tions, we use Robson's eucalyptus spray, as recommended by Hewetson in 1885. The eucalyptus seems to me, however, not to be of much importance. The great point is that the air, passing through the cotton-wool, becomes disinfected; and, therefore, as this air is constantly over the wound, there is less danger of micro-organisms entering the wound. The spray also prevents the breath of the operator, assistants, etc., from passing over the wound.

When the speculum has been introduced, we wash the conjunctival sac well out with sublimate, so as to remove any mucus, germs, etc., which may have been hidden in the folds of the conjunctiva. In cases of enucleation, evisceration, etc., we irrigate the eye during the whole of the operation with sublimate solution. This not only keeps the wound aseptic, keeps the field of operation clear, but also helps to arrest the hæmorrhage. As soon as the bleeding has ceased, and not before, we dress with dry salicylic wool, or, better still, sublimate gauze, but never with a sponge. Sponges are, if not very carefully disinfected, always septic, and ought never to be used. They are not necessary, and always a source of great danger. I have often wondered that we do not see many more cases of meningitis after enucleation, judging by the number of cases in which septic sponges are used for arresting the hæmorrhage.

As regards instruments, they must be sharp and clean. The instruments used for suppurating and non-suppurating cases ought to be kept distinctly separate, not even in the same cabinet. The box or cabinet should be made of wood and metal, and not lined with silk or velvet, etc. After having been carefully washed in sublimate (1 in 5000), the forceps brushed, etc., the instruments are placed on a porcelain or glass dish, and covered with a piece of plate glass. Just before use they are dipped into sublimate lotion, or, better still, into absolute alcohol. They are then examined with a lens, to see if any particles of dust, cotton-wool, etc., remain on them.

Should there be any suppuration in a corneal wound, this can, in most cases, be prevented from progressing by energetic antiseptic treatment; that is, the wound must be opened, the anterior chamber washed out with 1 in 10,000 sublimate solution, and then the edges of the wound burnt by the galvano-cautery. This should, if necessary, be repeated every 5 to 6 hours. I have seen suppuration arrested by these measures in cases in which the eye seemed hopelessly lost. This treatment is also greatly to be recommended in cases of corneal ulcers with hypopyon, traumatic hypopyon-keratitis, etc. In cases of accident, etc., if we carry out these simple antiseptic precautions, we are often able to save the eye from suppuration and subsequent enucleation, and also, in many cases, to prevent sympathetic ophthalmia.

In aural surgery it is, of course, quite impossible to perform an aseptic operation, as the wound is always in communication with the ear or throat. But we can try and make the operation antiseptic, that is, we can endeavour to destroy or prevent the development of the micro-organisms which may be in or near the wound. In operations on the membrana tympani, the external meatus ought to be well syringed out with sublimate lotion, and cotton-wool worn for two or three days after the operation.

In cases of mastoid abscess in which we may have to trephine, or simply make Wilde's incision, we try to make the wound as aseptic as possible by scraping, washing well out with sublimate, and keeping away fresh germs by cotton-wool, or, better still, sublimate gauze. And yet how frequently do we see the wound poulticed? A great many of the cases of fatal mastoid abscess are undoubtedly caused by injudicious poulticing, either before or after the operation.

There is another aural operation, if we may call it so, about which I should like to say a few words—that is, the use of the Eustachian catheter, which is now extensively used in most cases of diseases of the middle ear. Of course, air is, under ordinary circumstances, constantly passing through the Eustachian tube into the tympanum. It seems to me, however, that in passing over the large area of mucous membrane, the micro-organisms are either destroyed or prevented from entering the tympanum. Now, if we blow air in through the catheter, or even with Politzer's bag, the Eustachian tube is forcibly dilated, and the air, full of germs, rushes into the tympanum. In order to make the air which passes through the catheter aseptic, Professor Lucae, of Berlin, suggested to let it pass through cotton-wool. He attaches a gutta-percha capsule filled with cotton-wool on to the Politzer's bag.

There is another point with regard to the use of the catheter

to which I should like to draw your attention—that is, the great importance of thoroughly disinfecting it before use. This is best done by putting it in boiling water for a few minutes. The same catheter ought never to be used for two persons without having been boiled. In fact, we ought to use a different catheter for either nostril. Not only can we introduce the germs of suppuration from one person to another, or from one ear to the other ear of the same person, but, what is of vital importance, we can inoculate syphilis. The same thing applies to the proper disinfection of the aural specula.

ON THE VALUE OF THE CAUTERY IN THE TREATMENT OF ULCERATION OF THE CORNEA.¹

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THE cautery has always been regarded as a valuable means of treatment in general surgery, but it is only in recent years that ophthalmic surgeons have recognised its benefit in diseases of the eye, more especially in ulcerations of the cornea.

The Best Form of Cautery.—The simplest, neatest and most portable, is that described by Mr. Simeon Snell, of Sheffield,² and to him we are indebted for drawing the attention of the profession to its value in severe forms of ulceration of the cornea. His cautery is heated in a spirit lamp, and retains the heat long enough to apply to a small ulcer, but requires reheating for a second or larger ulcer, and this is where I think we are better served by the thermo-cautery, which can now be obtained at a moderate price, with suitable points. It retains the heat as long as is required for any number of ulcers, and in infirmary work this is of importance. The cautery I show has served me for four years without going wrong, and was obtained from Mr. Gardner, surgical instrument maker in Edinburgh.

The Electric Cautery.—There is no doubt that this form of cautery works admirably, but the want of a good reliable battery has prevented us from using this form more. Recently Mr. Salt, of Birmingham, has made for me a neat, portable, and reliable battery, which with very little trouble is constant and most satisfactory. The elements are zinc and chloride of silver, the exciting fluid is a strong solution of chloride of zinc, and the box is so neatly arranged that it can be carried without spilling. A rheostat regu-

¹ Read in the Section of Ophthalmology at the Annual Meeting of the British Medical Association, held in Glasgow, August, 1888.

² JOURNAL, vol. i, 1883, p. 9.

lates the strength of the current, and contact is made by pushing forward the ivory button on the cautery handle. The battery is contained in a walnut-wood case, measuring $6\frac{1}{2}$ inches long, $5\frac{1}{4}$ inches wide, and $8\frac{1}{4}$ inches high, and which has a drawer $1\frac{1}{2}$ inch deep, to hold the conducting cords, handle and cauteries. Its external appearance is well shown in the woodcut, and I have great pleasure in strongly recommending it to ophthalmic surgeons and others requiring delicate cautery points carefully heated.

The ball-cautery, which is made on the principle of the nævus needle of Mr. Lund, of Manchester, is very useful, and retains the heat longer than Mr. Snell's, but it takes about three times longer to heat.

The application of the cautery requires some care, as if used too freely it will do harm, or if not sufficiently, the results will be disappointing. Place a cocaine disc, $\frac{1}{8}$ th of a grain, or a drop of a 5 per cent. solution, over the ulcer, until the cornea is non-sensitive, wash the cornea and lids with a solution of corrosive sublimate, then apply the cautery at a dull red heat to the surface of the ulcer, and to any points where the ulcer has spread, or if the cornea is infiltrated in one or two directions, carry the point into the different regions, incising the superficial layers of the cornea, if necessary, to enable you to destroy the infecting material. Be careful to apply the cautery lightly, so as not to harm healthy layers. Bathe the eye with corrosive solution, and apply a dry pad of absorbent corrosive sublimate wadding (in very sloughy cases a little finely powdered iodoform or boracic acid may be applied) and a bandage.

The patient must rest in bed for a longer or shorter period, according to the severity of the case. Bathe the eye daily with corrosive sublimate solution; if the ulcerative process is arrested, use calomel powder to encourage healing, and continue dry dressing; give calomel and opium to relieve pain if necessary, good nourishing food, not forgetting the addition of a malt stimulant, which the late Dr. McKenzie so strongly advised.

If the ulcer extends reapply the cautery, and if there is much infiltration or a large hypopyon, perforate the cornea, which may be done with perfect safety; the perforation at once relieves tension and puts the eye at rest, in addition to allowing free drainage. The wound in the cornea does not heal so quickly as that made by Saemisch's incision.

CASES SUITABLE FOR THE CAUTERY.

1. *Traumatic Ulcers*.—The slightest injury of the cornea may become irritated or sloughy, and therefore the sooner careful treatment is adopted the better. Whenever anyone receives an injury to the cornea it should be bathed with an antiseptic solution, atropine introduced (the ordinary liq. atropiæ is best) and a dry antiseptic pad and bandage applied. If the slightest appearance of irritation or spreading of the ulcer shows itself the cautery should at once be used, the irritation will be checked and the eye preserved.

If the ulcer has spread over the cornea, and a hypopyon formed, the cautery should be applied to the ulcer, and frequently the hypopyon disappears. If this does not take place, or if the anterior chamber is one-third full of pus, then tapping is the best addition to the treatment. Some of the best results I have had have been in cases where the cautery and tapping have been combined. If the ulcer is extensive and the corneal layers much infiltrated, then Saemisch's incision, or perforation with the cautery, ought to be practised at once, more especially if the patient is in feeble health, and above 50, as naturally the reactive powers in such cases are not great.

Idiopathic Ulcer.—Every variety of ulcer may at times benefit by the cautery—strumous, weak, rheumatic, or gouty; granular ulcer occurring as a result of granular conjunctiva; and serpiginous ulcer, to which the remarks made on traumatic serpiginous ulcer equally apply.

In strumous children and young women in feeble health, either from bad hygienic conditions or overwork of any kind, such as nursing for too long a period, ulcers of the cornea are very common. Numerous cases could be given in detail, but that would only weary you, but the general story is: An ulcer on the cornea for months, often three or even five, a variety of lotions and blisters used along with good internal treatment, with no improvement, the cautery applied, with generally a week's rest in bed, but frequently without, and the eye is quiet, the ulcer healing. In another week the patient is well.

In the strumous ulcer of children I cannot recommend this

treatment too strongly, as I have during the last two years used it to a considerable extent with the best results, even in apparently deep ulcers the cicatricial mark being very slight, and, if practised early, no trace is left.

I have frequently tried other means of treatment, such as eserine and atropine combined, with tonics, and no improvement took place until the cautery was applied.

Rheumatic and Gouty Ulcers.—In rheumatic and gouty ulcers the cautery is of great service, both in young and old patients. One very well marked case may be mentioned. A gentleman, who had had one or two rheumatic attacks, was seized with well-marked rheumatic ophthalmia with ciliary pain, and a minute ulcer of the cornea. The irritation subsided under leeching, eserine, and internal treatment; but another attack followed soon after, and again another, the minute ulcer remaining unhealed in spite of various applications. He was advised to try a change south; there he was worse, and on his return home had another attack. The cautery was applied to the ulcer; it healed, and he has not since had any irritation or trouble with his eye, which is now eighteen months ago, and he had five months of trouble with it. Since this case I have used the cautery in a number of others with marked benefit. In old gouty gentlemen a slight touch with the cautery makes their ulcers heal. Ulcers the result of granular conjunctiva heal quickly when the granulations are freely destroyed, and the ulcers themselves require touching.

How does the cautery act? By destroying the infective material, and thus the process of ulceration is arrested. Remove the cause, and Nature, with some assistance, will heal the ulcer.

REMARKS.—While advocating a more general use of the cautery in ulceration of the cornea, I am anxious to avoid the impression that I regard the other means that have been 'strongly recommended as unsatisfactory; far from that, for Saemisch's method and Mr. Teale's of scraping, with the more recent addition of iodoform afterwards, succeed admirably; but I conceive that in the vast variety of human beings and their ailments, it is of advantage to have several aids to their recovery or improvement, so that when one method seems unsatisfactory in any particular case, we may try another. We must also bear humbly in remembrance that it is not always the method that is to blame, but the man who carries it out; and it frequently ends in each surgeon fixing on the plan he succeeds best with, and keeping to it. I shall, however, feel grateful if what I have said leads to a more general use of the cautery in ulceration of the cornea, more especially in mining districts, where injuries of the cornea are so frequent, and where prompt treatment would save many eyes.

ON THREE CASES OF CONICAL CORNEA TREATED BY THE ACTUAL CAUTERY.¹

By RICHARD WILLIAMS, M.R.C.S.,
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WHEN, in October, 1886, the first of the following cases came under my care, I could not help feeling very much disinclined to adopt any of the recognised methods of treating keratoconus, because the results, in my own practice as well as what I had seen in that of others, had not been such as to give me much encouragement. While thus hesitating before again entering on a path which had only led to unsatisfactory results, it occurred to me that the loss of substance caused by the actual cautery might be utilised in producing a tough scar at the apex of the cone, which is the aim of all operative treatment of conical cornea. At that time I was not aware that the cautery had been previously employed in this affection, and I must confess it was only on reading Mr. W. L. Cant's article in the JOURNAL for July 23rd, 1887, that I became acquainted with the late Dr. Andrew's paper on The Actual Cautery in Eye Disease, which appeared in the volume of the JOURNAL for the latter half of 1884. On reference to these articles, I find the plan adopted by these operators differs in at least one important point from the method employed in the cases which I am about to relate. The essential difference consists in the fact that the two surgeons named make a point of opening the anterior chamber so as to allow a continuous drainage of the aqueous for a prolonged period, and so purposely use a needle

¹ Read in the Section of Ophthalmology at the Annual Meeting of the British Medical Association, held at Glasgow, in August, 1888.