateral lobes must be removed as well, and then taking advantage of the division of the mucous membrane and the exposure of the surface of the outgrowth a sufficient amount must be removed from either side to make the passage really funnel-shaped. Surrounded as it is now by rigid tissues, having lost all its natural flexibility, nothing else will answer. So long as the bladder is of fair capacity this is not so difficult as it appears to be; the greater the size and the more irregular the enlargement, the easier enucleation becomes; the dense fibroid variety that requires cutting forceps seems rarely to project in this way. On several occasions McGill removed as much as two ounces weight from the sides alone, and Vignard, experimenting upon the dead subject, found that he was able to enucleate the whole gland through the bladder in six cases out of ten. But plainly, unless Helferich's resection of the pubes is added to the operation (and this seriously increases the gravity of it) it would be very unwise to attempt to carry out the necessary manipulation through a supra-pubic opening unless the bladder were of sufficient size, or could be easily distended.

#### *General Conclusions.*

Such are the operations proposed for the radical cure of enlargement of the prostate, and the results, so far, that have been obtained by them. It remains now to consider whether—and in what cases—they should be performed.

And first, are they really what they profess to be—radical? Can the whole of the obstruction be removed? and if it is, will the bladder recover?

The first part of the question must certainly be answered in the affirmative; by selecting suitable methods the whole certainly can. Whether the risk to life is too great to render the



operation advisable will be considered later on ; here I am only concerned with the possibility of removing the obstacle.

*Recurrence.*

If it is removed, will it return ? This opens up a question of very great interest, and one that will need much more investigation before a definite answer can be given.

Mercier's operations, there is no doubt, are failures ; the obstruction forms again almost at once. If a larger amount is removed by a more extensive and thorough operation, will the same thing occur, of course, later ? In reference to this I have only been able to collect a few data, but they are of very great importance.

Definite recurrence of the growth has been noted in one case (No. 6), Benno Schmidt's first. The patient was 67 years of age ; the prostate was of enormous size and must have been growing for years, as hæmaturia had been noted for at least seven. On opening the bladder the urethra was found to be compressed into a slit, and in addition hanging over it, there was a partly pedunculated median lobe, the size of a walnut. The galvano-cautery was used, and spontaneous micturition occurred on the seventeenth day, for the first time for more than a year. Then suppuration followed, all voluntary power disappeared again, uræmia set in, and the patient died nine months after the operation. *Post-mortem*, a new growth the size of a walnut was found under the old scar. Unhappily no microscopic examination appears to have been made and Belfield suggests that it might have been of a malignant character ; but although this is not impossible it is scarcely in accordance with the length of time the case had already continued.

Whether Guyon's case (No. 63) in which also a relapse occurred, is to be regarded as an example of recurrent growth, or like Meinhardt Schmidt's of insufficient division, is somewhat doubtful. The patient was 67 years of age, and had suffered for upwards of four years. On opening the bladder the obstacle was found to be an enlargement of the left lobe, and the formation of a bar connecting it with the other. This bar was divided with the cautery, and then a catheter entered easily. This continued until the fifteenth day : soon after the difficulty was experienced again, and in a few days the obstruction to the catheter was as great as it was before. It is hardly possible to



conceive that a new growth, sufficiently large to obstruct not merely the passage of urine but the introduction of a catheter, could have grown up in such a short space of time; it seems much more probable that the original operation was not sufficiently thorough, and Guyon himself apparently inclines to this view as he suggests that in a similar case it would be advisable to adopt Harrison's method of prolonged drainage.

On the other hand I am able to point to four cases in which, on the bladder being opened some time later, no new growth was found; and to many more in which the clinical symptoms for which the operation was performed have never returned, and the passage has remained free for two and sometimes upwards of three years. The first of the four (No. 40) is one of the six recorded by Kümmell. The patient died from pneumonia three months after the operation, and on the bladder being examined there was no sign of any return. McGill's first case (No. 11) is another. The operation was performed in March, 1887; eighteen months later during an attack of retention the wound reopened, and in December, 1888, the bladder was explored and a phosphatic concretion removed: there was no fresh enlargement. The third is recorded by Williams, of Norwich. The middle lobe of the prostate was accidentally removed during the operation of lithotomy. Two years and a half later, another stone formed, and the bladder was opened a second time; the cicatrix was perfectly smooth and there was no recurrence. The fourth is taken from St. Bartholomew's Hospital Reports for 1885. There it is mentioned that in a case in which median lithotomy was performed the prostate was found to be very much enlarged, and it was therefore removed. On the patient dying a year later, a small cavity only marked the site of the excision, a thin capsule of prostatic tissue alone remaining.

This, however, is by no means all that can be said on this point. There is good evidence to show that in some instances the prostate undergoes an actual diminution in size after operation. One such of the most striking character is recorded by Reginald Harrison in his Lectures on the Surgical Disorders of the Urinary Organs. Packard of Philadelphia writes to me that he has noticed the same thing on several occasions after suprapubic cystotomy; the prostate has shrunk down again until the projection into the bladder has almost disappeared: and in one case under my care, in which the post-prostatic pouch was punctured through the perineum with a straight trocar and



cannula for the sake of draining the bladder, on the patient dying some weeks later, there was unmistakable evidence of a great change in the middle portion of the gland. The trocar had originally passed straight in, traversing in its route the end of the prostatic portion of the urethra. At the *post-mortem* examination the track it had made was bent at an angle corresponding to this point: the middle lobe had contracted so far that the two portions were no longer in the same straight line. Even when full allowance is made for the subsidence of congestion and the contraction and absorption of thrombi it is scarcely possible to avoid the conclusion that in cases of this kind there is some actual shrinkage in the tissue of the gland.

Harrison considers that in his case the diminution can only be explained by atrophy. This may take place occasionally, but it seems on the whole more probable that the change is really due to the fibroid consolidation which sets in sooner or later in so many of these cases. In some there is abundant adenomatous growth with the production of large and sometimes outlying nodules: in such there can be no certainty that fresh ones will not spring up and cause trouble again. Benno Schmidt's case in which recurrence took place within a few months, may have been of this variety. More frequently after attaining a certain size, the older part of the growth, that in the urethra, appears to become denser and harder, as if it underwent a fibroid transformation, the glandular tissue disappearing; and it may be that occasionally this change is either started or materially assisted by the operation. But whether this is so or not, it is certainly encouraging that in spite of the fact that some of them are now upwards of four years old and that the amount removed and the general shape, as in Buckston Browne's case, were such as to suggest continuous growth, in only one out of the ninety-four has any definite recurrence been recorded.

#### *Will the Bladder Recover?*

The second question whether, if the obstruction is removed there is a fair chance of the bladder regaining its power, can also so far as the majority is concerned, be answered in the affirmative. It has done so in a very large proportion of the cases, and provided the patient still retains a certain amount of vigour and the condition of its muscular coat, before the operation, is not too bad, there is no reason why it should not. In spite of the great



authority of Guyon, whatever may happen in special cases, there is no satisfactory proof that primary muscular degeneration is invariably, or even generally, associated with overgrowth of the prostate. The starting point, certainly in most, is the upgrowth in the orifice; this is the first cause of the collection of residual urine and of the wasting of the fibres that should close in the posterior fundus; only unhappily it does not long remain the only one. As this view, however, is not universally accepted, and as there is a certain proportion of cases in which, for one cause or another, the bladder never did regain power, it is necessary very briefly to enter into some of the details.

Of the nineteen cases that may be considered failures, four, so far as this is concerned, should be dismissed at once, Meinhardt Schmidt's (No. 24), Guyon's (No. 63), one of McGill's (No. 27), and Buckston Browne's (No. 61); either the whole obstruction was not removed, or no attempt was made to re-establish the natural route; and two others (Nos. 3 and 74), ought scarcely to be counted in, for a vesical tumour had already been removed, leaving a fistula; they cannot fairly be considered ordinary cases of prostatic overgrowth. One other patient (No. 23) was a very feeble old man, who became insane within a few months of the operation; and in another (Benno Schmidt's), there was, as already mentioned, a recurrent growth, and the power of voluntary urination which was beginning to return disappeared finally.

Of the remaining eleven, in three (Nos. 11, 80 and 92), calculi (not simply phosphatic concretions on the surface of the wound) made their appearance subsequently. One of these possibly was due to the operation; there was a large amount of residual urine before, but no calculus; in the other two, however, calculi had been present—in one a considerable number—so that there may have been other reasons for the recurrence. This leaves eight in which, although the obstruction was apparently removed, either the irritability persisted, or the muscular strength never returned; the bladder had been injured to such an extent by overdistension, prolonged cystitis, or the continued use of catheters, that its function was permanently destroyed.

How long it takes for these causes to produce such an effect is a very serious question. One single act of over-distension has been known to be sufficient even in a young man, whose bladder was apparently perfectly sound; and of course in old people such a result would be much more likely. Temporary atony, indeed,



is almost invariable after complete retention in cases of enlarged prostate; many days may pass after such an occurrence before the amount of residual urine drops back to its former level. Cystitis, so long as it is limited to the mucous membrane, is perhaps not so serious; it may even, by increasing the resistance and the frequency of micturition, cause a certain degree of hypertrophy; but after it has lasted for years, as it had in a very large proportion of these cases, and involved, not merely the surface but the deeper structures as well, the injury it inflicts seems almost irreparable. The wall of the bladder may appear to be hypertrophied; great bands may stand out under the mucous membrane, and it may resist vigorously any attempt to stretch or distend it; but in many of these instances the hypertrophy is more apparent than real, the cavity is unduly contracted, and the increased thickness is caused much more by the products of chronic inflammation than by any actual overgrowth or multiplication of muscular fibres. The persistent use of catheters is even worse. Few people give full credit to the effect that it has upon the tone of the bladder wall. Sir H. Thompson says, in the last edition of his "Diseases of the Urinary Organs:" "When it has been necessary to practise habitual catheterism for retention from enlarged prostate for two or more years, the coats of the bladder lose their power, and are incapable, I believe, of regaining it in any case after that lapse of time, and would fail to expel their contents even supposing the obstruction to be entirely removed." McGill has shown that this rule is by no means so absolute as Sir H. Thompson lays down. In several of his cases (and in many more that I have been able to add to his list through the courtesy of his colleagues and of others), habitual self-catheterism had been practised for upwards of seven years, and yet the bladder recovered. It does not therefore follow in every case either with the certainty or the rapidity that this would suggest. Probably there is a very strong individual factor, for, as is well known, the effect not only upon the bladder but upon the other urinary organs, and the system generally, varies very widely in different persons; but it certainly may lead to complete atony, and it becomes, therefore, a matter for the gravest consideration whether, if other circumstances are favourable, it is advisable to run such a risk in the hope that it never will; whether it would not be better to operate and remove the obstruction, without waiting until perhaps it is too late. It is one of the strongest arguments in favour of early operation that



the chief palliative measure that replaces it may, within two years—will, according to Sir H. Thompson—so ruin the muscular power of the bladder that it can never recover.

Besides these cases in which the bladder never recovered, there were several others in which the return of power was very gradual, the amount of residual urine slowly diminishing. These were for the most part cases of simple atony, not of advanced cystitis, and in some of them very great benefit was derived from the use of cold douches, galvanism and local injections of strychnia; but one (No. 7), in spite of all that was done, never showed much sign of improvement. Whether those in which the cause was cystitis of long standing would have been benefited in any way by prolonged drainage, giving the bladder perfect rest, so that its muscular coats might free themselves by degrees from the old lymph and regain their normal state of nutrition, cannot be definitely asserted; but it is certainly worth the trial, and this must be regarded as an additional argument of considerable weight in favour of a perineal incision.

Fortunately, if the patient is carefully observed for some length of time beforehand, it is usually possible to tell whether the bladder will be able to recover or not, though it may not be possible to say how far. I have tried by means of a manometer to obtain a more accurate record of the expulsive power in health and in disease, hoping that perhaps the shape of the curve obtained towards the end of micturition might give more definite information with regard to the amount of tone the muscle still possessed; but I have sadly come to the conclusion that the very rough method of passing a full-sized catheter and noting the distance the stream can be projected, and the effect of the respiratory movements upon it, is quite as valuable for clinical purposes, and perhaps more so, for the patient is not so nervous.

### *What is the Risk?*

Granted that the obstruction can be removed, that the chance of its returning if the operation is sufficiently thorough is exceedingly small, and that unless the bladder wall is hopelessly involved, or the patient excessively feeble, there is a good prospect of its regaining power over its contents, there remains the further question, whether the operation does not involve too great a risk to life, and how far it will compare in this, and in the degree of comfort it confers, with palliative measures, such



as supra-pubic or perineal drainage? For it has been said that nearly the whole benefit derived from it is due to the temporary relief from cystitis, or to the extraction of calculi, and not in more than the remotest degree to the removal of the obstructing mass.

In answering this, the perineal operation must be considered separately from the supra-pubic. It is not a matter of option which of the two should be performed in any individual case; one may be required, or the other, or both. Nor is there in the majority of instances any difficulty in telling beforehand which should be selected. The size and distensibility of the bladder must be ascertained first; it may be so small and rigid that there is actually no room for the high operation, and either the growth must be removed through the perineum (possibly by Dittel's method), or if it is not suited to this, simple drainage must be employed. Then the growth itself must be measured; the length of the prostatic urethra is easily found; its breadth, its shape in different parts, and the degree of resistance its sides and floor present can be made out with a very fair degree of accuracy by a modification that I have suggested in MacMunn's urethrometer, and occasionally a certain amount of assistance can be derived from the use of the cystoscope, although its introduction is not easy or its value great when the shape of the prostate is in the least irregular. The only point about which there is any serious difficulty is the estimation of the distance to which the various lobes of the prostate project into the bladder, and the thickness of the growth at the level of the neck, and a great deal can be ascertained about this by combined urethral and rectal examination. Even, however, if there does happen to be a mistaken diagnosis, and owing to the presence of some misleading feature the perineal operation is selected in a case better suited to the other, exploration with the finger can do no harm, and the presence of the incision, supposing it is not wanted for drainage, adds little or nothing to the gravity of the operation.

Of the thirty-eight cases of perineal operation undertaken for this purpose, and not unintentionally or as an afterthought during lithotomy, only three died, and one of these was 80 years of age already, and in another the enlargement was of such a nature that the method selected proved unsuitable. Simple division of the bar is not, I grant, of much value, unless it is followed by prolonged drainage; but undoubtedly in suitable cases perineal prostatectomy, without necessitating an appreciably



greater risk, confers upon the patient a degree of relief with which that following mere cystotomy or drainage offers no comparison. The patient, in a very large proportion of cases, recovers complete control over his bladder; he is able to empty it thoroughly and at will without an instrument, and even in the failures—even in those cases in which a fistula is left, or in which the sole benefit gained is the easier introduction of a catheter—he is no worse off than if the establishment of a permanent fistulous opening and nothing more had been the object in view.

The supra-pubic operation stands on different grounds. Taking all the cases together the mortality is approximately 20 per cent., if the last half only, it is still 15 per cent. This, it must be admitted, is a very serious matter, and although it is to be expected that the proportion will fall considerably lower—at least, in the hands of those operators who are practised in the performance of it—it is probable that it will always remain higher than the other.

On the other hand, the condition of these patients must be taken into consideration; their age; the fact that they were suffering in nearly every instance from cystitis in its last stage, and that the majority were absolutely broken down from prolonged suffering; and it may well be asked if the operation is to be judged by the results of the first hundred cases taken indiscriminately, before any definite opinion has been formed as to when and under what circumstances it is suitable, what would have been the condition of those patients as regards comfort, and what would have been the duration of their lives had it not been done? Would they have lived longer? or would they even have wished to?

The real issue lies between supra-pubic prostatectomy on the one hand, and palliative operations, such as simple cystotomy and drainage of the bladder, on the other. Is the benefit it confers sufficient to justify the increased risk? That when it does succeed, the condition of the patient is infinitely better there can be no question; wearing a drainage tube permanently in either situation may be tolerated, but in spite of the enthusiastic comments of those who cannot live without it, it can scarcely be preferable to micturition by the natural route, and it must always be remembered that it does not invariably confer even this moderate degree of comfort—in those instances, for example, in which the prostatic growth projects into the cavity of the bladder, a supra-pubic drainage tube often makes the



irritation worse, and Hunter McGuire's artificial urethra is not always easy to maintain. Moreover, it is a curious fact that the results of drainage of the bladder, so far as one can tell from published accounts, are not so uniformly good ; it is not such an absolutely safe measure as one would imagine, and I cannot help thinking that there is a tendency, when a case of supra-pubic prostatectomy ends fatally, to put it down to the operation, and when the same thing occurs after cystotomy, to give the credit to the original complaint. Still there can be no question which is the more serious of the two.

Each has, I believe, distinctly its own field. Enlargement of the prostate of itself requires neither, and fortunately the majority of patients suffering from this complaint pass through life without its ever being necessary to raise the question. In a certain proportion, however, complications set in sooner or later ; some of these can be met and relieved by palliative measures, others can not, and to many patients there comes at length a time when their constitutions are still sound, but there are clear indications that the local conditions are surely, but with rapidly increasing speed, growing worse and worse. The catheter has to be passed more and more often ; occasionally there is a little difficulty in introducing it, and what is more important still, it no longer gives relief ; the desire to pass water is greater after the instrument has been withdrawn ; cystitis, in spite of every precaution, breaks out every now and then ; attacks of congestion, sometimes causing total retention, occur with greater frequency ; the urine has an inexplicable tendency to become ammoniacal ; the residuum is steadily growing larger and larger ; phosphatic *débris* is noticed from time to time, or actual calculi are formed ; the night's rest is habitually broken more than once or twice ; the patient's appetite is failing ; he is losing flesh and strength, and is growing anxious about himself ; for these and such as these, prostatectomy, by one route or the other, according to the special anatomical conditions present, certainly affords a far better prospect than cystotomy or drainage, and without sensibly greater risk. Permanent cure is possible in a very large proportion, and even the failures are as successful as the successes claimed for the other methods.

On the other hand, if this chance is lost—if, as too often happens, the patient has allowed himself to drift, using a catheter more and more frequently, without realising what the end must be, until his kidneys are diseased, or prolonged cystitis has



destroyed the muscular power of the bladder and caused it to become small and hard and rigid—the conditions are absolutely different. When the capacity of the bladder is very much reduced and it cannot be distended; when it has lost its power—whether this arises from prolonged retention, repeated attacks of inflammation, or the persistent use of catheters—and when under careful treatment, though watched from day to day, it shows no sign of recovery, it is useless attempting to remove the obstruction; cure is impossible, and the risk, if there is the least nephritis, is very great; palliative measures only can be employed—as much benefit will be derived from drainage as from the most complete enucleation; and no surgeon would undertake a grave operation when one that is less dangerous to life would answer equally well.



FIG. 1.



Sagittal section through the neck of the bladder from an infant six months old (a little to one side of the median line), showing the structural identity and continuity of the prostatic stroma with the tissue surrounding the vesiculæ seminales and the vas deferens.



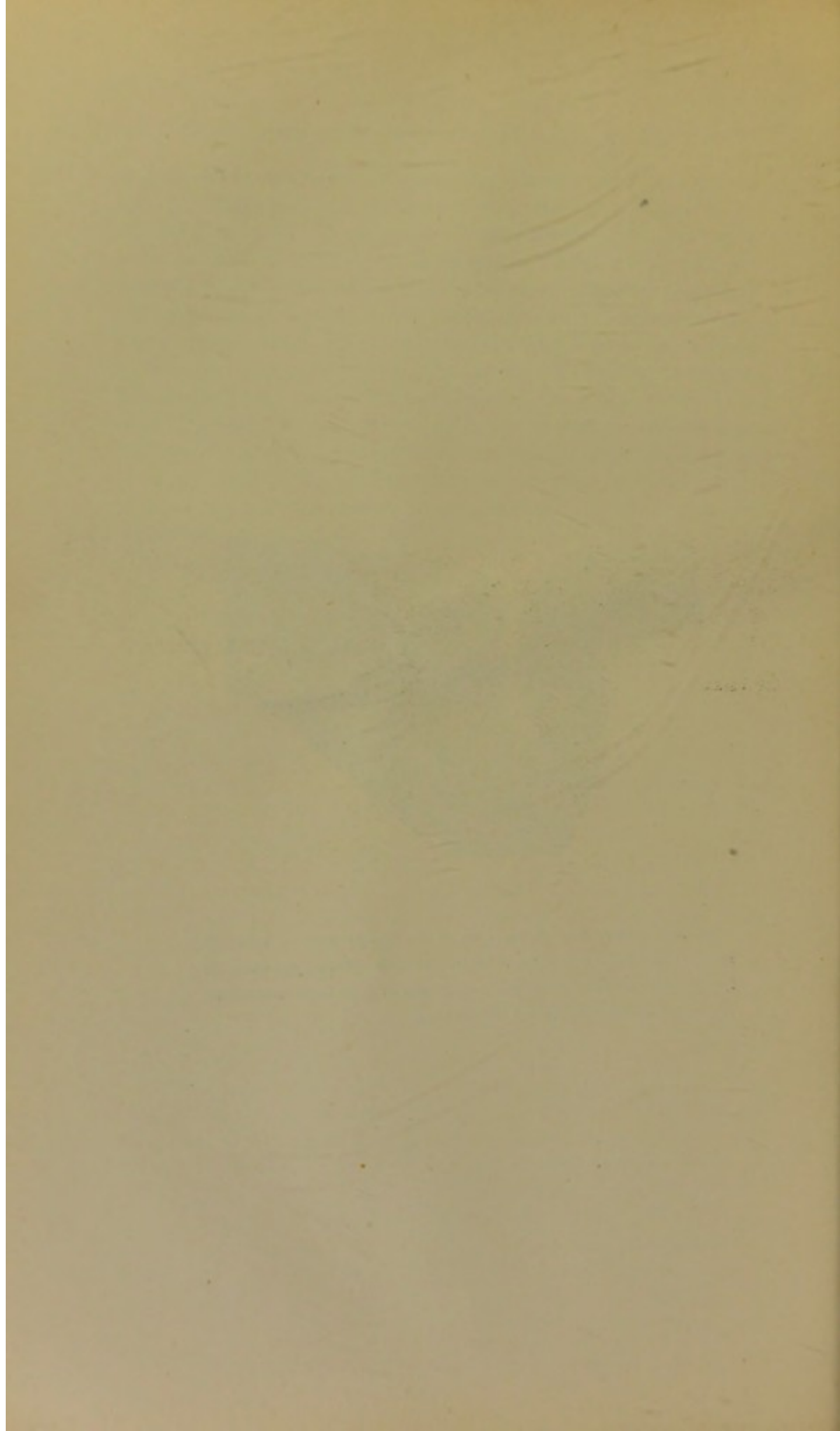




FIG. 2.



Median sagittal section through the neck of the bladder of a man forty-nine years of age, showing the growth of the adenoma up the posterior wall of the urethra into the neck of the bladder. Seen from the inside the vesical orifice was markedly crescentic in shape, as if the median lobe were projecting forwards into it.



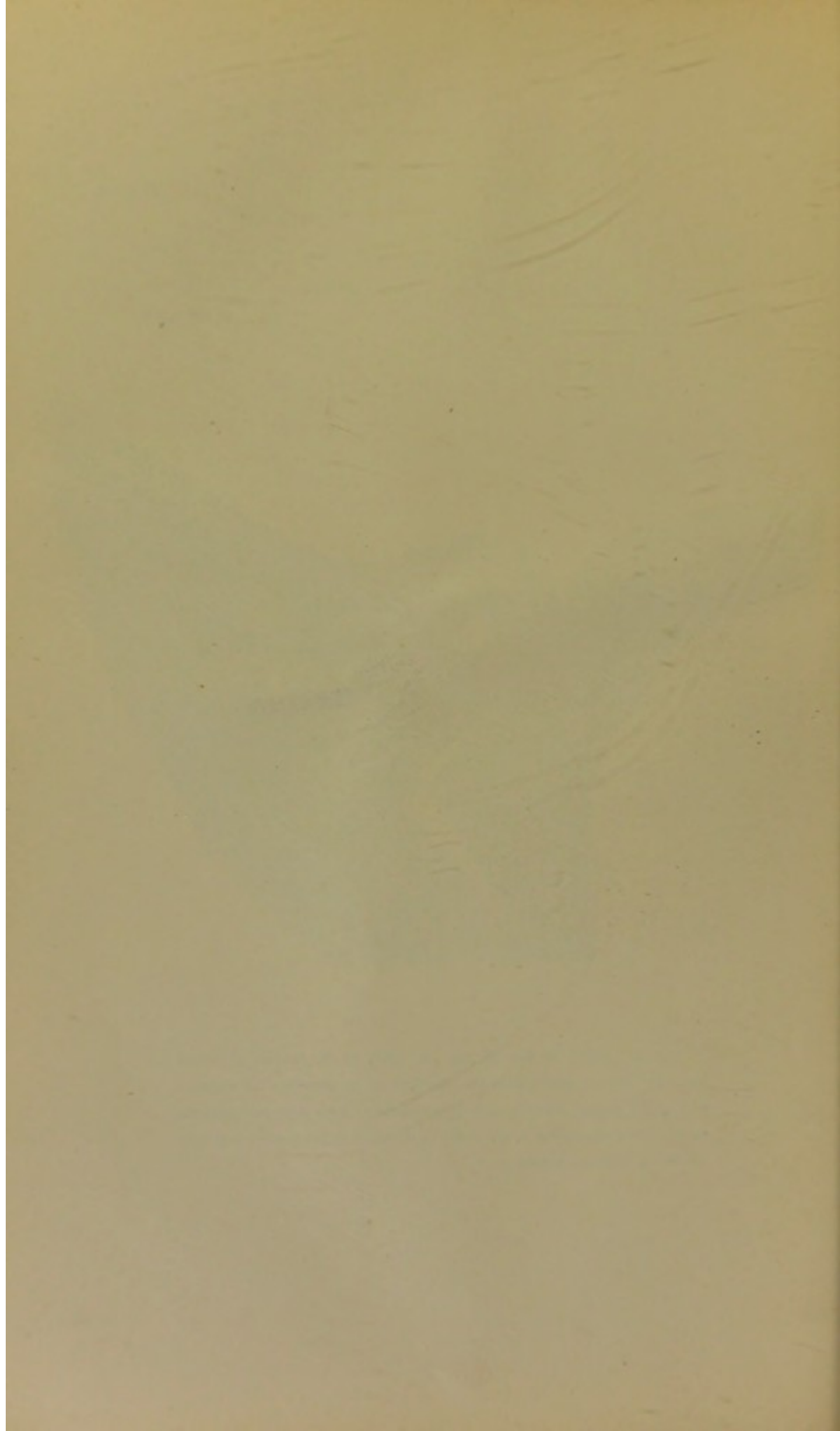
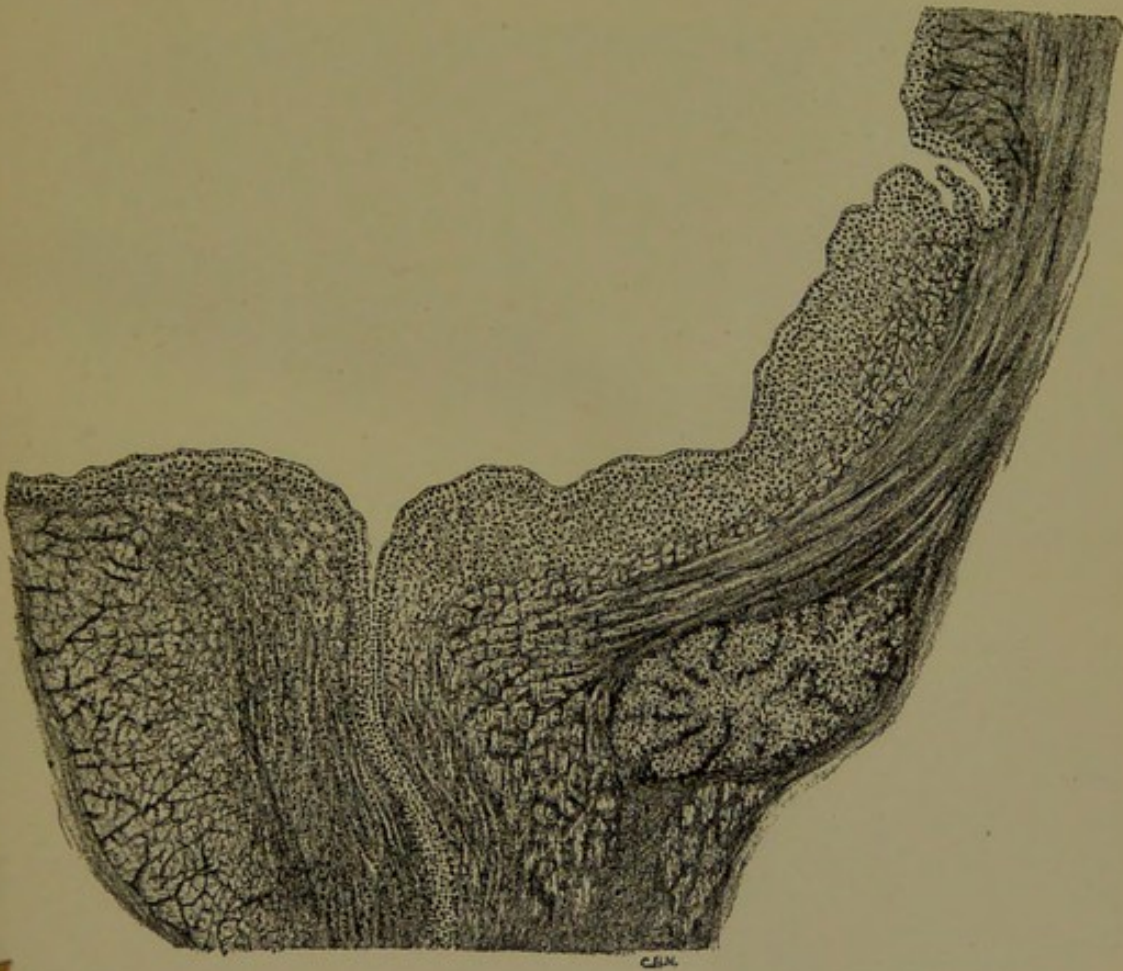




FIG. 3.



Sagittal section through the neck of the bladder, from a patient aged sixty-nine. The growth has extended up both the anterior and posterior walls of the urethra, and has reached quite to the back of the trigone. The muscular fibres around the neck are somewhat hypertrophied, and there is an indication of a commencing post-trigonal pouch.

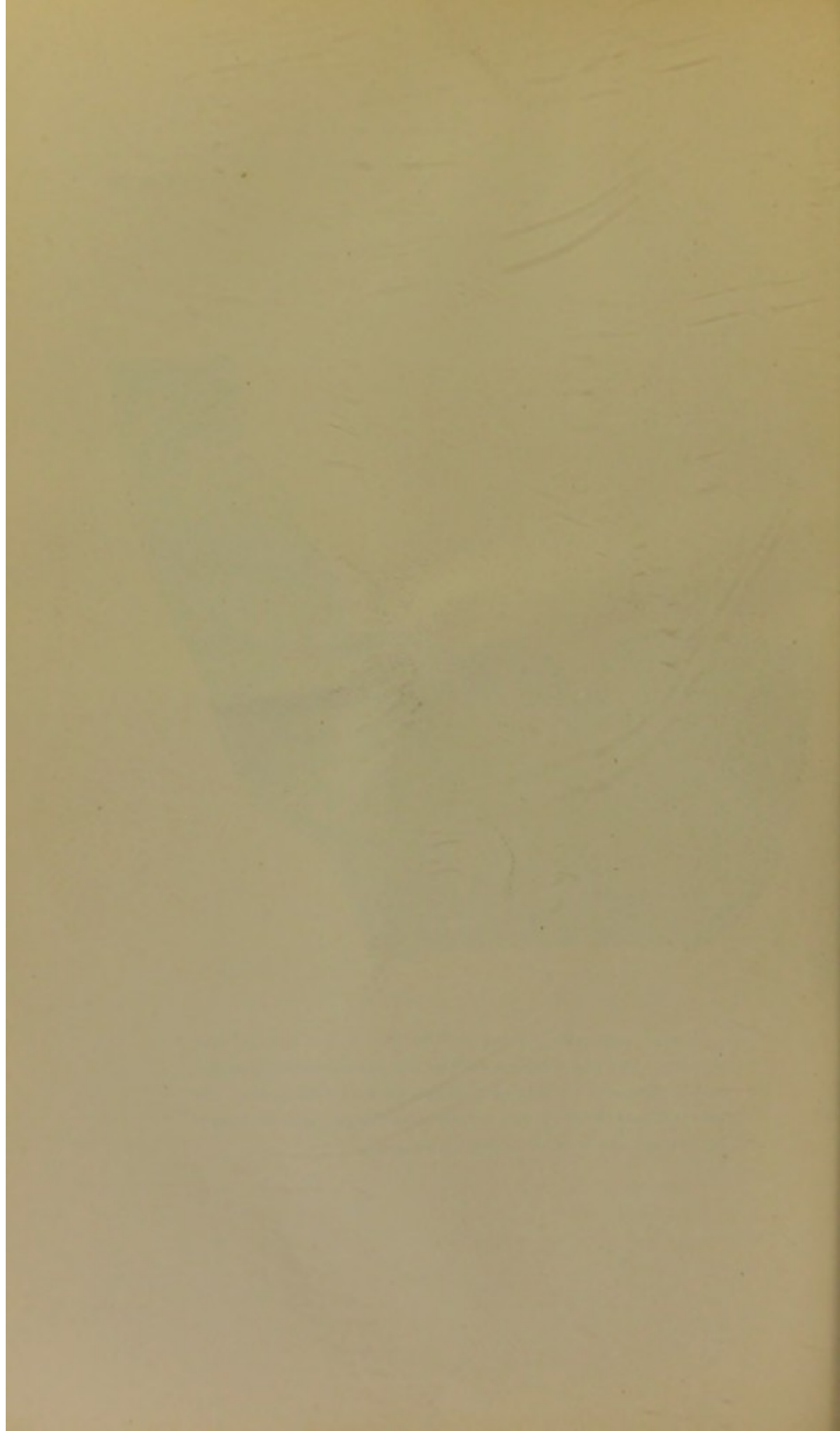
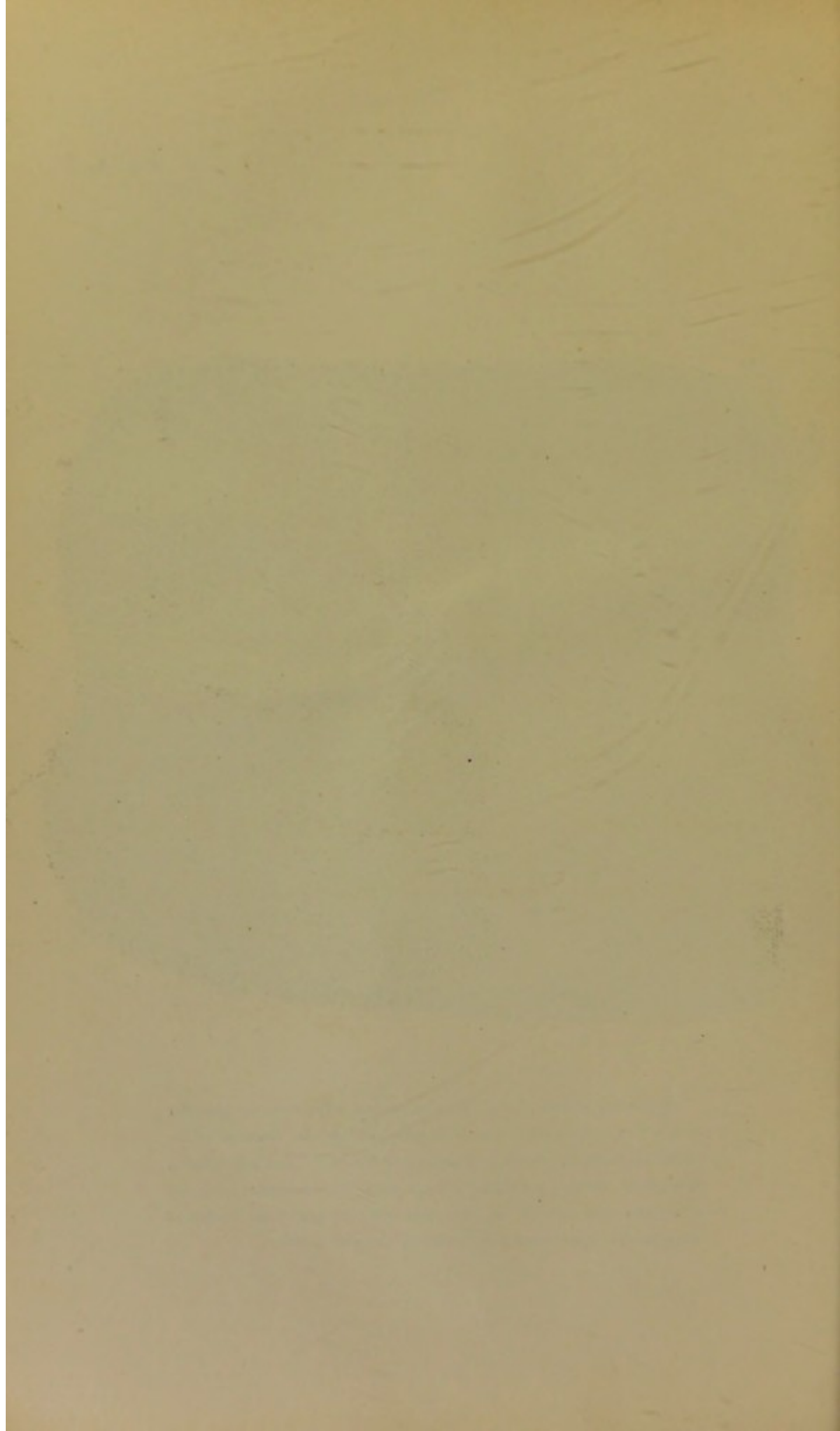




FIG. 4.



Microscopic section through the new growth, taken from the posterior boundary of the trigone of Fig. 3. It shows the peculiar character of the adenomatous tissue, composed apparently of irregularly arranged tubules, each with a basement membrane, a single layer of low columnar cells, and a few long fibre cells on the outer side, and here and there bundles of muscular fibre surrounded and isolated by the new growth.





In presenting these Tables, my cordial thanks are due to the very large number of surgeons who have given me permission to make use of the notes of their cases, and especially to the Staff of the Leeds General Infirmary, who not only have contributed a most important proportion of the whole, but who very kindly allowed the Resident Surgical Officer, Mr. Moynihan, to send me particulars of many of their operations that have not yet been published.

# List of Cases in which Supra-pubic Protastectomy (McGill's Operation) has been performed, arranged to some extent in chronological order.

(The figures after the names of the operators refer to the table following the paper presented by McGill at the Leeds Meeting of the British Medical Association, August, 1889; those in the "Reference Column" to the Paper by Belfield, in the *American Journal of Medical Sciences* for November, 1890.)

No.	Operator.	Reference.	Date.	Age of Patient.	Condition of bladder—capacity, power, cystitis, calculus, etc.	Retention, complete or partial.	Catheterism.	Condition found.	Method adopted.	Result. Immediate and final.
1	Amussat	... Vignard, "De la prostatectomie et de la prostatectomie"	1827		"Dans un cas de taille hypogastrique"	...	...	Valvular median lobe	Excised with long curved scissors	...
2	Dittel	... Wiener Klin. Wochenschrift, July, 1888	Feb. 13th, 1885	65	Bladder paralysed. Urine alkaline. Severe cystitis. Upper end of prostate not to be reached with finger. Lateral lobes enlarged. Suprapubic puncture on Nov. 30th, 1884, with very little relief.	Difficulty two years. Complete retention for one	Every three hours; very painful and difficult	Pedunculated median lobe channelled at sides	Snare. No sutures. Bladder drained supra pubes	Death, six days. Pyelonephritis
3	Dittel	... Wiener Klin. Wochenschrift, July, 1888	Feb. 1886	65	Severe cystitis. Grube, of Charkow, had performed suprapubic puncture in 1885; then cystotomy, and had removed a calculus and a tumour, using scissors for the latter. Fistula persistent	Complete on many occasions	...	Large central prostatic tumour	Galvano-cautery. Drainage	Much trouble from incrustations on surface of prostatic wound. Fistula persisted. Micturition through urethra very imperfect. Catheter could be introduced more easily and with less pain
4	Trendelenberg	Beiträge zur Klin. Chir., Tübingen Band 8, 1891	May, 1886	72	Twenty years' trouble. Severe cystitis. Forty-seven calculi	...	For ten years, easy, but every half hour (metal ones would not pass)	...	Wedge-shaped incision. Paquelin's cautery. Partial suture. Bladder drained supra pubes	Pneumonia. Suppuration round sutures. Fistula persisted. Metal catheter could be introduced. Three months later more suppuration behind pubes, and patient died without having regained voluntary power



5	Belfield	...	New York Med. Record Aug., 1886, (American Journ. of Med. Sciences No. 43)	June, 1886	70	Pus and blood in the urine. Bladder held two calculi	...	Every half hour day and night, two years	Median lobe one inch in breadth, pro- jecting up- wards one inch	Operation not completed owing to ex- haustion of patient	Did well until the 11th day, then diarrhoea and exhaustion set in and proved fatal in the fifth week. Probably corrosive sub- limate poisoning
6	Benno Schmidt	...	Arbeiten ausd. Chirurg. Univ. Polik- linik, zu Leipzig, 1886	Aug. 1886	67	Severe cystitis with calculi. Hæmaturia since 1879. Enormous enlargement felt per rectum.	Complete since 1885	Three years. Introduction difficult	Half pedun- culated mid- dle lobe, size of walnut. Lateral lobes leaving only a slit between Concentric growth pro- jecting around ori- fice	Galvano-cau- tery. No sutures or drainage	Wound healed well. Spontaneous micturition on 17th day. Ab- scess formed later near wound of prostate and all voluntary power disappeared. Died, uræmic, May 1887. New growth under old scar, size of walnut
7	Kümmell	...	Centralblatt für Chirurgie, 1889	Sept. 1886	73	Severe cystitis	Complete	Several years	Concentric growth pro- jecting around ori- fice	Cautery. Blad- der sutured. Ext. wound partly closed	Union at once. Injections of strychnia and faradisation were employed, but very little volun- tary power returned
8	Belfield	...	Journal of American Med. Asso- ciation, 1887. (op. cit. No. 44)	Oct. 1886	73	Bladder dilated. Catarrhal cystitis	...	Trouble for some years. Regular catheterism for one	Median lobe, size of almond, with long narrow pedicle	Twisted	Fistula closed on 17th day. Passes urine without catheter. Can empty bladder almost com- pletely. Continues well. (Med. Rec., 1888)
9	Trendelenberg	...	Beiträge z. Klin. Chir. Tübingen. Band 8, 1891	Dec. 1886	65	Five years' trouble. Cystitis and calculi. Metal catheter would not pass	...	Necessary every half- hour for three months	Median, pro- jecting as a thick conical mass	Piece, size of hen's egg, re- moved with scissors. Cautery after- wards	Micturition partly voluntary in Feb., 1887, but fistula never closed. Died one year after. (Incision transverse, as in T.'s later cases)
10	Benno Schmidt	...	München Med. Woch., Feb., 1889	Feb. 1887	72	Extreme cystitis and tenesmus. Calculi	Complete two years	Two years	Tumour, size of walnut, projecting into bladder from right side	Galvano- cautery. Orifice seen to be open	Wound healed, but several small urinary abscesses formed at lower angle. Voluntary mic- turition did not return. Cystitis much better.
11	McGill (1)	...	British Med. Ass., 1889	Mar. 1887	53	Symptoms five years. Calculi and hæmaturia. Urine 1014, acid, much mucus and little albumin. Prostate per rectum slightly enlarged	Incontinence, necessitat- ing urinal	Every two hours night and day for seven months	Collar, size of walnut, round urethra. Six calculi	Removed	Urine per urethram on 18th day. Discharged. Passing urine na- turally on 36th. In Nov., 1888, the wound opened during an at- tack of retention. A phos- phatic concretion was removed in Dec. No fresh enlargement. Quite well at date



No.	Operator.	Reference.	Date.	Age of Patient.	Condition of bladder—capacity, power, cystitis, calculus, etc.	Retention, complete or partial.	Catheterism.	Condition found.	Method adopted.	Result. Immediate and final.
12	McGill (2) ...	British Med. Ass., 1889	April, 1887	65	General condition bad. Symptoms two years. Urine 1016, offensive, with blood, pus, and a little albumin. Prostate per rectum slightly enlarged	Almost complete for two weeks	...	Middle lobe size of bean, not pedunculated	Removed	Urine per ureth. on 14th day. Wound healed and natural micturition on 27th. At date, no difficulty with urine unless he drinks to excess, then easily relieved by catheter
13	McGill (3) ...	British Med. Ass., 1889	July, 1887	61	Symptoms six years. Is uremic, with constant vomiting and diarrhoea. Urine 1020, putrid, one-third pus, with some albumin. Prostate much enlarged	Complete three years ago	Very frequent	Collar enlargement size of walnut. Ureters dilated, admitting tip of finger	Removed in small fragments	Urine per ureth. on 9th day. Wound healed and natural micturition on Sept. 10th. At date is in very good health, not having required catheter since leaving hospital. Some turbidity of urine and increased frequency of micturition during last four months
14	Atkinson (4)...	British Med. Ass., 1889	Oct. 1887	66	Bladder distended above umbilicus. Urine, acid, dark chocolate, with clots. Right side of prostate feels enlarged per rectum.	Repeated retention for last five years	Difficult and always followed by bleeding. Of late every four hours without relief	Growth the size of cricket ball attached to right lobe	Enucleated in seven pieces—largest, an inch in diameter, smallest, size of a bean	Convalescence tedious owing to bronchitis and emphysema. Discharged Jan. 14th. Writes at date saying that he is completely cured, and that he feels nothing of his old complaint
15	Atkinson (5)	British Med. Ass., 1889	Dec. 1887	71	Symptoms for years. Bladder up to umbilicus. Urine, blood stained, the hæmorrhage persisting. Prostate per rectum greatly enlarged	Complete four days ago	Catheterism failed of late	Lateral lobes two inches in vertical diameter. Pedunculated nodule, size of marble, hanging over urethra from left	Pedunculated mass removed with scissors. Lateral enucleated (weight $\frac{1}{2}$ ounce)	Wound healed and natural micturition on Jan. 14th. Died from pneumonia Jan. 30th. Site of operation perfectly natural; no unhealed surface and no cicatricial contraction
16	Mayo Robson (6)	British Med. Ass., 1889	Dec. 1887	67	Symptoms many years. Hæmaturia and calculus for four. General condition bad. Micturition every half hour day and night. No enlargement felt per rectum	...	...	Projecting middle lobe. Uric acid calculus 322 grs.	Removed with scissors and forceps	Urine per ureth. on 9th day. Wound healed Jan 31st. Dischd. well



17	McGill (7)	...	British Med. Ass., 1889	Dec. 1887	62	Symptoms seven years. Acute cystitis three weeks. Urine ammoniacal, with copious purulent deposit	Complete three weeks	Auto-catheterism seven years	Collar, size of walnut, middle, size of pea, projecting into floor of urethra	Removed	Urine per ureth. on 10th day. Wound healed and natural micturition on Jan. 10th. At date, has never used a catheter; can empty bladder perfectly; no pain; passes urine three or four times daily. Urine free from mucus
18	Belfield	...	New York Med. Record, March, 1888 (op. cit. No. 45)	...	64	Two attacks of cystitis	Residual urine, two ounces	Dependent on catheter nearly two years	Median, size of hazel nut	...	Recovery of power of voluntary urination. Observed eleven months
19	Helferich	...	Münchenener Med. Woch., Feb. 1889	June, 1887	70	Twenty years' trouble. Bladder thick walled and covered with diphtheritic membrane and incrustations. Prostate per rectum considerably enlarged	...	For some months though not exclusively; soft one passes without much trouble	Prostate found hanging over the orifice	Scissors and cautery which was made to sink deeply in. Two drainage tubes. Catheter tied in. Bladder packed with iodoform gauze	Fistula still in November, healed later, after cauterisation. Urine evacuated voluntarily every two hours. Catheter can be passed with ease
20	Helferich	...	Proc. Cong. (17th) German Surgeons 1888	...	...	Hæmaturia	Complete	...	Enormous middle lobe	Resection of upper half of symphysis	Died on 8th day
21	Holmes	...	...	70	Calculus. Attempted perineal drainage without relief. Finger could not reach bladder	Complete	Complete	...	Large median mass	Cutaway piece-meal	Death in three weeks from exhaustion
22	McGill (8)	...	British Med. Association, Aug., 1889	Jan., 1888	67	General condition fairly good. Urinary symptoms four years. Urine acid. Prostate per rectum slightly enlarged	...	Three and a half years. Ten times in the twenty-four hours	Middle lobe size of filbert. Bladder thick. Cavity small and not distensible	Removed	Much suppuration. No healing. Persistent hiccup. Abscess in front of left thigh, Feb. 9th. Died Feb. 11th. Granular kidneys. Abscess in retro-pubic space. Prostate wound healed
23	McGill (9)	...	British Med. Association, Aug., 1889	Feb., 1888	73	Very feeble old man. Urine albuminous. Considerable hæmorrhage after catheter. Prostate per rectum much enlarged	Complete five years ago and frequently since	Coudé passed with difficulty. Required every three or four hours	Both lateral lobes much enlarged	Removed in seven pieces, largest two inches. Total weight, 2 oz. 30 grs.	Urine per ureth. on 8th day. Healed on 17th. Discharged March 6th. Death Jan. 1, 1889. Symptoms of cystitis three or four months before death. Became insane



No.	Operator.	Reference.	Date.	Age of Patient.	Condition of bladder—capacity, power, cystitis, calculus, etc.	Retention, complete or partial.	Catheterism.	Condition found.	Method adopted.	Result. Immediate and final.
24	Meinhardt Schmidt	Deutsche Zeit fur Chirurgie, Band 28	Feb., 1888	55	Bladder thick-walled. Urine purulent and ammoniacal. Several calculi	Complete	Three years off and on	Broad based lobe projecting into bladder. The mass at base left	Torn off and out	In March the catheter was stopped by prostate as before operation. Median cystostomy. Urethra dilated and divided, and female catheter tied in. Afterwards a soft one instead. In April, voluntary micturition began to return, and recovery was complete in August, 1890
25	McGill (10) ...	British Med. Ass., Aug., 1889	May, 1888	69	General condition good. Urinary symptoms thirty years. Passes urine 15—20 times in twenty-four hours	...	...	Prostate generally enlarged and very hard. Projecting middle lobe blocking urethra like a bar	Small piece the size of a pea removed with difficulty	Got up on 8th day. Urine per urethram on 22nd. Discharged June 28th, with wound almost healed. Passes urine three times during night
26	Mayo Robson (11)	British Med. Ass., Aug., 1889	June, 1888	63	Symptoms eight years. Much hæmaturia. Urine 1011, alkaline, no albumen. Fifty calculi	Complete on several occasions	...	Lateral lobes	A piece of each removed with scissors and forceps	Operation followed by cystitis. Urine per urethram on July 6th. Wound healed Aug. 6th. Sept. 1st, wound re-opened. Oct. 6th, discharged well. Patient at date writes that he is very well
27	McGill (12) ...	British Med. Ass., Aug., 1889	June, 1888	72	General condition bad. Symptoms two years. Passes urine thirty or forty times during the day, ten or twelve at night	...	...	Prostate very hard. Small projecting middle lobe	Piece, size of pea, removed with difficulty	Passed blood per rectum on two occasions after operation (required plugging once). July 11th wound healed, but symptoms not relieved, wound re-opened and a permanent fistula made (It is doubtful whether this should be included in the list. — McGill)
28	Jessop ...	British Med. Ass., Aug., 1889	July, 1888	73	Symptoms of calculus for twelve months. Severe hæmaturia. Prostate per rectum enlarged	..	...	Middle lobe. Thirteen calculi	Removed piecemeal	Urine per urethram on 14th day. Discharged well Sept. 11th. Three months later another calculus formed



29	Mayo Robson (14)	British Ass., 1889	Med. Aug.	Sept. 1888	62	Injury to perineum eight years ago. Increased frequency of micturition since (twenty times a night). End of catheter broken in bladder; median perineal section; relief for a time; then recurrence of symptoms. Bladder greatly distended	Complete	...	Middle lobe size of walnut. Lateral lobes enlarged	Removed in six portions weighing more than half an ounce	Intermittent hæmorrhage until Sept. 25th. Wound healed Oct. 19th. Some cystitis at date of discharge—Nov. 2nd. At date, still suffers from some vesical catarrh, but has not re- quired catheter
30	McGill (15) ..	British Ass., 1889	Med. Aug.	Oct. 1888	64	Symptoms fourteen years—very severe for last three. Micturi- tion seven or eight times every night. Urine foetid; catheter- isation without relief. General condition very bad with bron- chitis and emphysema	Complete one year ago	Catheter passed with much diffi- culty, many false passages	Lateral and middle	Three portions removed each the size of a bean. Con- siderable hæmorrhage	Died next day. Kidneys healthy. Bladder much hypertrophied, containing two or three ounces of blood clot
31	McGill (16) ...	British Ass., 1889	Med. Aug.	Nov. 1888	62	Symptoms four years. Extreme vesical irritability for last three weeks. Urine 1020, acid, no albumen. Enlarged prostate felt per rectum	Residual urine 9 oz.	Catheterisation for fifteen months	Middle lobe size of filbert	Removed with scissors	Bleeding for four days—clots re- moved by irrigation. Urine per ureth. on 14th day. Wound healed and micturition natural on Dec. 22nd. At date, urinary symptoms completely relieved
32	Teale (17) ...	British Ass., 1889	Med. Aug.	Nov. 1888	54	Symptoms four years. Hæma- turia three months ago. Gen- eral condition fairly good, but rapidly deteriorating	Complete for four days	Catheterisation necessary	Lateral lobes	Two pieces the size of a fil- bert removed with scissors and forceps. Considerable hæmorrhage	Hæmorrhage continued until death eighteen hours after operation
33	McGill (18) ...	British Ass., 1889	Med. Aug.	Dec. 1888	73	Symptoms ten years. Urine very thick and bloody. Urina- tion every hour day and night for nine months. General condition very bad	Complete many times	...	Surrounding urethra at sides and be- low. Two large calculi	Two ounces forty grains of prostate removed. Hæmorrhage trifling	Died thirty hours later. Left kidney normal. R. many spots of commencing suppurative neph- ritis. Bladder much thickened. Considerable ecchymosis and abrasion of muc. memb. of rectum
34	Jessop (19) ...	British Ass., 1889	Med. Aug.	Dec. 1888	73	Symptoms seven years. Worse for last three. Micturition often two or three times in the hour. Urine 1013; pus and a little albumen. Calculus felt. No enlargement per rectum	...	..	Middle lobe projecting over urethra	Removed with forceps. Blad- der coated with phos- phates	Wound suppurated freely and be- came coated with phosphates. Healed March 2nd. Urine passed naturally but much ves- ical irritability. No improve- ment up to date



No.	Operator.	Reference.	Age.	Age of Patient.	Condition of bladder—capacity, power, cystitis, calculus, etc.	Retention, complete or partial.	Catheterism.	Condition found.	Method adopted.	Result. Immediate and final.
35	Jessop (20) ...	British Med. Ass., Aug. 1889	Dec. 1888	68	Symptoms six years; much worse last year. Cannot hold urine more than an hour and a half. Urine 1016, acid; a little albumen	...	Catheterisation difficult and very painful. Patient losing ground	Middle and lateral	Middle removed with forceps. Lateral enucleated	Passed urine per ureth. on 9th. day. Wound healed and micturition natural on Jan. 22nd. Has continued quite well since the operation
36	Watson ...	Boston Med. and Surg. Journal, March, 1889	...	69	Bladder large. Profuse hæmaturia on several occasions, latterly every two months, sometimes distending bladder with coagula	Retention ten years, and five years before	For five years	Two lateral portions the size of Spanish chestnuts projecting into bladder, median lobe perforated and covered with granulations	Lateral portions divided with bistoury and removed with wire; median with scissors and curette. Wound left open	Hæmorrhage slight. Healed on 16th day. Up on 18th. Patient regained strength but did not recover power of voluntary urination
37	Watson ...	"Operative Treatment of the Hypertrophied Prostrate"	...	80	Urinary symptoms for ten years. Palliative treatment failed to relieve cystitis. Bladder of good size	Four months	Very frequent and painful. False passages	Large crescentic median growth	Partial removal. Wounds left open. Double drainage tubes	Died on 4th day with sudden rise of temp. (106° F.) and coma. Death from acute irritative urinary fever. No suppuration or septic process. Kidneys continued to secrete up to death
38	Belfield ...	American Journal of Med. Sciences 1890 (No. 46)	...	63	...	Acute retention on three occasions	Catheter used irregularly and with difficulty for several years. Dependent upon catheter for two years	Growths in shape of horse-shoe	Excision	Urination easy. No appreciable residual urine. Observed for eight months
39	Belfield ...	American Journal of Med. Sciences 1890 (No. 47)	...	69	...	...	...	Median and lateral	Excision of lateral. Enucleation of median	No return of symptoms. Residual urine one ounce. Observed for six months
40	Kümmell ...	Centralblatt für Chirurgie, 1889	...	73	...	Complete on many occasions for four years	...	Median growth size of a pea	Paquelin's cautery. Bladder sutured. Catheter left in	Some weeks in healing. Voluntary control regained. Died from pneumonia three months later. No sign of return of growth



41	Kümmell	...	Centralblatt für Chirurgie, 1889	...	68	...	Complete for a long time	...	Middle lobe size of end of thumb	Cautery. Bladder sutured. Catheter tied in	Healed in fourteen days. Paralysis of detrusor urine, which gradually disappeared under strychnia, &c., until patient could retain and evacuate urine at will
42	Kümmell	...	Centralblatt für Chirurgie, 1889	...	71	Urine alkaline and highly albuminous	...	One year. Up ten or twelve times every night	Enlargement of left lobe	...	Recovery very slow owing to an attack of pneumonia. Fistula closed at last. Could retain urine for three hours during the day—two and a half at night Died in ten days of pneumonia
43	Kümmell	...	Centralblatt für Chirurgie, 1889	...	69	Urine alkaline	Complete	...	Projection into bladder the size of a walnut	Cautery	
44	Kümmell	...	Centralblatt für Chirurgie, 1889	...	...	...	...	...	Horse-shoe shaped collar round orifice ...	...	Spontaneous micturition became possible. Died six weeks later of cystitis and pyelonephritis
45	Atkinson (21)	Jan., 1889	British Med. Ass., Aug., 1889	Jan., 1889	68	Has lately micturated twenty or thirty times during the night and oftener during the day	Complete. Four pints drawn off	...	...	Scissors	Urine per urethra on 19th. Discharged Feb. 1st, passing urine naturally. Much relieved since operation. Passes urine eight or nine times in twenty- four hours. Some inflammation around wound, leaving a small sinus leading down to bladder
46	McGill (22)	June, 1889	British Med. Ass., Aug., 1889	June, 1889	75	Ordinary prostatic symptoms five years. Incontinence for some months. Trace of albumen. Very feeble old man	Admitted with reten- tion	Catheter passed with difficulty	Two enlarged lateral lobes each size of small walnut	Enucleated. Threesutures fastening bladder to abdominal wall below and at sides	Got up on fourth day. Progressing favourably at date. (Discharged with sinus above pubes—Mr. Moynihan)
47	Atkinson (23)	July, 1889	British Med. Ass., Aug., 1889	July, 1889	70	General condition good. Urine acid, 1015, a little pus and a trace of albumen. Calculus. Five years ago eleven calculi removed by Mr. Atkinson by lateral lithotomy. For last year recurrence of symptoms and frequent nocturnal micturition	...	...	Prostatic enlargement collar like in shape and position. Two calculi	Two pieces of prostate weighing two drachms re- moved	Passed urine per ureth. on 9th day. Doing well at date
48	Atkinson (24)	Aug., 1889	British Med. Ass., Aug., 1889	Aug., 1889	55	Small perineal fistula from old lithotomy. Cystitis and calculi	None	None	Enlarged nipple-like middle lobe	...	In four weeks all urine came by urethra

No.	Operator.	Reference.	Date.	Age of Patient.	Condition of bladder—capacity, power, cystitis, calculus, etc.	Retention, complete or partial.	Catheterism.	Condition found.	Method adopted.	Result. Immediate and Final.
49	Atkinson	This and the following eight cases were sent to me by Mr. Moynihan, the Resident Med. Officer at the Leeds Infirmary, by permission of the Staff	Aug., 1889	70	Urinating frequently. Six or seven times during night. Stream dribbling and not improved by straining. Two large calculi	None	None	...	Two pieces, $\frac{3}{4}$ by $1\frac{1}{2}$ inch, removed	Passes urine without much difficulty about eight times daily. (Later.—Passes urine normally every four hours night and day)
50	McGill	...	Aug., 1889	70	Dribbling stream for some time. Residual urine $\bar{\text{ij}}$ .	Complete on admission	Six months	Uniform enlargement	...	Passed urine easily when discharged
51	McGill	...	Aug., 1889	58	Urinating frequently. Residual urine $\bar{\text{xiv}}$ .	Complete for three weeks	Three weeks	Enlarged middle lobe	...	Passes urine freely and without pain
52	Atkinson	...	Sept., 1889	69	Stream had for some time been dribbling. Not improved by straining. Hæmaturia, but only since catheterism	Complete three days	Three days	Enlarged middle lobe	Two large pieces weighing $\bar{\text{ij}}$ . enucleated	In twenty-four hours no difficulty
53	McGill	...	Oct., 1889	64	Dribbling stream for some time. Residuum $\bar{\text{iv}}$ .	None	None	Enlarged middle lobe	...	Died two days after operation
54	McGill	...	Oct., 1889	68	Urinating frequently. Residuum $\bar{\text{iv}}$ .	None	None	Enlargement of R. lateral lobe	...	Relieved
55	McGill	...	Nov., 1889	60	Difficulty in micturition for a few years. Cystitis	Admitted with retention	Three months	Middle and left lateral enlarged	...	Passes urine thrice daily without pain
56	McGill	...	Dec., 1889	56	Urinating frequently. Residual urine $\bar{\text{viii}}$ . Cystitis and calculus	...	Three years	Enlarged middle lobe	...	Death on 5th day. Had bronchitis previous to operation. Aggravated attack subsequently
57	McGill	...	Dec., 1889	75	Has passed urine in small quantities, and more frequently than normal for fourteen years. Slight cystitis	Admitted with retention	For last thirteen years	Middle and lateral lobes enlarged	...	Passes urine easily



58	Bangs	...	New York Med. Journal June, 1889	..	59	Retention on one occasion 34 years before. No return. Frequent urination several years, for the last two—every two hours. Cystitis and calculus. No enlargement per rectum	...	Three months. No urine voluntarily. Intense pain	Three small sessile growths ap- parently of hypertrophied muc. memb., projecting so that when folded to- gether they would oc- clude urethra as a valve	Scissors and sharp spoon. Cautery	Drainage tube down to bladder : wound packed with iodoform gauze. Severe tenesmus. Tube removed on 5th day. Urine per urethram on 11th. Up on 13th. Not yet regained normal urina- tion, but passes a few drachms spontaneously
59	Willy Meyer	New York Med- ical Record, March, 1891	1889	58	Puncture supra pubes performed first	Complete	...	...	Median and la- teral	Median re- moved. Blad- der drained.	Wound left open. Healthy and comfortable up to date
60	Bennett May	British Med. Jour., Oct., 1889	Mar., 1889	69	Cystitis ; phosphatic calculi. Median cystotomy with re- lief. Supra-pubic drainage, with temporary relief after- wards, but tube soon became intolerable	...	...	...	Collar very large	Scissors and pile forceps so as to make a deep in- dent in front and behind	Spontaneous micturition on 23rd day, the first time for two years. Can hold urine for six or seven hours during night and three or four during day
61	Buckston Browne	Clinical Soc., May, 1889	Mar., 1889	87	Hæmaturia ; intense vesical spasm. Sounded for calculus on several occasions	Four years	Four years. Every hour of late, day and night	Enormous prostatic out- growth from right side of orifice, not pedunculated	Twisted away piecemeal by finger and forceps. Four ounces in all	Twisted away piecemeal by finger and forceps. Four ounces in all	Sat up on sixteenth day. Fitted with supra-pubic plate and tube. Catheter passes easily. Nine weeks after patient able to dress and walk about
62	Lane...	Lancet, April 27th, 1889	...	72	First trouble a fortnight before. Inability to pass urine ; great straining ; bladder enormous with thickened walls. Hæma- turia very profuse	Complete	One week. No difficulty	Middle, size of tangerine orange ; not constricted at base, whole gland en- larged. Many sacculi	Enucleation failed. Ectra- seur. Slight hæmorrhage. Soft catheter as syphon	Enucleation failed. Ectra- seur. Slight hæmorrhage. Soft catheter as syphon	Did well at first. Then died on 11th day from purulent bron- chitis, from which he had always suffered
63	Guyon	Vignard, "De la prostatec- tomie"	July, 1889	67	Four years' trouble. Two years before treated by tying in catheter. Power of bladder fair. Able to eject water nine inches, but power of voluntary micturition almost lost	Complete two years before	Difficult, es- pecially of late. A little bleeding as catheter en- tered bladder	Enlarged left lobe and bar connecting lateral lobes. This was found by trial to be the ob- stacle to cath- eterism	Enlarged lobe in part, and bar divided with cautery. Catheter en- tered easily, tied in for three days	Enlarged lobe in part, and bar divided with cautery. Catheter en- tered easily, tied in for three days	Wound healed on 25th day. Soft catheter entered easily on 15th day. It was passed several times a day, but after a few days the entrance to the bladder be- came obstructed, as if the bar had grown up again. Guyon believes Harrison's tube would have been beneficial



No.	Operator.	Reference.	Date.	Age of Patient.	Condition of bladder—capacity, power, cystitis, calculus, etc.	Retention, complete or partial.	Catheterism.	Condition found.	Method adopted.	Result. Immediate and final.
76	Belfield	Int. Journal of Med. Science Nov., 1890, (op. cit. 132)	...	49	...	...	A year—very painful and difficult	Mass, size of walnut, springing from left lobe. Small mass in floor, obstructing catheter	Enucleated Boutonnière. Operation as well, and tumour detached into bladder by pressure	Voluntary and complete evacuation restored. Observed four months
77	Keyes	New York Med. Record, Oct. 1891	Sept., 1890	65	Atony. Urination every two hours, day and night. Blood. Albumen and casts. Calculus	...	...	Lateral lobes enlarged and hard	Small projection snipped off. Enucleation even with scissors not possible	Sept., 1891.—Voluntary urination without pain. Atony and five ounces residual urine still
78	Trendelenberg	Beiträge z. Klin. Chir., Tübingen, 1891	Nov., 1890	...	Always difficulty. Strangury eight months. Atony; hæmaturia, retention, and relief with palliative treatment; relapsed	Three days complete	...	Middle, size of walnut	Scissors—little bleeding. Partial suture and drainage	Drain removed in fourteen days and voluntary urination returned at once. March, 1891.—Urination five or six times a day; once or twice at night. Bladder empties itself; a little cystitis
79	Eigenbrodt	Beiträge z. Klin. Chir., Tübingen, 1891	Nov., 1890	...	Trouble eight years. Urine acid, purulent, with slight cystitis. Silver catheter hitches, then slips in. Prostate per rectum normal	...	Every half hour for two years	Fold of bladder wall found with a series of lower folds behind. Prostate normal	Fold divided. Partial suture and drainage	Drain removed on fourteenth day, when urine came per urethram. Convalescence delayed by hernia. Urination voluntary every two to three hours. Urine alkaline and turbid. Residuum 100 c.c.
80	Haslam	Privately communicated	Feb., 1891	70	Calculi (573 grains). Urine depositing phosphates largely. Supra-pubic lithotomy in May, 1890. Recurrence of calculus. Supra-pubic operation again. 190 grains removed	...	...	General collar enlargement. Saccule of bladder on right side	Scissors. Piece as large as end joint of thumb	Wound healed in four weeks. Symptoms returned July 24th. Old wound opened again and 145 grains of phosphatic debris removed. Stood operation very well, but the removal of prostate did not seem to benefit
81	Keyes	New York Med. Record, Oct., 1891	Mar., 1891	70	Urine clear. Urethra had been divulsed a year before without benefit. Small third lobe seen with cystoscope	Complete	Can only pass urine by catheter. Great pain	Median	Pinched off with rongeur	Total suppression, from which patient never rallied. Previous division had had no ill effect



82	Keyes	...	New York Med. Record, Oct., 1891	April, 1891	66	Atony. Eight ounces of residual urine	...	Not dependent on catheter or relieved by it	Third lobe and collar	Ecraseur. Collar snipped away. 249 grains shelled out	Up in three weeks. Sept., 1891.—Bladder emptied with full stream every three or four hours. Atony gone
83	Keyes	...	New York Med. Record, Oct., 1891	July, 1891	59	Blood, albumen, casts and calculus	...	Relies on catheter hourly	Third lobe as big as last joint of thumb	Snare. Deep piece cut out from base as well	Given up catheter. Full stream. Urination every five hours. Has gained 50 lbs. weight
84	Keyes	...	New York Med. Record, Oct., 1891	July, 1891	66	Complete atony. Urine putrid, containing blood and casts, calculi	...	Six years	Third lobe and a bar	307 grains removed	Life saved, but no note as to urination
85	Keyes	...	New York Med. Record, Oct., 1891	Aug., 1891	65	Calculus	Habitual retention	Every two hours night and day	Conical third lobe and horse collar enlargement	Scissors and rongeur. Half right lobe torn away. 116 grains	Wound not quite closed. Catheter not known. Oct. 25th.—Can empty bladder entirely
86	Keyes	...	New York Med. Record, Oct., 1891	Aug., 1891	60	Calculus	...	Every two hours	Bar with bulging lateral lobes forming a collar ...	63 grains moved	Oct. 25th.—Can empty bladder completely
87	Keyes	...	New York Med. Record, Oct., 1891	Sept., 1891	61	Calculus	...	Eight years with constant pain	...	130 grains removed	Died on fifteenth day
88	Weir	...	New York Med. Record, March, 1891	..	57	End of catheter known to be inside bladder	...	Seven years	Median enlargement	Curved scissors. Considerable ooze.	In four weeks' time the wound had closed. Catheter not required. Residual urine 5ij.
89	Morgan	...	Privately communicated	July, 1891	65	Cystitis. Alkaline urine depositing phosphates. Relapsed several times. Straining during micturition increases the flow	Complete several times	...	Ring of dense tissue round vesical orifice	Incised on both sides, and portions with part of median removed. Little bleeding.	Urine per urethram on third day. Wound healed in ten weeks. Convalescence very slow. Wound broke down afterwards and left fistula, which healed Dec. 18th. Micturition very frequent
90	Southam	...	Privately communicated	May, 1891	49	No enlargement to be felt per rectum. One calculus	Complete two and a half years	Every two or three hours	Collar enlargement	Drainage Scissors. Vertical section of gland below	Wound healed in ninth week. Regaining power, but catheter still required to empty bladder. Can pass urine voluntarily but not completely



No.	Operator.	Reference.	Date.	Age of Patient.	Condition of bladder—capacity, power, cystitis, calculus, etc.	Retention, complete or partial.	Catheterism.	Condition found.	Method adopted.	Result. Immediate and final.
91	Southam ...	Brit. Med. Journ., Dec., 1891	Oct., 1891	63	Three calculi	Complete two years	...	General intra-vesical enlargement. Collar round orifice, with number of polypoid out-growths the size of hazel nuts	Scissors	Wound healed at end of fourth week. Still requires catheter (January, 1892), but is regaining power of expulsion
92	Mayo Robson	Privately communicated	Aug., 1891	61	Feeble power. Cystitis. Residual urine, 10 oz. No calculus	Yes	Eleven years since catheter first required. Six months' regular but easy catheterism	Pedunculated middle lobe size of walnut, and smaller growth from left side of orifice, blocking it	Scissors	A month afterwards was passing urine by urethra without pain. Three months after, frequency and difficulty of micturition returned; catheter used again. On sounding, soft calculous material felt. Bladder re-opened above pubes and drained again. Three phosphatic calculi removed
93	Mayo Robson	Privately communicated	Jan., 1892	61	Six months' difficulty in micturition. No power for last month. Capacity twenty ounces	Retention one month	Catheterism one month	Collar round orifice	Wedge-shaped piece removed with scissors and forceps	Recovery rapid. Began to pass urine per urethram within a week of operation
94	Wishard ...	Belfield (op. cit. 133)	...	74	Perineal prostatectomy two weeks before—failed to remove sufficient	...	Several years. Now almost impossible	Pear-shaped mass overhanging orifice	Excised	One month later the wounds had closed and the patient was emptying bladder voluntarily and completely
95	Swinford Edwards	Privately communicated	1891	51	Urinary trouble two years. Micturition every half-hour during day, every hour at night. No stream—urine flowing away. Urine turbid, acid, sp. gr. 1018. Mucopus; faint trace of blood. Residual—iv. 3s.	...	...	Large middle lobe, with broad base, pressing on and partly occluding orifice	Scissors. Large drain inserted	Died in three weeks. No rise of temperature. Gradually became weaker and feebler. P.M.—Old cystitis with recent acute attack. Ureters not dilated. Kidneys slightly granular and congested. Small quantity of pus in pelvis of left



# *List of Cases of Perineal Operations upon the Prostate.*

## *I. Prostatotomy.*

No.	Name.	Reference.	Date.	Age	General condition and complications.	Retention.	Condition found.	Method.	Final Result.
1	Harrison ...	Copenhagen Congress	1883	68	General condition very feeble. Atony of bladder	Catheterism very difficult and attended with hæmorrhage	Thick bar of prostatic tissue	Divided. Drained for eight weeks	Upon tenth day. Wound closed as soon as drain removed. No difficulty in micturition or in passing catheter. Bladder recovered power. Could hold urine four hours. No residuum. Died of hæmiplegia in six months
2	Harrison ...	Lettsoman Lectures	1883	63	Tenesmus very severe. Sleep without leaving in catheter impossible. Cystitis	...	Nipple-like projection at orifice	Lateral incision in prostate. Drained four weeks	Very small fistula persisted. Two years after operation had recovered completely
3	Harrison ...	Lectures on Surgical Disorders of Urinary Organs	1884	74	Three weeks' palliative treatment without benefit	Constant need, owing to retention. Difficult and often causing bleeding	...	Drained seven weeks	Fifteen months later catheter entered without difficulty. Had not required one since operation
4	Schmidt Meinhardt	Deut. Zeit. für Chirurgie, Band 28	Feb., 1888	55	Bladder thick walled. Urine purulent and ammoniacal. Several calculi. Supra-pubic prostatectomy already, without benefit	Complete retention with catheterism, off and on, for three years	Firm growth in urethra	Urethra divided and dilated. Female catheter tied in at first, afterwards a Nélaton	In March catheter arrested as before operation. In April voluntary micturition began to return. Complete recovery and well in August, 1890. (No. 24 of supra-pubic cases).
5	Belfield ...	Watson's Operative Treatment of hypertrophied prostate. Journal of American Med. Ass., 1886	1885	59	Chronic cystitis for fifteen years. Urination frequent and painful. Failure of palliative treatment	Repeated retention	...	Drainage for two weeks, then prostatectomy with galvanocautery through wound	Entire relief from urinary symptoms. Residual urine falling from 8 oz. to 1 oz. Death six months after from uræmia

No.	Name.	Reference.	Date.	Age	General condition and complications.	Retention.	Condition found.	Method.	Final Result.
6	Belfield	Watson's Operative Treatment of hypertrophied prostate. Journal of American Med. Ass., 1886	1885	68	General condition very bad: cystitis seven years	...	...	Drainage for two weeks; then prostaticotomy with galvano-cautery through wound, but not completed	Urinary symptoms mitigated during life. Death from general exhaustion
7	Cabot	Watson's Operative Treatment of hypertrophied prostate. Boston Med. and Surg. Journal 1887	...	60	Calculus. Painful urinary symptoms for several years	Catheterisation once an hour	...	Prostaticotomy. Drainage for four weeks	Normal function of bladder almost restored. Cystitis returned later owing to neglect
8	Cabot	Watson's Operative Treatment of hypertrophied prostate. Boston Med. and Surg. Journal 1887	...	62	Cystitis for five years. Failure of palliative treatment	...	...	Prostaticotomy. Drainage for two weeks	Partial incontinence for some months. Recovery: no return of urinary symptoms, but persistence of residual urine. Eighteen months' observation
9	Gouley	American Surg. Ass., 1885	...	...	...	...	...	...	Recovery
10	Gouley	...	...	...	Bladder symptoms five years. Hematuria. Cystitis. Urine foetid and purulent. Per rectum very large bilateral hypertrophy	...	Small median enlargement. Perineal distance four inches	Division of bar. Drained for eight weeks	Cessation of pain and hematuria. Bladder only capable of holding two ounces. Voluntary urination not restored. Catheterisation only required every three hours. Capacity of bladder increased to five ounces
11	Watson	Oper. of Hyp. Prostate	...	74	...	Catheterisation necessary one year. For last six months every half-hour	...	...	...



12	Chismore (San Francisco.)	Privately communicated	July, 1889	66	Perineal section for acute retention one year previously. Catheter still required at irregular intervals. No cystitis	Complete retention	...	Prostatotomy	Voluntary urination returned. Residual urine—half an ounce. Occasional trouble. Well at date (April, 1892)
13	Wishard	Belfield, Amer. Journ. of Med. Science, Nov., 1890	...	63	...	Catheterisation necessary	...	Bar divided	Recovery of voluntary urination
14	Wishard	Belfield, Amer. Journ. of Med. Science, Nov., 1890	...	80	...	Catheterisation necessary	...	Bar divided	Died of uræmia on third day
15	Wishard	Belfield, Amer. Journ. of Med. Science, Nov., 1890	...	70	...	Necessary	...	Prostatic ring divided	Recovery of voluntary urination
16	Watson	Belfield, Amer. Journ. of Med. Science, Nov., 1890	...	68	...	Dependent upon catheter two years	Prominent median bar	Incised to base	Recovered, but did not regain voluntary power. Observed four months
17	Hutchison (Brooklyn)	Belfield, Amer. Journ. of Med. Science, Nov., 1890; New man, Proc. Ninth Int. Med. Congress	...	66	...	Catheter required for last three years	...	..	Recovery. No definite statement as to urination
18	Briggs (St. Louis)	Belfield, Amer. Journ. of Med. Science, Nov., 1890; New man, Proc. Ninth Int. Med. Congress	...	72	...	Catheterisation necessary	...	Prostatotomy	Recovery, but tube worn permanently
19	Chismore	Privately communicated	Dec., 1889	...	Median cystostomy for encysted calculus. Chronic cystitis. Prostate divided. Stone not extracted. Suprapubic operation eight days later	Catheterisation habitual	Size of an orange	Divided. Drained for four weeks	Catheter still necessary

No.	Name.	Reference.	Date.	Age	General condition and complications.	Retention.	Condition found.	Method.	Final Result.
20	Chismore ...	Privately communicated	Oct., 1889	65	Lithotomy three years before. Relapse. Median lith. without relief. Supra-pubic cystotomy in March, 1890, when the prostate was found to have been divided in the median operation. Mass not removed	...	...	Prostatotomy	Catheter still necessary, but can be introduced without pain or difficulty
21	Chismore ...	Privately communicated	Feb., 1888	70	Litholapaxy. Median perineal section also	Catheter had been required several years	Enormously enlarged	Prostatotomy. Drainage four weeks	No benefit, except that catheter passes more easily and with less pain. Supra-pubic operation performed in July, 1890—with fatal suppression
22	Abner Post ...	Boston Med. and Surg. Journal, April, 1891	...	42	Ever since twenty-one, when he met with an accident, has had to strain in passing water. For ten years only able to urinate after lifting perineum and rubbing urethra. Rises 5—11 times every night. Cystitis	Catheterisation very difficult	...	Divided through perineum with knife, and then torn with sinus dilator. Intensely hard. Drainage four weeks	Urine can be projected in a stream. Rises once at night. Two years without any return
23	Mansell Moullin	...	June, 1890	42	Cystitis for some months. History of gravel. Stream through catheter very feeble, rising and falling with respiration. Bladder washed out four months without benefit.	Voluntary micturition impossible for some months. Stream stops as soon as the first few drops pass	Enlarged median portion	Divided and drained nine days	Cystitis cured. Voluntary micturition regained. Residual urine 12 c.c. on discharge
24	Mansell Moullin	...	Feb., 1892	59	Impermeable stricture. Wheel-house's operation. Severe cystitis	...	Enlarged median portion	Divided and drained	Cystitis much improved. Fistula not closed yet



## 2. Prostatectomy.

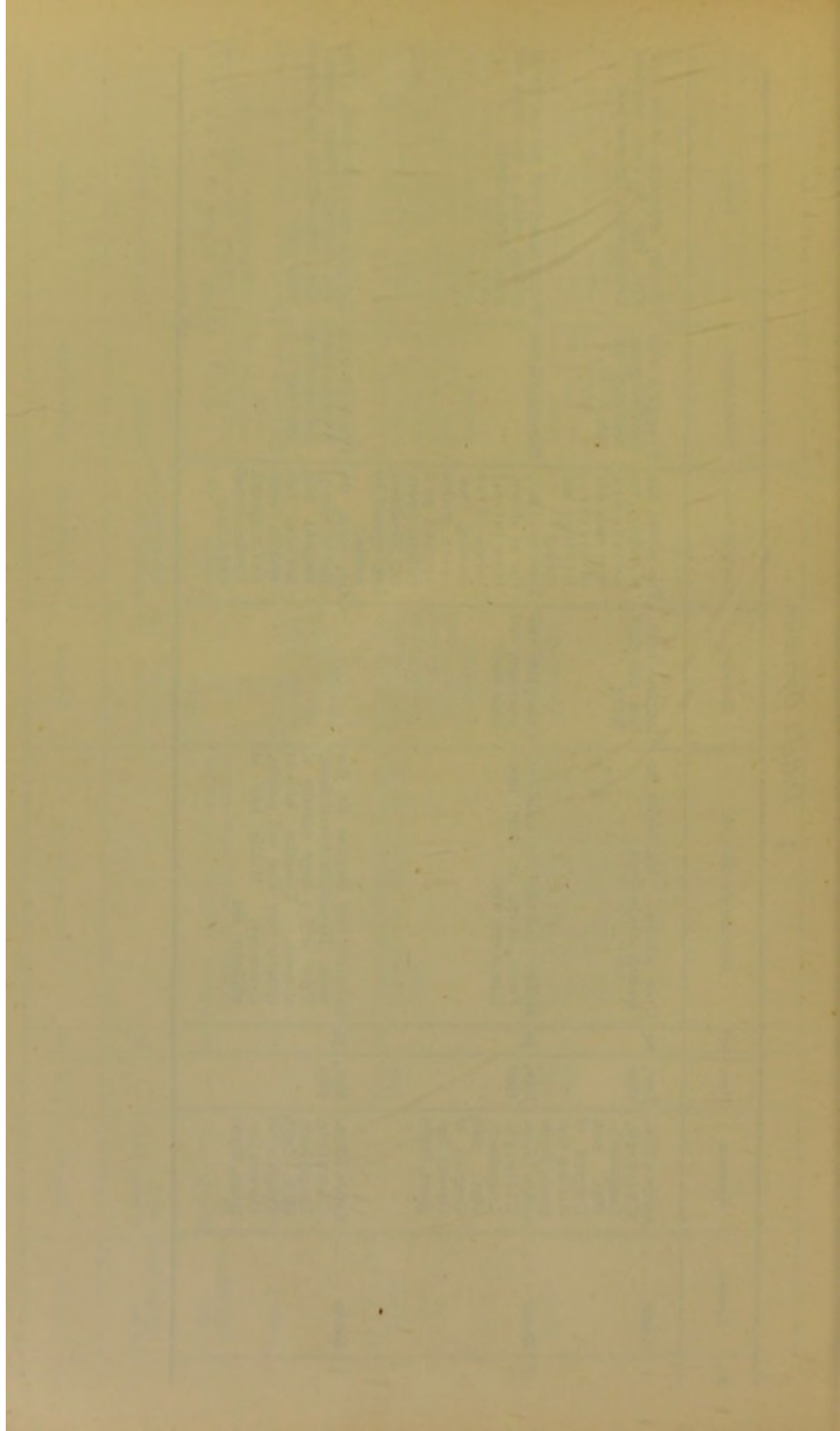
No.	Operator.	Reference.	Date.	Age	Condition of Bladder.	Retention.	Condition found.	Method adopted.	Result.
1	Keyes	New York Med. Record, Oct., 1891	Feb., 1883	65	Incessant dribbling. exceedingly painful	Urination	Catheter employed day and night without relief	Outstanding portion of right lobe as large as end of thumb	Twisted off Relieved, not cured. Intervals prolonged to three or four hours. Urination voluntary, but bladder does not empty itself
2	Keyes	New York Med. Record, Oct., 1891	June, 1891	66	Recurrent hæmaturia. dual urine	Little residual urine	...	Prostatic bar and projecting third lobe	V-shaped piece excised, and third lobe twisted off Health and strength excellent (Sept. 1891). Urination free. No hæmaturia
3	Gouley	American Surg. Ass., 1885	...	...	...	...	...	...	Amelioration of urinary symptoms
4	Gouley	American Surg. Ass., 1885. Watson (op. cit.).	...	...	...	...	...	...	Amelioration of urinary symptoms
5	Harrison	Lect. on Surg. Disorders of Urinary Organs	...	...	Profuse hæmaturia for seven days in consequence of perforation of prostate by catheter	...	Middle lobe perforated at base and gangrenous	Came away easily	Petticoated drainage tube. No further hæmorrhage and no return of urinary troubles. Died two years later
6	Harrison	Watson (op. cit.)	...	80	Frequent and painful urination. Hæmaturia	...	A tumour of the median portion	Removed by forceps	Cessation of hæmaturia and great relief to urinary symptoms. Persistence of fistula
7	Harrison	Watson (op. cit.)	...	...	...	Complete retention	...	...	Permanent relief to urinary symptoms
8	Norton	Privately communicated	...	...	...	Complete retention	...	Central line of middle lobe gouged out with a prostatectotome	Complete cure
9	Norton	Privately communicated	...	...	...	Complete retention	...	Central line of middle lobe gouged out with a prostatectotome	Cured, but to completely empty bladder must lie on back

No.	Operator.	Reference.	Date.	Age	Condition of Bladder.	Retention.	Condition found.	Method adopted.	Result.
10	Dunn (Minneapolis)	Belfield (op. cit.)	...	45	...	Completely de- pendent on catheter for four years ...	Sessile, median, size of hazel nut	Excised	Quite well ten months later
11	Pilcher (Brooklyn)	Belfield (op. cit.)	...	63	Perineal cystotomy by another surgeon six weeks before without relief	...	Tumour right lobe	R e m o v e d through bila- teral lithotomy wound	Died on 10th day. Ascribed to iodoform poisoning: symptoms suggest uremia. No autopsy
12	Wishard ...	Belfield (op. cit., 133)	...	74	...	Catheterism several years. Now almost impossible	Tumour project- ing from anterior wall of urethra	Removed in part, the vesical portion being out of reach. Drained	Supra-pubic cystotomy two weeks later, and removal of pear-shaped tumour obstructing urethra (No. 94 of supra-pubic cases)
13	M a n s e l l Moullin	...	Feb., 1891	70	Frequent micturition for some time. Prostate per rectum much en- larged	Partial retention three weeks. Complete for ten days. No urine passed except by catheter	Enlarged median and left lateral lobes	E x c i s e d b y means of a snare. Base d i v i d e d . B l a d d e r drained	Shock very severe and considerable oozing. Patient delirious for some days. Perineal wound healed in three weeks. Bladder slowly regained power, and at time of discharge (six weeks from opera- tion) only $\frac{1}{2}$ ss. of residual urine, but micturition still every two hours
14	M a n s e l l Moullin	...	Jan. 12th, 1892	66	Stricture. False passages. Urine 1010, alkaline, with pus, blood and albumen. General condition very bad. Patient delirious at times from incipient uremia. Prostate much enlarged	Catheterisation very difficult	Lateral lobes with large bar connecting them	Bar divided and lateral lobes enucleated with a Volkmann's spoon and for- ceps. Bladder drained	Respiration ceased after operation. Partial suppression of urine. Great improvement after injections of digitalin. Delirium ceased and strength regained a little, but hæmorrhage (3ii.) occurred on Feb. 2nd, and again (3iv.) on March 15th, and patient died next day. P.M.—Sloughy cavity in place of prostate, which was almost completely removed. Old interstitial nephritis. A little suppurative pyelonephritis. Amy- loid liver, and an old encysted empyema



### 3. Dittel's Operation.

No.	Operator.	Reference.	Date.	Age	Condition of Bladder, etc.	Retention.	Condition found.	Method adopted.	Result.
1	Kuster	Archiv. f. Klin. Chirurgie, Langenbeck, 1891. 20th Congress of German Surgeons, Berlin	June, 1890	64	Urine alkaline. Micturition frequently only in drops	Complete retention two days before	Two masses, size of a cherry, removed, one from each side of urethra. Urethra not opened	Plugged with iodoform gauze. Secondary suture	Voluntary micturition in ten days. Feb., 1891. No more retention. Urination free, but some pain
2	Kuster	Archiv. f. Klin. Chirurgie, Langenbeck, 1891. 20th Congress of German Surgeons, Berlin	June, 1890	50	Bladder distended to umbilicus. Faeces escape at same time. Stream very weak	Complete two years ago, and often since	Three masses, size of cherry, from lateral lobes. Free bleeding. Prostatic urethra opened and catheter inserted. Membranous opened by accident	Secondary suture	Wound healed well, but small fistula through which a few drops still come. (Feb., 1891)
3	Kuster	Archiv. f. Klin. Chirurgie, Langenbeck, 1891. 20th Congress of German Surgeons, Berlin	Mar., 1891	54	Urination very frequent for five years. Hematuria several times. Urine acid; large quantity of albumen. Urination without catheter very slow and painful. Cystoscopy. Middle lobe of moderate size	...	One mass, the size of cherry, removed from left lobe. Left vesicula seminalis opened. Urethra opened and sutured	Plugged with iodoform gauze and sutured on third day	Urination much less painful. Fifty c.c. residual. Fistula persists. Oct., 1891.—Writes that he has no more pain





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## POSTSCRIPT

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Since the above was written I have received from several friends an account of some other cases, most of which have not yet been published, which serve to illustrate in some important particulars the conclusions I have put forward in the preceding lectures. Mr. Jordan Lloyd, of Birmingham, writes to me that he has performed the supra-pubic operation on five patients, of whom three made a rapid recovery; one got well with a sinus over the pubes, which still persists (three years after the operation), and one died. In this case there was a central nodule of great size with enormous general enlargement, the mass removed filling a six ounce bottle; hiccough set in on the eighth day, and the patient sank from exhaustion ten days later. Mr. Bruce Clarke has informed me of four cases under his care, all successful; and of one other in which death occurred from pneumonia a month after the operation, when the supra-pubic wound was almost closed. And Dr. Wishard, of Indianapolis, has very kindly sent me a most valuable paper on the "Surgery of the Prostate," reprinted from the *Journal of Urinary and Cutaneous Diseases*, and containing a full account, not only of the cases tabulated in the statistics, but of several others in which he has divided or removed more or less of the prostate through the perineum.

Dr. Wishard, who gives the preference to the perineal operation on account of its greater safety in all cases in which there is not a large rectal tumour, has operated fourteen times in all upon thirteen patients. In two the double operation was performed, the supra-pubic and the perineal. One of these was Case No. 12 of the perineal prostatectomies, and Case No. 94 of the supra-pubic list; the other died within thirty-six hours, apparently from shock, never having rallied—a result which Dr. Wishard is inclined to attribute to the rectal distension with a six ounce bag, as in two other cases in which he performed



supra-pubic cystotomy for other causes the same symptoms followed the distension, though fortunately not with the same result.

The twelve other operations were performed through the perineum alone. Of these, the three first are referred to already, upon Belfield's authority, in the table of perineal prostatectomies; one (No. 14), 80 years of age, died on the third day from uræmia; the other two (Nos. 13 and 15), in which long continued drainage had been employed, recovered and regained power over their bladders in a very satisfactory manner. Of the rest, one, 68 years of age, died five weeks later from uræmia, the bladder never having recovered, although the whole of the obstruction was removed; another, 71 years of age, whose general condition was very bad, died from the same cause in ten days; and a third from suppurative pyelonephritis three months and a-half after a second operation. In this case perineal lithotomy had already been performed, with relief; thirteen months later it was repeated, and the galvano-cautery was applied to the neck of the bladder through a small speculum introduced into the wound, with a view of burning off as much of the growth as could be reached, and of effecting some permanent contraction by making perforations in the rest. Then again, a few months later, as the benefit was only transitory and calculi had re-formed, an attempt was made to enucleate the lateral lobes through the perineum. In this, Wishard, who apparently had not heard of any similar cases, succeeded, but the condition of the patient was too far advanced; and he finally concludes that, though the lateral lobes can be enucleated in this way, it seems evident that no method devised offers the advantages afforded by a supra-pubic opening in the great majority of cases.