rated to dryness and exhausted with absolute alcohol. The alcoholic solution on evaporation deposited microscopic acicular crystals.

A fragment of the putrid liver, swarming with bacterial life, but in which no characteristic pathogenic forms could be detected, was macerated in water previously sterilised by heat, and some of the macerated fluid was inoculated beneath the skin of the flanks of three guinea-pigs. All died within twenty-four hours. Two of the animals exhibited no particular *post-mortem* appearances. The third had much oedema about the site of inoculation, there was fluid in the peritoneal cavity, the spleen was enlarged and much congested, and the intestines were emphysematous. The oedematous fluid from the site of inoculation, the peritoneal fluid, and the spleen juice all abounded in bacilli, similar in appearance to those of malignant oedema. Some were single rods, but many were prolonged into long jointed threads. No spores were seen.

A large, old, grey, wild buck rat was now fed on the remainder of the liver—less than half an ounce. It was found dead in eighteen hours. No bacteria were found in the blood nor in the spleen juice, though this organ was congested. It will be noted that the liver was toxic to a rat, and toxic and capable of producing a malignant oedema in the guinea-pig, but that I failed to obtain from it a toxic alkaloid.

Lastly, a large, old, grey, wild buck rat was fed on a small piece of the putrid stomach of the deceased. It died in about twenty hours. No bacteria were found either in the blood or the spleen juice of this animal after death.

REMARKS.—My evidence given at the inquest on the body of the deceased man, before I had experimented on the guinea-pigs, expresses an opinion which my later experiments have confirmed, and was as follows:—"My experiments show that a poison of the class produced by decomposition of animal matter was contained in some of the fish, and not at all, or not in deadly quantity, in other of the fish, and that the same poison was present in the vomit and stomach of the deceased man."

That a ptomaine and not the direct action of bacteria was the cause of the death of W. H. seems to me clear from the above experiments. Nevertheless, the facts that there was oedema of the thigh of the deceased man, and that his liver was capable of producing malignant oedema in a guinea-pig are curious. I incline to the opinion that the ptomaine was generated before the tinning of the sardines.

My thanks are due to Surgeon-Captain Weston for his care in supplying me with the history of this most interesting case, and, above all, to Dr. Washbourn, without whose aid and advice the investigation must have been more incomplete than it still is.

THE RADICAL CURE OF PROSTATIC OBSTRUCTION BY THE GALVANO-CAUTERY.

By W. BRUCE CLARKE, M.B., F.R.C.S.,

Assistant Surgeon St. Bartholomew's Hospital; Examiner in Surgery to the University of Oxford, etc.

Of the various surgical procedures which have been proposed during the last few years for the relief of prostatic enlargement, most have been directed to the removal of the gland itself or of some portion of it either through a perineal wound or after the bladder has been opened by the suprapubic route. When a considerable amount of enlargement exists, so that a swelling the size of a small egg can very possibly be felt *per rectum*, either with or without the introduction of an instrument into the bladder, such operations as these are not only useful, but are urgently called for. But the conditions which demand them are comparatively rare. In by far the great majority of cases the obstruction to the urinary outflow is produced by some small portion of the prostate gland, overlaid perhaps by a piece of swollen and enlarged mucous membrane. Indeed, the obstacle may be sometimes so slight that it is oftentimes overlooked after death unless it is carefully sought for at the *post-mortem* examination. Even in those cases in which the prostatic obstruction is accompanied by a considerable amount of prostatic hypertrophy, it is very

often the case that the actual cause of the obstruction lies in some tiny portion of the gland, and the large mass which is so obvious when the bladder is opened has played but a small part in obstructing the urinary outflow. It is clear, then, that no operation which does not aim at making more patent the actual orifice of the prostatic urethra is likely to succeed in restoring the patient to natural urination. Some few years back, Mercier, of Paris, attempted the removal of the offending portion of the gland by means of an instrument shaped

somewhat like a lithotrite, by means of which he punched out the obstructing portion of the gland. In many instances the results which he obtained were excellent for a few weeks after the operation was performed, but relapse speedily took place, and no permanent benefit ensued. I have myself tried this instrument on several occasions, but success in each instance was but temporary, and in one of them by no means complete even for a time. A short time back the same problem was attacked by Professor Bottini, who has made use of the galvano-cautery, and after numerous experiments both on the living animal and upon dead tissues he has succeeded in constructing an instrument—his "*cauterizzatore termo-galvanico*"—which is here displayed. (Figs. 1 and 2). In shape it resembles an ordinary lithotrite, or, to be more precise, the instrument of Mercier, and consists of a metal tube which is divided into two compartments by means of a thin septum. By this contrivance a continuous stream of water can be passed through, and thus ensure that it will not become too hot during an operation or inflict any damage on the rest of the urethra.

The galvanic current is conducted to the cautery by means of a wire which is thoroughly insulated, and passes down the inside of the tube, whilst the metal of the instrument is utilised for the return current. The cautery itself consists of a strip of thin platinum, about three-quarters of an inch in length and from one-eighth to a quarter of an inch in breadth, which is laid upon a piece of porcelain. This is sunk in the bend of the instrument, so that it does not stand up from its surface, or in any way impede its introduction into the bladder, or its withdrawal from it. It is so placed that when the beak of the instrument is turned round towards the rectum, the platinum plate rests on the obstructing portion of the prostate gland. Before introducing the instrument, it is of course essential to ascertain that a sufficient current is available to heat the platinum to a dull red heat, by which means the tissues can be destroyed without the occurrence of any serious hæmorrhage.

Fig. 1.

Fig. 2.

The period during which the heated instrument is kept in contact with the prostate is, as a rule, only fifty seconds, after which it is carefully withdrawn, and a soft red rubber catheter is introduced into the bladder and retained there for forty-eight hours. Great care is necessary, both in the removal of the one instrument and in the introduction of the other, so as not to displace the eschar which has been produced by the cautery. Bottini himself does not in all cases employ chloroform, as he finds that the operation is by no means a painful one. In my operations, however, the patient has always been anaesthetised, partly in order to avoid pain, and partly for the sake of ensuring that perfect quiet which is so essential to a successful result. So much depends on an accurate adjustment of the instrument, and on bringing the cautery into

exact apposition with the obstructing portion of the prostate, that every means should be employed of putting the patient into a position which will enable the surgeon to gauge as precisely as possible by his sense of touch the exact locality of the obstruction; and it is no less important that when the instrument is once in action no dislodgment should occur, which quite possibly might be the case were the patient not somewhat deeply anaesthetised. As a rule, but little, if any, pain is experienced by the patient when he comes round from the anaesthetic, and oftentimes until the catheter is withdrawn forty-eight hours later, but little pain is complained of; it is usually not until the instrument has been removed for a day or two, that the eschar begins to separate, and its fragments are brought away with the urine, generally without any difficulty. This process continues for about a week, and during this period there is some liability to blocking of the urethra by the sloughs, thus possibly necessitating the careful passage of a catheter. A week or two later, when the urine begins to get clear and free from sloughs, it is advisable to gently introduce a catheter for the purpose of ascertaining whether any residual urine still exists in the bladder. The rapidity with which the bladder will regain its power of expelling urine must of course depend upon the extent to which atrophy of the muscular wall has already taken place, and, to a certain extent, upon the presence or absence of previous cystitis; but it is remarkable how soon, provided the patient is fairly healthy, complete recovery takes place. It not infrequently happens that for a few days after the operation the patient is unable to hold his water satisfactorily, but this is only a temporary condition, and speedily passes off.

In one of my cases the patient had suffered with urinary trouble, frequency of micturition, etc., for about a year, and had 18 ounces of residual urine in his bladder when he first came into the hospital, and yet in less than three weeks he was walking about, able completely to empty his bladder, and has remained perfectly well up to the present time—now more than a year since the operation. The following notes will serve to indicate the course and progress of this plan of treatment:

CASE I.—W. P., aged 73, came under my care in St. Bartholomew's Hospital on June 20th, 1891, complaining of urinary incontinence. He stated that for the past year or more he had noticed that his water had not passed so freely as it should do, but he had always been able to void it until April of that year, when, after a day's work which involved some prolonged stooping, he was quite unable to make water, and had to send for a surgeon to relieve him. A catheter was passed without any very considerable difficulty, and he believed himself to be all right; but the next day his testicles began to swell and he was obliged to go to bed. He suffered a good deal of pain in the testicles for several days. During the last two months he has been unable to retain his water, which has dribbled away from him, particularly at night. He has not slept well recently, and has become a good deal thinner. There is at present a slight enlargement of the prostate to be felt *per rectum*, and a metal instrument does not enter the bladder without some difficulty. Between his admission and July 8th his residual urine was drawn off regularly twice a day. It varied between 4 and 7 ounces in amount.

July 8th. Under chloroform, Bottini's instrument was introduced into the bladder and connected up with two accumulators, which it had been previously ascertained would heat it up sufficiently. The instrument was turned round so as to bring the platinum into relation with the obstructing prostate, and the current was turned on for a period of fifty seconds, after which it was withdrawn and a No. 10 red rubber catheter introduced and tied in. Dr. Morotti, Bottini's assistant, was present both at this case as well as at the succeeding one, and I am much indebted to him for the care with which he explained and demonstrated the various points of the method, for without his assistance in my early cases I should not have been able to succeed as I have done.

July 9th. Next morning the catheter slipped out, but Mr. Maund, the house-surgeon, found no difficulty in introducing a *coudé* in its place.

July 10th. The patient expresses himself as feeling quite comfortable. Urine, acid, contains some amount of phosphates and pus. The catheter slipped out a second time, but was easily replaced.

July 13th. The catheter was withdrawn, as it seemed to be causing a great deal of irritation, and the temperature had risen to 101° F. The patient feels comfortable and passes his water without inconvenience.

July 27th. During the last fortnight he has had no special trouble, but his right testicle has swollen a great deal, and to-day there is evidently some pus in connection with his epididymis and tunica vaginalis. Pus let out; boracic fomentation.

August 18th. The patient's general condition is good. He eats and sleeps well, does not get up at all at night to pass water, and can hold his water during the day for four or five hours continuously. A No. 12 catheter was passed, and no residual urine whatever was found in his bladder; the wound in his scrotum was well.

December 28th, 1891. Letter from the patient to say that he is perfectly well and able to do his work.

A catheter was passed in October for diagnostic purposes, and there was no residual urine whatever. He is well at the present time, December 5th, 1892.

CASE II.—J. P., aged 58, admitted into St. Bartholomew's Hospital on August 17th, 1891, suffering from difficulty in micturition. He is a healthy-looking man, and states that he has had trouble with his water to a marked extent for the last three months, and of a slighter nature for eight or nine months more. At the present time he has to get up two or three times a night to pass his water, and can only get rid of it after a great deal of straining. On first coming into the hospital a No. 12 English instrument was passed, and after he had emptied his bladder as far as he was able by his own unaided efforts, 14 ounces of residual urine were drawn off. During the next few days the residual urine varied from 9 up to 17 ounces; the water was perfectly clear, acid, and contained no albumen. Specific gravity 1018.

August 24th, 1891. After the patient had been placed under the influence of an anaesthetic, and the bladder had been completely emptied of urine by means of a catheter, Bottini's instrument was introduced into the bladder, and the beak was reversed and pulled back until it was fixed against the obstructing prostate, the instrument being held at such an angle as to ensure this. Connection with the battery was then made, and continued for fifty seconds, cold water circulating through the hollow portion of the instrument at the same time. The instrument was carefully withdrawn, and a No. 14 soft red rubber catheter introduced on a stylette, and the stylette was withdrawn and the catheter left behind. The patient complained of but little pain during the next day or two. Forty-eight hours later the catheter was withdrawn, and he passed his water perfectly well.

August 28th. He has to strain a little to pass his water. During the night he passed a few sloughs. Urine rather thick, acid; specific gravity, 1020.

August 29th. Passes water quite easily, without straining.

September 3rd. A No. 11 red rubber catheter was passed. A slight obstruction was encountered near the prostate, but only 1 ounce of residual urine could be drawn off.

September 7th. Still passing one or two tiny sloughs, which cause occasional straining, otherwise quite well. No residual urine. Urine contains some phosphates, acid, no albumen or sugar. Seen on two occasions since, and a catheter passed. No residual urine. Feels perfectly well.

December 29th. Letter saying he is quite well.

December 5th, 1892. Still perfectly well.

CASE III.—H. G. S., aged 67 (sent me by Dr. Harper, of Kensington). First came under my care suffering with a stricture, and complaining that he could not get rid of the whole of his urine without the aid of a catheter. He had had his stricture divided some few years previously, but partial recontraction had taken place, and only a No. 6 would pass through it. There was only a slight amount of prostatic enlargement to be felt *per rectum*, and no difficulty was experienced in passing the catheter into the bladder. Under these circumstances, treatment of the stricture was advised in the first instance, it being explained to the patient that his prostate might require treatment later on. The stricture was treated by electrolysis, and notwithstanding several slight attacks of gout which induced a considerable amount of vesical irritability, by October 7th a No. 16 English easily passed into the bladder. The water was clearer than it had been, but the residual urine still continued, and varied in amount from 4 up to about 8 ounces.

November 30th, 1891. Dr. Harper being present, and Mr. Mills administering the anaesthetic, whilst Dr. Lewis Jones assisted with the accumulators, Bottini's operation was performed exactly in the same way as in the last two cases, and a red rubber catheter tied in.

December 1st. The temperature rose to 100.4°, and there was a good deal of vesical irritability.

December 2nd. The instrument was withdrawn, and a good deal of mucus came away, with perhaps a dessertspoonful of purulent-looking fluid. The urine was only slightly acid, as large doses of citrate of potash had been administered in order to diminish the acidity, which seemed to be aggravating the vesical irritability.

December 5th. The patient was able to pass his water in the standing position, which he had been unable to do for more than a year, but though much clearer than it had been, the water was still thick and contained a good deal ofropy mucus. He had been for several hours the day before in a good deal of pain owing to the slough sticking in his urethra, and it had only been able to be dislodged by the passage of a catheter.

December 21st. Has gone on uninterruptedly well since the last visit. Sits up and goes about the house as well. He has so long been accustomed to the use of his catheter that he is inclined to use it too often, and thus provokes a certain amount of extra vesical irritability.

January 11th, 1892. He seems in excellent health; goes out in all weathers. There is still some residual urine, but slightly less than there was. Occasionally some ropy mucus in the water. Passes water with perfect ease in the standing position.

November 30th, 1892. Dr. Harper tells me he is much the same.

CASE IV.—J. C., aged 72, admitted under my care in St. Bartholomew's Hospital on November 14th, 1891, suffering from retention of urine. He has had difficulty with his water for the last fifteen or twenty years, and has from time to time been obliged to seek medical aid and have catheters passed, and his water is only passed after considerable straining, which has been at times so severe as to cause some prolapsus ani. At the present time he suffers quite as much, if not more, with his rectum than with his bladder. For the last week he has had to have his water drawn off with a catheter twice daily, and there has been at times a good deal of blood mixed with it. On admission, a great deal of pain; 16 ounces of water withdrawn by catheter, contains some blood. Morphine injection $\frac{1}{4}$ gr.

November 18th. Can only pass a very little water; most of it has to be drawn off; a good deal of pain still; the urethra is exceedingly sore. Temperature, 104.6°; rigor; urine acid, 1018, no albumen, some blood.

November 26th. He is now much better; passes a good deal of his water unaided, but there is about 8 ounces of residual urine.

December 8th. Under an anaesthetic, the residual urine, amounting to about 6 ounces, was drawn off. Bottini's galvano-cautery was passed into his bladder, and the current turned on for the space of fifty seconds, after which the instrument was withdrawn, and a No. 12 red rubber was introduced. About half an hour after the operation the patient passed

about 3 ounces of blood-stained urine, and complained of a good deal of pain. During the night he suffered from a desire to micturate about every half hour.

December 9th. In his attempts to micturate he managed to pull his catheter out, which was not replaced, and he has been more comfortable ever since.

December 10th. Slept much better and feels easier. Says he has not passed water so easily for years.

December 11th. A large slough, measuring nearly $\frac{1}{2}$ inch in length, has passed with his urine, which, with the exception of the sloughs, is quite clear, acid, 1020, no albumen.

December 17th. Catheter passed after he had micturated, and there was no residual urine whatever.

December 18th. The prolapsed rectum and piles were operated on, a cautery being used to the mucous membrane.

December 26th. Had to have his water drawn off.

January 7th. Now perfectly well. Passes his water without any difficulty, and has no residual urine. Piles and prolapsus are also well.

November 9th, 1892. Remains well.

From the notes which have just been read it will be seen that the operation in question is one which has, so far, yielded most excellent results in a class of case which is usually amongst the most intractable in surgery so far as cure is concerned. The only one of the four cases in which the temperature after the operation rose as high as 100.5° , or gave one the slightest momentary anxiety, was the first, in which case also it will be remembered that there was an abscess formed in connection with the testicle, thus unduly prolonging the period of convalescence. To a large extent, if not entirely, this was, in my opinion, due to the retention of the catheter for a longer period than forty-eight hours. It is the practice of Bottini to insist on this plan of procedure, but such retention is, I am convinced, both unnecessary and undesirable, as is shown by the more favourable course which the other cases have taken. As far as the results are concerned, three out of the four cases now pass the whole of their urine without catheter, and experience no difficulty whatever in its passage, whilst the fourth, which was the most severe case of them all, is so far improved that he can urinate when standing up, which he had been unable to accomplish for some year and more, as well as having much less residual urine in his bladder than was formerly the case.

RETINAL AFFECTIONS OF CHRONIC BRIGHT'S DISEASE AND DIABETES.

Being an Abstract of the Middlemore Lectures delivered at the Birmingham and Midland Counties Eye Hospital.

By ROBERT SAUNDY, M.D., F.R.C.P.,

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LECTURE I.

THE following classification of the retinal affections of Bright's disease formed the basis for the descriptions given by the lecturer:—

1. Diffused opacity.
2. White patches: (a) Rounded soft-edged areas generally situated near the disc, and (b) smaller, brighter, often radiated specks generally near the yellow spot.
3. Hæmorrhages.
4. Optic papillitis.
5. Diffuse retinitis.
6. Secondary atrophic changes.
7. General retinal periarteritis.

General retinal periarteritis was included in this classification because although not solely, it was usually associated with Bright's disease, and had therefore as much claim to be regarded as one of the retinal affections met with in Bright's disease as any of the forms more usually recognised.

The pathological explanation of all these changes was sought in the dyscrasia, which set up, first nutritive disturbances and, secondly, inflammatory and degenerative changes in the tissues. The minute histological details of each were fully described. The course of the inflammatory lesions was shown to be not necessarily hopeless of cure, though more or less permanent structural change might remain; even the degenerative spots sometimes disappeared; cases illustrating these facts were quoted. The difficulty of assigning any absolute diagnostic value to these appearances was pointed out and illustrated by drawings and cases.

On the other hand the prognostic meaning of the degenerative white specks (b), of diffuse neuro-retinitis, and of general periarteritis in otherwise well-assured cases of Bright's disease, was well defined and of the most serious character. The lecture was illustrated by a number of diagrams and by microscopical preparations kindly lent by Mr. E. Treacher Collins, Mr. Lawford, and Mr. Priestley Smith.

LECTURE II.

After a brief historical introduction the lecturer described the retinal affections of diabetes in accordance with Hirschberg's recent classification.

1. Retinitis centralis punctata diabetica, in which there is a characteristic inflammation of the central portion of the retina, giving rise to the appearance of bright spots often coalescing, and frequently accompanied by hæmorrhages.

2. Retinitis hæmorrhagica diabetica, in which the essential process is hæmorrhage followed by inflammatory and degenerative changes.

3. Mixed cases.

The disease in all its forms occurs only in persons of middle or advanced life, and in cases of diabetes of some standing. It is generally bilateral and causes disturbance of vision, the patients complaining of a mist before their eyes. In the first form the ophthalmoscope reveals groups of small, clear, bright specks situated in the structure of the retina, in and around the disc, occurring on the nasal as well as the temporal side, never radiated in arrangement but often occupying large areas, never pigmented but accompanied by fine punctiform hæmorrhages. It is never attended by optic papillitis or diffuse retinitis. Newly formed blood vessels have been observed, and there is a decided tendency to the occurrence of large hæmorrhages into the vitreous. This description was illustrated by a case, and the fundus oculi shown by means of Mr. Priestley Smith's demonstrating ophthalmoscope.

The pathology of the affection was held to be dependent on the diabetic dyscrasia which leads to nutritive changes in the walls of the vessels, and to the effusion of albuminous material into and between the layers of the retina. In the second form the hæmorrhages are usually punctiform, but may be striated, and are situated all over the retina; their source is not the superficial retinal vessels, and their rounded shape indicates that they are situated below the nerve fibre layer. There may be haziness of the retina, depending on some degree of œdema. The hæmorrhages are due to vascular degeneration caused doubtless by the dyscrasia, but the histological details have not been worked out. The course of both is progressive, and no instance of recovery has been recorded, although temporary improvement in vision occasionally takes place.

The first form is highly characteristic when well marked, but the diagnosis should always be confirmed by examining the urine. Little is known definitely as to the prognostic importance of either, but on general grounds it is probable that they indicate an advanced degree of those nutritive derangements which herald a fatal termination.

This lecture was illustrated by drawings and microscopical sections, the latter being kindly lent for the purpose by Dr. Stephen Mackenzie.

THE PATHOLOGY AND TREATMENT

OF

SUPPURATIVE DISEASES OF THE EAR.

Being an abstract of the Harveian Lectures delivered before the Harveian Society of London.

By G. P. FIELD, M.R.C.S.,

Aural Surgeon to St. Mary's Hospital and Dean of the Medical School.

LECTURE III.—INTRACRANIAL ABSCESS.

A NEW epoch in brain surgery was inaugurated by the publication of Mr. Hulke's Remarks on Trephining for Evacuation of Intracranial Abscess in Connection with Suppurations in the Ear.¹ His account therein of three typical cases will ever be prominent in the literature of middle ear disease. It was Mr. Hulke who first laid stress on the frequent occur-

¹ *Lancet*, July 3rd, 1886.