Original contributions to ophthalmic surgery / by J.R. Wolfe, with illustrations.

ORIGINAL CONTRIBUTIONS

TO

OPHTHALMIC SURGERY.

BY

J. R. WOLFE, M.D., F.R.C.S.E.,

PROFESSOR OF OPHTHALMOLOGY IN ST. MUNGO'S COLLEGE;
SENIOR SURGEON TO THE GLASGOW OPHTHALMIC INSTITUTION.

With Illustrations.

LONDON:
J. & A. CHURCHILL,
11 NEW BURLINGTON STREET.
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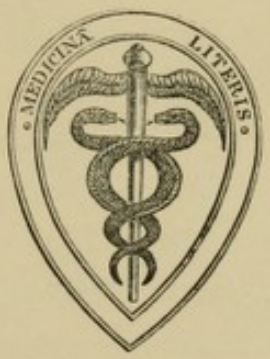

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PREFACE.

As frequent applications have been made for copies of my "Clinical Demonstrations on Ophthalmic Subjects," originally published at different periods, but now for some time out of print, I have thought it desirable to republish them in a collected form. New matter—viz., a report of the Demonstration on Extraction of Cataract given last year at the Meeting of the British Medical Association in Glasgow, and a paper on the operation for Staphyloma —has been added, and all the subjects treated have been brought up to date.

In my former publications I was under the necessity of appealing to my own work in support of my operations, but the acceptance of these operations by the profession has now relieved me of that necessity, and rendered the preparation of these sheets for the press an agreeable labour. For instance, the success of the demonstration given in Paris on my operation for Detachment of the Retina, and, more recently, the clinical experience of Prof. von Esmarch as to the practical value of my method of performing plastic operations, have now securely established both. I thus submit to the notice of the profession not mere theories, but operations, which have brought within the control of practical surgery pathological conditions previously regarded as incurable, and I venture to hope that this fasciculus will obtain for them still wider recognition.

J. R. W.

18 Brandon Place,
Glasgow, *December*, 1889.

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I.

DEMONSTRATION ON EXTRACTION OF CATARACT.

The technic is the primary and essential element in extraction of cataract.

AT a meeting of the British Medical Association in August, 1888, I gave, in one sitting of two hours' duration, a demonstration of eleven cases of extraction of cataract. The operations were performed without prolapse of iris, loss of vitreous, or sinking of the lens, without, in short, any of those accidents which usually attend this operation. The patients were examined both immediately after, and also three days later, and the results were found to be perfectly satisfactory.*

* "Dr. Wolfe gave an excellent demonstration of his method of operating for 'Extraction of Cataract.' . . . In this method there is very little risk of escape of vitreus, and in the numerous cases we saw, numbering eleven in all, the procedure appeared to be eminently satisfactory."—*The Lancet*, August 11, 1888.

"Dr. Wolfe demonstrated his method of operating for cataract, which gives remarkably good results. Ten cases were males and one was a woman. The immediate results were highly satisfactory in all the cases exhibited, the pupil being clear, and the patient being able to see and count fingers at once. Dr. Wolfe gave a second demonstration (August 10). . . . At the close of this demonstration, the cases operated on for cataract three days previously were examined, before those present, and were found in perfect condition."—*British Medical Journal*, August 20, 1888.

"Dr. Wolfe operated on eleven cases. Four of the patients had previously been operated on successfully on the other eye; some had sunken eyes, one had his eyebrows so prominent, that the puncture and counter-puncture could be performed with difficulty, others suffered

I had previously given, in November, 1884, a similar demonstration of twenty-one cases in presence of all the members of my staff, who watched every step of the operations, and examined each patient as to acuity of vision obtained. A report of this demonstration appeared in the *Medical Times and Gazette* of 1884. I thus proved that all the risks which accompany other procedures can be avoided by my method of operating.

The method followed by me being, with some modifications, that which I had recommended to the profession in the *Lancet* of 1878, a short review of the history of extraction of cataract during the last quarter of a century may be useful in assisting us to appreciate our present position. The subject is altogether of the deepest interest to ophthalmologists and the profession in general. For the removal of cataract is the most important operation which has to be performed frequently, and, if it should turn out that in it we have fallen back, this would detract from our vaunted progress in recent years.

Until 1860, Daviel's method of flap extraction was universally practised, and when successful, was worthy of admiration for the beauty of its results. But it is an operation fraught both with risks to the patient and anxiety to the surgeon, and it is besides inapplicable to cases of local and constitutional complications. It consists in removing the lens through the pupil by a semi-

from deafness, and could not be made to understand how to rotate their eyeballs ; and in all these cases the results have been eminently successful. It may be said that the work passed off practically without a single hitch. There were none of those numerous accidents, which we generally read of as occurring, even in the hands of the best operators."—*The Medical Press*, August 29, 1888.

circular incision in the cornea, involving the half of its circumference.

Now (1) this large corneal incision requires some days to heal, and during this time there is the risk of the cicatrix bursting open. In a patient, therefore, of strumous habit or in advanced old age, or in a diabetic patient, such a large flap is apt to suppurate.

(2) The iris may be the source of immediate and subsequent mischief. The sphincter iridis sometimes contracts so much that the capsule cannot be sufficiently opened, or, even after it has been opened, the iris may close upon the lens and prevent its easy exit. Inordinate pressure is then used, resulting in contusion, and there is developed a form of iritis, which may either close the pupil or extend the inflammatory process to the wound, which bursts open and so produces "hernia iridis" and anterior adhesions. The inflammation may even extend to the ciliary circle and the membranes, and thus cause panophthalmitis and complete destruction.

(3) In cases in which the lens does not come out entire the nucleus alone comes through, leaving the cortical substance in the equator of the eye. These fragments act as a focus of inflammation, and I consider this to be the most fruitful source of failure in an operation for cataract.

It is thus evident that Daviel's operation is not applicable to a cataractous eye, in which we have also to deal with (*a*) an adherent pupil, (*b*) softened vitreous, (*c*) dropsy of the anterior chamber, or (*d*) central opacity of the cornea. Moreover, as the patient is required after such an operation to remain perfectly quiescent for six

or eight days, it is inapplicable to patients who are suffering from (1) rheumatism, (2) sciatica, (3) diseases of the bladder, (4) bronchitis or asthma, and other concomitants of old age, and who form the majority of cataractous patients. It is, therefore, not astonishing that when Waldau introduced his method of spoon-extraction in 1860, it was received by surgeons with great eagerness and substituted for Daviel's, though the spoon, too, after repeated trials, had to be abandoned. This turning point was a highly momentous one in the history of the operation. Various new methods were recommended, but none of them attained such a position as that introduced in 1865 by von Graefe, whose name alone would have secured respectful consideration for any procedure recommended by him. The distinction between his method and Daviel's was that he substituted a small linear incision for the flap, and combined iridectomy with it.

My reasons for not practising Graefe's method were stated at the time to be as follows:—The section in the sclerotic exposes the eye too much to the loss of vitreous and sinking of the lens, so that not only does the operator find himself in embarrassing positions during the operation, but there is also the risk of subsequent mischief. It has also been more recently proved from eyes enucleated after extraction by Graefe's method, that there had been strangulation of the ciliary nerves in the cicatrix, and that this in some cases had given rise to sympathetic inflammation in the other eye. I have followed with alarm the reports of this operation, which have appeared periodically in the medical journals.

Innumerable eyes have been sacrificed to the authority of this great master, who, if he had lived, would undoubtedly have withdrawn this operation from practice, or at least so modified it as to divest it of its danger.*

One circumstance, which, in my opinion, tended to prolong its existence was the introduction of bacteriology in eye pathology. This new doctrine diverted attention from the real cause of disaster. Operators took to the study of bacilli and cocci and to washing their instruments with antiseptic drugs, so as to sterilise them. These speculations have indirectly been a source of injury to ophthalmology in thus diverting attention from the defective technic, for which no antiseptic purification will ever compensate. Is it not very remarkable that, after the lapse of a quarter of a century, with all our antiseptic precautions and innumerable agents, including eserine and cocaine, many of the leading operators are now abandoning Graefe's operation and returning to Daviel's? In what a vicious circle must we have been moving for these twenty-five years, that we are now returning to an operation, which we had given up as hazardous and inapplicable to a large class of cases. The change is altogether a curious one. Some ten years ago everybody was practising Graefe's operation, and

* Dr. Vidor, Pesth, reports the result of forty extractions by v. Graefe's method :—Eight total loss=25 per cent.; prolapse of iris, 10 per cent.; iridodialysis, 5 per cent.; dislocation of lens into vitreous, 25 per cent. In 12 per cent. the loss of vitreous occurred before removal of the lens.—*Centralblatt für Practische Augenheilkunde.*

some surgeons were satisfied with their results. When antiseptics and the spray came into fashion, the condition still further improved. But, notwithstanding that we have since had the additional help of cocaine, Graefe's method has been given up without regret in exchange for that of Daviel.

I therefore maintain, in the words of my motto, that "the technic is the primary and essential element in extraction of cataract," which, if neglected, will lead to failure, but, if properly attended to, will turn a hazardous operation into one of comparative ease and security. This is the principle upon which my operation is founded.

In the operation for cataract there are three acts, and each is attended with some risk. We must, therefore, study these *seriatim* and try to avoid, instead of plunging into the operation in entire dependence on the venerable name of its author. The different parts of the operation are (1) the corneal section, (2) the opening of the lens capsule, and (3) the extraction of the lens. In the first we are exposed to the risk of wounding or contusing the iris and of the escape of vitreous; the second cannot be done properly on account of the contraction of the pupil; and in the third we have to contend against the contraction of the pupil or the sinking of the lens in soft vitreous. The iris is thus in the way at every stage of the operation, while the vitreous generally prolapses at the close of the corneal section.

But the most fruitful source of danger is the remaining *débris* of the lens, the nucleus coming out and the cortical masses remaining behind. Our object must be to extract

the entire lens, and nothing but the lens. If cortical substance remains behind, we can never be sure of success, for, after the lapse of three or four days, inflammation may set in, and, if the eye is not lost by iritis or panophthalmitis, the process terminates in the closure of the pupil, and a further operation is necessary.

The extraction of the lens through the natural pupil, as in Daviel's operation, is very beautiful when successful, but what are the chances of securing the integrity of the pupil? How often does the iris fall upon the edge of the knife and a piece of it gets cut off? How frequently does hernia iridis result, and in how many per cent. of cases is the pupil blocked up by the *débris* of the lens or by the capsule having been improperly lacerated? Everyone who has had experience of Daviel's operation, as I have seen in the hands of Desmarres, the chief of operators, and then in my own practice, will be able to answer. Finally, what chances are there of removing large masses of cortex through the pupil after extraction of the nucleus?

The removal of a portion of the iris is therefore of great assistance, divesting as it does the procedure of many risks, and enabling us to carry out all the steps of the operation, with more precision and security. Desmarres was the first to perform iridectomy in cases of cataract, when complicated with close pupil. Subsequent operators adopting that suggestion, founded on it a regular method, and v. Graefe applied it to the cure of glaucoma.

For the extraction of cataract, my first step therefore is iridectomy, and it I prefer to do ten days or a

fortnight before, when it is possible to shape the pupil to our liking. I generally do it downwards at the vertical meridan, rounding it off in such a manner as not to disfigure the eye, and leaving the ciliary margin. This method has the advantage that, in case of hæmorrhage from the iris, the aqueous chamber is not obscured, and the lens does not require to be extracted in the dark, as it must when iridectomy and extraction are performed at the same time.

In extraction, the patient is made to recline on his back, and his head is held by an assistant. A speculum is introduced and the eye is fixed with forceps. The section is made with Graefe's knife, or with my narrow triangular knife, which is introduced at the junction of the cornea with the sclerotic, and the counter puncture is made at the opposite side, so as to produce an arched incision, extending along rather more than a third of the corneal circumference. Before the section is finished, the knife is withdrawn, and in withdrawing its point is directed to the lens-capsule which is opened; the knife is then withdrawn and the speculum removed. A corneal bridge is thus left, which prevents the escape of vitreous, so that we have the eye under our control and may manipulate it with freedom in the subsequent stages. The thumb and index finger of the left hand are now used as a speculum to separate the eyelids, the cystotome is introduced, the capsule more widely opened, and if the lens has a tendency to sink or to shift, it is brought into position for easy exit. Another moment of rest is given, then the lids are again opened and a blunt pointed corneal knife is introduced and the corneal bridge divided.

After another short interval of rest, the skin of the upper eyelid is held up between the finger and thumb, with which pressure is applied to the upper margin of the cornea, while with the index and middle finger of the other hand the lower eyelid is held aside and counter pressure applied, so that the lens is made to glide through the opening. If cortical substance remains behind, friction through the lid upon the eyeball makes it advance, and the eyeballs having again been opened, it is easily squeezed out.

As it is only in very rare cases that I give chloroform, I prefer the lower section, for without chloroform it is difficult to make the patient look downwards for the removal of the lens, and still more so for the removal of the cortical substance, which is so very essential. When I do administer chloroform, I perform the upper section, though even then the dragging down of the eyeball with forceps cannot be done without risk to the vitreous humour, and in small sunken eyes is impracticable. Indeed, in cases such as these, I was forced by necessity to resort to the lower section, and finding it much safer, I generally practise it in cases of old people. I find that finishing the corneal section without a speculum renders the manipulation more easy and comfortable for the patient, so that I dispense with the use of cocaine on account of its bleaching the parts, that sometimes the corneal margin cannot easily be seen, and as the use of this drug is not without risk, I prefer to do without it. It is desirable in every case to test the sight before putting the patient to bed, as it puts him into a more cheerful mood than if he be left in uncertainty and

the result taken on trust. The healing process is thus facilitated.

My dressings consist of three strips of court plaister applied to the closed eyelids, and two square pieces of lint and an immovable bandage. I dip my instruments in hot water and dry them with lint before the operation, and at subsequent dressings I bathe the eyes with warm water alone, and no other antiseptic is used.

I am a strong adherent of antiseptic surgery, and an admirer of its achievements. Before Sir Joseph Lister published his famous papers on "Antisepticism in Surgery," I recommended—in the Aberdeen Infirmary—the application of dry carbolised wadding for the dressing of wounds and ulcers, and I stated in the *Medical Times* my opinion that its systematic use might serve as a protection against hospitalism. But the application of antiseptic dressings to eye surgery was not, in my opinion, a very happy thought, for, in the first place, we cannot exclude from the conjunctival sac the germs which float in the atmosphere, and, in the second place, we must first decide which is the true germicide. Some years ago, when the carbolic spray was in fashion, some German surgeons were fined for neglecting to dress their patients' wounds with carbolic oil.

Let us hear what Prof. Billroth says now about these nostrums:—"1. Iodoform is the safest and most effective of all manageable antiseptics. 2. Moss, wood-turf, mould and oakum are useful, where there are discharges from the wound. 3. Corrosive sublimate in dilute solution is perfectly inert as an antiseptic applied to wounds, and renders patient and surgeon alike liable to mercurial poisoning. 4. Carbolic acid, which is known to be dan-

gerous in strong solutions, is, in very weak ones, as good for wound irrigation as clear water, but probably no better." I have always regarded the practice of putting instruments into carbolic lotions as a superstitious rite, which may be either harmless, or on account of its irritating nature injurious, but is satisfactory only in so far as it gives the operator satisfaction and produces in his mind a *bien être*. I object to it on the ground that, through his devotion to antiseptics, the surgeon is apt to lose sight of the primary and essential requisite to success.

At the meeting in Belfast I was asked to open a discussion on the following subject:—"Does the position of the section in cataract operations influence suppuration of the cornea, and if so, what part is played by septic infection?" I embraced the opportunity of pointing out to the meeting the fallacies involved in the proposition that the position of the section is an important factor in such cases. I showed in the first place that the cornea, if properly treated, does not readily take on inflammatory action, and, in the second place, that the fear of septic agencies and the precautions adopted to elude them rest altogether on mistaken notions, and that all the mishaps and failures in cataract extractions are mainly owing to defective methods and routine practice. In confirmation of my view, I showed a patient far advanced in and much emaciated from diabetes, upon whom I had a fortnight previously successfully operated for cataract, the incision having been made in the corneal border.* I referred also to my experience in corneal transplantation. One

* *Medical Times and Gazette*, August 16, 1884, and *British Medical Journal*, January 31, 1885,

member, a surgeon of an English Eye Hospital, stated that he and his colleagues operated by Graefe's method with success. On referring to the published report of that hospital I found that, of twenty consecutive cases, three were lost by corneal suppuration, and that apologies were made for other two mishaps. The report of the following year did not show a higher percentage of successes.

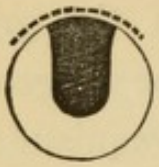

Fig. 1.

Fig. 2.

A glance at fig. 1 will show that it is the fault, not of the operator, but of the method. At the upper part of the figure can be seen the linear slit of von Graefe, marked by the dotted line. Through this slit the lens must pass, or rather must be squeezed out by a flexible curette applied to the cornea, and thus in many cases one or other of several accidents is likely to follow. The cornea may be torn, the vitreous may be squeezed out, the lens may sink into the vitreous, or the nucleus may come through and the cortical substance be pushed into the equator. With

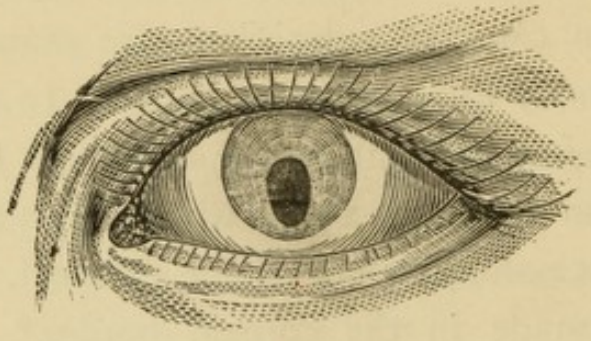

Fig. 3.

a prolapsed vitreous, the eyeball is consequently not in a fit condition for clearing out the lenticular *débris*. All

these awkward conditions are due to the method which has been followed, but, when suppuration, iritis, or other mischief sets in, we blame the microbes.

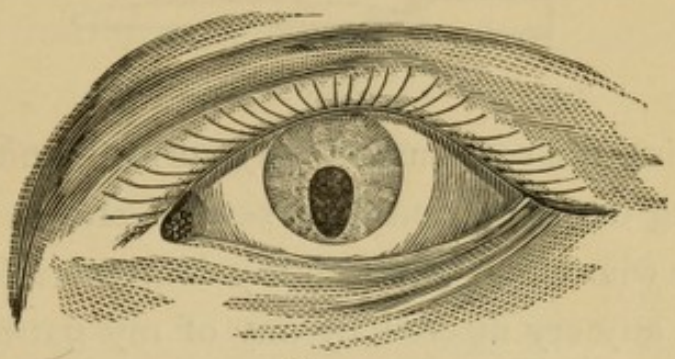

Fig. 4.

But now we are going to change all this: we are to abandon von Graefe's and return to Daviel's method, as represented in fig. 2. The section marked by the thick arc will show the risks we run both during and subsequent to the operation, as I have explained above. What compensation, then, do we get for all these disadvantages? Perhaps a round pupil, instead of a slightly elongated one, as in my operation (figs. 3, 4). The two figures represent the eyes of two patients shown to the meeting. But in the latter visual acuity is not in the least impaired, for, when the lens is removed, accommodation for the near point is rendered impossible, and hence the shape of the pupil is of no consequence. Even from a cosmetic point of view it is so, since the coloboma iridis is hid under the eyelid. I maintain, therefore, that it is worth the sacrifice of a piece of the iris to avoid so many sources of danger during the operation, and such serious consequences after it.

With regard to the use of cocaine, I think that there is a great deal of exaggeration of the pain caused by the

corneal section. The greatest pain is caused by the speculum and the fixation forceps, and this can be lessened by removing the speculum before the section is completed,

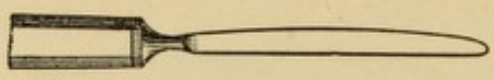

Fig. 5.

and finishing the section with my corneal knife, fig. 5, and by dividing the operation into several stages. I have put it to those who have witnessed my demonstrations, whether there was any cry uttered by any of my patients. It has been suggested to me that the Scotch are less sensitive to pain than English or Americans, but I maintain that we reduce pain to a minimum by careful manipulation, and as a set-off against the pain we avoid the risk of toxic effects. I feel it to be an unpleasant mission to speak discouragingly of a discovery which has thrown some of my friends into hysteric delight; but unfortunately the agent is not a harmless one, as is evidenced by the frequent reports of cases of poisoning by means of it, as well as fatal cases from paralysis of the heart (syncope). The most unfavourable results flow from its use as an anæsthetic in ophthalmic surgery. Thus we read:* "The application of cocaine is probably the cause in the majority of cases of ophthalmic surgery accidents. The accidents were of three kinds: destruction of corneal epithelium, vesicular eruption of the cornea and parenchymatous lesion with considerable destruction of corneal tissue." Stevens reports a case in which the instillation of 10 drops of a 4 per cent. solution into the eye caused convulsions in a healthy man.

* "*Klin. Monatsb. f. Augenheilkunde*," quoted in *Medical Press*, Nov. 10, 1886.

Mornhausen writes of a girl, twelve years old, who suffered from pain in the neck, nausea, and indistinctness of speech from the instillation of 15 drops of a 2 per cent. solution into her eye. More alarming are Reich's two cases—the first, a child from the use of a 2 per cent. solution suffering from syncope and vomiting; the second, a man, aged sixty, who from 10 drops of a 2 per cent. solution had trembling of limbs, vertigo, and difficulty of breathing. Five cases of alarming symptoms occurring after the moderate use of the drug are reported from the clinique of Professor Dobrowolski, of St. Petersburg. The widely-different explanations given of its physiological action show how little we as yet know of the substance. On the one hand Pflüger attributes its anæsthetic action to the direct influence of the alkaloid on the sensory nerve ends, while, on the other hand, Everbush* believes that its effects are due to its influence on the arterioles and the anæmic condition of the capillaries. In every case in which we make a section into tissues and are desirous of securing adhesion by first intention, we must endeavour to put these tissues in their physiological condition, any departure from which lessens the chance of primary union. And since, as I have observed, the application of a solution of cocaine blanches the surface, and the reduced sensibility is a pathological condition, we deprive the tissue of the life which is necessary to union. By this process of reasoning I was led to fear that in ophthalmic practice the anæsthesia might be too dearly purchased, and subsequent reports of the drug have amply confirmed my apprehensions, and hence I use it only in exceptional cases.

* *Centralblatt f. Practic. Augenheilkunde*, p. 289.

I have published several cases of cataract with local and constitutional complications in which perfect success followed my method.

Thus among my first twenty cases there was one of R. B., labourer, aged seventy-one, cataract in both eyes complicated in both eyes with burn of the cornea, the iris in the left being also implicated. Vision good, reads Jaeger No. 6. Another case was that of N. F., school-boy, eleven years of age. The cataract was the result of an injury with a pen, by which hypopion was produced. The pus was evacuated and the hypopion was recovered from with the result of a closed pupil. The lens was extracted. Reads Jaeger No. 10.

Among the last demonstration on eleven cases, two had small cornea and very sunken eyes, and one with closed pupils, both of whom proved successful.

I may mention also the case of Mr. N. G., a well-known Glasgow Merchant, aged ninety-two, whose cataracts were complicated with chronic conjunctivitis, causing partial eversion of the under lids. Notwithstanding his old age, he was anxious to have a chance of seeing to read the Bible. Owing to senile infirmities, strict confinement, even for two days, was impracticable. The operation proved highly successful. He could read the newspaper with ease and comfort.

The following case is of unusual interest :—

In 1887, Mrs. C., aged seventy-five, incomplete cataract in both eyes, was recommended to me by Dr. Joseph Bell, of Edinburgh, who stated in his letter that when the time for an operation comes I would find her the most critical patient I ever had to deal with.

In April, 1888, Dr. Cruikshank, of Nairn, informed me that Mrs. C.'s cataracts in both eyes were complete, but as she had a severe attack of gout with headache symptoms, and as her health was otherwise much shattered, the idea of an operation must be given up altogether. But as she had no family, and was dependent upon the care of strangers, she was determined to have her sight restored. She arrived in Glasgow on the 6th of June, and I performed iridectomy on the following day. I extracted the lens from the left eye on June 22. She was out of bed on the fourth day, and her sight was all that could be desired, and we were thinking of extracting the cataract from the other eye also, before she went home, when on July 12 she was suddenly taken ill with inflammation of the lungs. She was attended by Dr. Samuel Moore and Dr. M'Gregor Robertson, and was seen also by Dr. Cruikshank, of Nairn, and her life was despaired of. The following notes are from Dr. Robertson:

"On July 11, Mrs. C. complained of not feeling well, lost appetite, but still got up. On the 13th she was still more indisposed, and on examination the temperature was found to be 102·4° and pulse 110. Pain was complained of on the right side, and on auscultation crepitation was found at the extreme base of the right lung. By next day the whole lower lobe of the right lung was involved, but the temperature fell to 101·8°, above which it did not again rise, while the pulse rate increased to 130, and the respiration to 40. By the 16th the right lung was extensively involved, and the left had also become implicated in its lower portion. The pulse and respiration continued high, but the temperature remained low. Lividity was marked,

the tongue was coated with a thick white fur, the abdomen was distended and tympanitic, and the patient seemed to be certainly sinking. On the following day the condition seemed worse if possible, and at 11 p.m. the pulse rate was 150, the respiration 50, and gasping, but the temperature did not reach 101°. The patient was sunk down in bed, lying with mouth open, only semi-conscious, and death did not seem to be far off. Up to this time food had been administered in small quantities at short intervals —milk, beef and chicken tea, prepared foods, and so on, with teaspoonful doses of brandy every hour. The brandy was now increased, and the nurse was ordered to give it much more frequently. During the night a remarkable improvement occurred, and when the first visit was made at 7 a.m., pulse and respiration had greatly improved, and quiet breathing had taken the place of the gasping inspiration. From this time improvement was continuous, and in a week all danger was past."

The remarkable feature about this case is that during the state of prostration, the eye has not suffered. She is able to read the newspapers, and her letters show that her sight is perfectly good. She is at present (Oct. 15) in Glasgow to consult Dr. Moore for her gout and general health, but her sight is all that could be desired.

II.

ON THE TREATMENT OF DETACHMENT OF THE RETINA.

Communication addressed to the Académie de Médicine of Paris, October 14, 1884.

From the "British Medical Journal," December 20, 1884.

I HAVE the honour to present to the Academy a method of treatment in cases of detachment of the retina, an affection which has hitherto been regarded by all oculists as incurable. Various means, of both medical and surgical treatment, have been tried, but have been all abandoned as unfitted to cope with that disease. As I have frequently succeeded in curing patients of detachment of the retina, I am desirous of submitting my mode of treatment for the consideration of the Academy.

Detachment of the retina is produced by an effusion of serum between that membrane and the choroid. The retina thus becomes wrinkled and separated, is brought in front of the focus of the dioptric system, and can easily be seen by the erect ophthalmoscopic image. In the first stage, it shows only a slight undulation. When further advanced, a pale grey elevation becomes visible, which, when the eye is in motion, screens a part of the fundus, and the vessels are seen crossing the surface of the detached portion. This grey opaque body gradually increases in size, and the subretinal fluid accumulates, until no part of the fundus can be seen. Total loss of

vision then ensues, and the detachment is said to be complete.

The subjective symptoms are, first, dimness of vision, the patient seeing, as it were, a cloud before him; secondly, the interruption of the visual field, that is, the patient sees when looking in one direction, but, when looking in another direction, a cloud seems to intervene between him and the object. In looking at the light of a lamp, the colour appears of a blue tinge. When the effusion approaches the macula, objects appear crooked, and when the macula itself becomes involved, the optic axis deviates in another direction. When the effusion has once commenced, it continues to develop itself until the whole visual field is abolished, and the patient cannot distinguish the light of a candle moved before him in any direction. It is worthy of note that, in some cases of extensive effusion, even that part of the retina which is *in situ*, and still visible by the ophthalmoscope, loses its sensibility to light, because it seems to have, to some extent, imbibed the fluid from the other part.

The description just given is that of the acute form of the affection, which, whether it follows a more or less rapid course in its development, may be traced to a chill caused by a sudden exposure to cold while heated. As a typical case, may be mentioned that recorded by Desmarres, of a lady of distinction, who, in coming from a ball at the Hôtel de Ville on a frosty night, was unable to find her cloak. Too impatient to wait for it, she walked with bare head and shoulders to the carriage, and was instantly taken with detachment of the retina of the right eye (*Maladies de Yeux*, vol. iii.). This acute form

may also supervene upon either a single attack, or a succession of attacks, of violent epistaxis. The vascular relation between the arteria centralis retinæ, and the orbital and frontal arteries on the one hand, and the Schneiderian membrane on the other, in the case of chill to an overheated face and neck, sufficiently accounts for the phenomena in question; but continued epistaxis may also be the consequence, rather than the cause, of the retinal congestion and detachment. Further, instead of a simple stretching of the retina, a part of it may be torn away, and float as a flap in the vitreous humour.

The detachment more frequently follows a chronic course, and may take two or three years for its development; and in such cases the fluid, instead of being transparent pure serum, is mixed with pigment-granules, and sometimes, though rarely, with white flocculi. This chronic state is caused by acute irido-choroiditis, irido-cyclitis, or, indeed, by any of the various forms of chronic intra-ocular inflammation. It is very fortunate if the inflammation be confined to the membranes, and leaves the vitreous body uninvolved, for otherwise the lens ultimately participates and the result is softening and atrophy of the globe. Sometimes, spontaneous intra-ocular hæmorrhage and total disorganisation of the eye-ball may take place.

Associated with the chronic form of detachment of the retina we most frequently have a high degree of myopia, which state of refraction, in fact, goes hand in hand with the intra-ocular pathological conditions just mentioned.

Detachment of the retina may, however, also be traumatic in its origin. I have at present under observation

the case of Admiral ——, who, when out shooting in November, 1879, was struck in the right eye by a pellet from the gun of one of the party. I extracted the pellet, which was lodged under the conjunctiva, and had made an indention in the sclerotic. The eye remained perfectly well, February, 1880, when, after being out on the ice curling during the day, he had the same evening an attack of epistaxis, so violent that a basin was completely filled with blood, from the right nostril. Irido-choroiditis, with detachment of the retina, followed some days later. The inflammatory attack left a posterior synechia behind, and the detachment gradually increased. I may also mention that the detachment may either be continuous, or in isolated spots or portions. When the detachment is large, it is generally situated in the lower portion. Even when it begins at the upper portion, it for the most part gravitates downwards; and the part of the retina originally affected, if the layer of rods and cones have not been long macerated, applies itself again upon the choroid, and reassumes its function. My clinical observations have fully convinced me of that fact.

Treatment.—Having observed, in cases of wounding of the sclerotic and prolapse of the vitreous, how satisfactorily the wounds heal without prejudice to vision if we secure coaptation, I have come to the conclusion that the safest operation for removing the fluid is to cut down upon the sclerotic and evacuate the effused serum by *subconjunctival meridional sclerotomy;* and my experience has convinced me that this effusion can be treated in the same way as other effusions in serous cavities, as, for example, in the pleura or in the peritoneum. I withdraw the effused fluid

by a subconjunctival sclerotomy, practised in the meridional direction. The following are the different steps in my operation, when there is a large continuous detachment of the retina, and vision is nearly or entirely abolished :— I examine the patient by the erect ophthalmoscopic image, in order to ascertain the site of the detachment, and also to which side the effused fluid inclines. It is essential to repeat this examination, putting the patient's head in different positions. Thus, with the patient sitting upright, and then, also, with the head placed in a horizontal position, he is made to look upwards and downwards, to the right and to the left. The side to which the fluid inclines in the different positions of the eyeball having been thus ascertained, the patient is put under chloroform, and the ophthalmostat is introduced. I then make a vertical incision into the conjunctiva, half an inch long, in the region of the detachment. The assistant separates the lips of the wound in a horizontal direction, by means of two strabismus-hooks. I then open Tenon's capsule, lay bare the sclerotic, and rotate the eyeball in such a direction as to expose the corresponding part of the sclerotic, towards which the fluid inclines. Into that part I introduce a broad sclerotome. The instrument is gently withdrawn without the slightest inclination, and the liquid flows on the withdrawal of the instrument. The instrument is introduced obliquely, in such a manner that the edges of the scleral wound should overlap each other, and not remain gaping when the instrument is withdrawn. If I judge that more fluid remains behind, I introduce a fine silver spatula, and press gently on the lips of the scleral wound. If the detachment be not very extensive, or the

eyeball too prominent, or, rather soft, I operate with a very narrow sclerotome.

The lips of the conjunctival wound are now brought together by means of one or two fine silk ligatures (although, in exceptional cases, these ligatures may be dispensed with), and both eyes are shut by three strips of court-plaster, lint, and a bandage. The patient is ordered to lie upon his back for two or three days, as after the extraction of cataract. On the third or fourth day I renew the simple dressing without opening the eyes; but on the fifth day the eyes are opened, and the results of the operation ascertained. By this time there is generally not the slightest trace of an operation left, so that this method is, at all events, inoffensive, even if we do not always obtain the desired result. Generally, however, we obtain satisfactory results. Of seven operations which *have been recorded* from my *clinique* since 1878, three have resulted in perfect success. The state of total blindness in each has been cured, so that the patients could return to their ordinary occupations. In each of four other cases there was a decided improvement; the patients could see to walk about, although sight was not completely restored.

CASE I.—My first successful case was recorded * as follows:—

Miss A. L., aged 58, shopkeeper, who had previously enjoyed perfectly good health and sight, felt her eyes beginning to get dim in October, 1877. When she consulted me in January following I found in the right eye retinal

* *The Lancet*, October 12, 1878.

dropsy complete, and the left progressing in the same direction. In May the detachment became complete in the left also, vision was entirely abolished, blindness being so advanced that she could not follow the flame of a gas-burner passed within a few inches of her eyes. Dr. Walker, of Edinburgh, pronounced the case as incurable. I operated on the right eye on September 15 in the manner described above, with the result that, on the eighth day, she could distinguish persons distinctly, and count figures in all directions at two feet distance. On the twenty-second day after the operation she could see the time to a minute on a watch, and distinguish between shades of colours, such as red and pink, green and blue. Six weeks after the operation she called at my house, having passed through a crowded thoroughfare unaided. The following year I received a letter addressed to me in her own handwriting.

CASE II.—Eight days ago, in the ophthalmic hospital of Paris, I operated upon a patient under the following circumstances. For the report of the case I am indebted to Dr. Henri Campart, Chef de Clinique.

Madame B., aged 57, came to the Clinique Nationale Ophthalmologique des Quinze Vingts, July 12, 1884. She stated that, in the previous April, she frequently noticed shadows floating before her right eye. Every object that she looked at attentively appeared to her surrounded by coloured rings, especially if the objects were in a bright light. She had never been myopic, and three months previously the sight of the right eye was quite as good as that of the left. A few days afterwards, in getting up one morning, she found that the sight of the

right eye had become considerably impaired, and that in a very rapid manner. Objects appeared to her crooked, and she could not distinguish their lower half. She felt a sense of weariness in using the eyes, but there was no spontaneous pain. Dr. Galezowski, when consulted some days later as to this anomaly of vision, found a detachment of the retina of the right eye. He ordered cold compresses to the eye, and blister and leeches to the right temple, and a collyrium of sulphate of eserine (5 centigrammes to 10 grammes of distilled water). Having received no benefit from this treatment, the patient presented herself at the Quinze Vingts on the date above mentioned. She is a stout, plethoric woman, and stated that she had long suffered from asthma, attacks of which occurred several times a week. Her occupation was that of a laundress, and she had evidently been much overworked. Dr. Fieuzal diagnosed the case as detachment of the retina of the right eye, with glaucomatous excavation of the optic nerve. With the right eye she could count the fingers at 58 inches distance; with the left eye vision was $\frac{2}{3}$ of Wecker's types.

Treatment.—A solution of sulphate of atropine (1 in 200) was dropped into the right eye, and sulphate of eserine into the left. Iodide of potassium was also prescribed to be taken before each meal. At the beginning of October it was proposed to her that she should undergo an operation; she assented, and the operation was fixed for October 7, 1884.

With the authority of Dr. Fieuzal, chief surgeon of the hospital, who assisted at the operation, an anæsthetic was given, and Dr. Wolfe performed paracentesis of the sclerotic. The lids were kept widely open, and fixed by means of a

blepharostat, and a small opening having been made in the conjunctiva, the sclerotic was punctured on its outer side, between and posterior to the insertion of the external and inferior recti muscles. A brownish limpid fluid escaped from the wound. When it had ceased flowing the instrument was removed, and, without any sutures having been introduced into the conjunctival wound, the eye was closed, and an agglutinative dressing applied. The patient was ordered absolute rest. She took, every morning, a glass of aperient water.

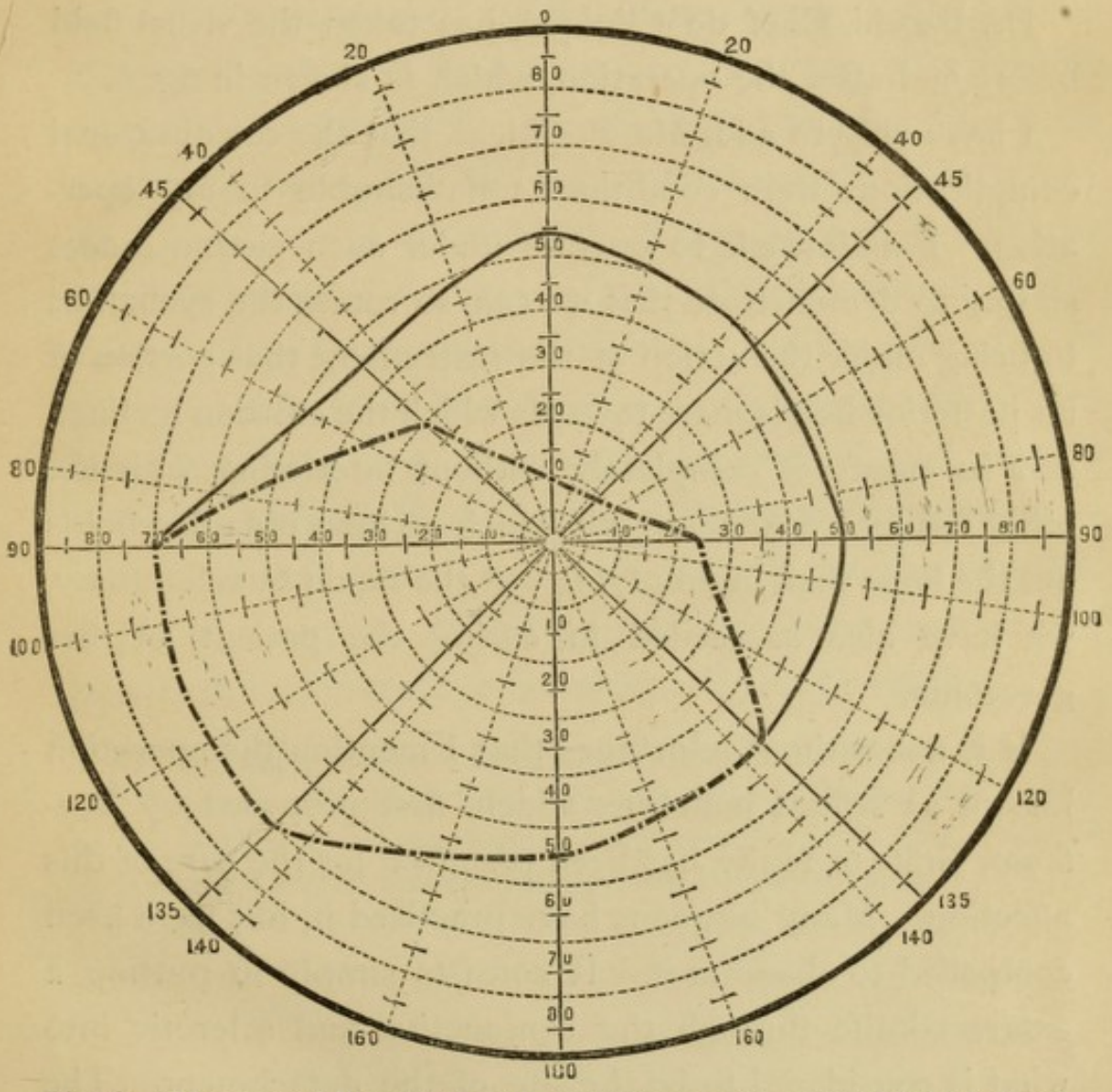

Fig. 6.—The dotted line marks the boundary of the visual field before, and the continued line shows the gain after, the operation.

On October 10 the dressing was removed, and as soon as she opened her eyes the patient was astonished at the result of the operation. She could count the fingers, see the whole length of them, and distinguish between two different coins of the same colour.

On October 12 the dressing was again removed, and it was found that progress continued to be made. The patient could read at a distance of 2 metres $\frac{1}{3}$ of Wecker's type with the eye that had been operated on, and she could tell the time on a watch.

Dr. Bacchi, Chef de Clinique, has taken the visual field before and after the operation, which is shown in fig. 6.

I have only to add, Mr. President, that the constitutional complications were conditions unfavourable to my operation. I undertook to operate under such circumstances simply to demonstrate that we can so rotate the eyeball as to bring under the action of the instrument that portion of its posterior hemisphere towards which the effusion inclines, and so empty it completely without interfering with the other tissues. But the result which we have obtained holds out the hope that, in emptying out the liquid by sclerotomy, we have also succeeded in curing the patient of her glaucoma.

It is not without reluctance that I mention the operation known as scleral puncture, which, first proposed by Professor Gräfe of Halle, has been practised for the cure of this affection. Many surgeons have practised it, but have been compelled to abandon it. It consists simply in putting a cataract-knife through the conjunctiva and sclerotic into what is considered to be the site of the detachment. The result is that a tumour, which is supposed to contain the

effused serum, is formed under the conjunctiva. The fluid is allowed, for a fortnight or so, to absorb, and then, as a rule, very little or no result is obtained. I mention this simply to point out that, in the first place, to thrust a knife into the eyeball in the hope of effecting something, is not eye-surgery. This is not the way in which we attempt to remove fluid from other cavities. Further, when the patient is put on his back and under chloroform, the power of rotation of the eyeball becomes very limited, and the probability is that the fluid falls backwards; and in many cases there is removed, not the effused serum, but a portion of the vitreous. So long, therefore, as surgeons regard my operation simply as a subconjunctival sclerotomy, their chances of success will be comparatively small. My system must be studied in its totality. Two things in it are to be specially attended to, namely, the ophthalmoscopic examination of the eye in various positions, and the liberating of the eyeball from its envelope, so as to render visible and bring into proper position that part behind the equator towards which the fluid inclines, and also to demonstrate to our senses that the effusion, and nothing but the effusion, has been removed. If the operation be so understood and practised, it is certain to be satisfactory in its results.

The foregoing Paper was also published in *La France Medicale*, and the cases referred to, have been discussed at the Annual Meeting of the French Ophthalmological Society in January, 1885, reported in *Annales d'Oculistique* for January and February, 1885.

CASE III. was reported by a former assistant, Dr. Cappie-Shand.* Mrs. G., aged 47, applied at the Ophthalmic Institution in the beginning of December, 1881, for deficiency of sight. Ophthalmoscopic examination showed opacity of the vitreous of the left eye, and in the right, complete detachment of the retina with pigment floating in the subretinal effusions. She could not see the light of a gas-burner held before her, but could discern only a faint glimmer of the burner at the lower and outer margin. Tension slightly increased (T=1). This was a case of detachment of the retina complicated with choroiditis. In the middle of January she had an attack of iritis in the blind eye. The sclerotic was punctured on February 19, 1882. About half a drachm of yellow serum was withdrawn along with the black pigment. On February 23, when the dressings were removed, she could see everybody in the house, could count fingers and distinguish features and different colours. A cursory ophthalmoscopic examination showed the disappearance of the serous effusion, but a considerable wrinkling of the retina, especially at its lower periphery, while the centre was tolerably free. The remarkable circumstances of the case, noted at the time, were the entire absence of pain or feeling of uneasiness in the eye since the operation, but rather a feeling of greater comfort in it, as well as the healthy appearance of the conjunctival sac. Indeed, with the exception of redness at the spot where the incision had been made, the rest of the conjunctiva bore no trace of an operation.

* *Medical Times and Gazette*, March 11, 1882.

CASE IV. was reported by my present assistant, Dr. A. T. Thomson.*

A. B., aged 14, was admitted into the Glasgow Ophthalmic Institution in May, 1882, for detachment of the retina of the right eye. The boy appeared healthy; no history of previous ailments, although he looked rather pale; he enjoyed perfectly good sight until within six months before, when it was noticed that the right eye suffered from convergent squint; about April the schoolmaster began to complain that the boy held his book very close to one eye and his head twisted in that direction; and in the beginning of May the failure of vision terminated in almost total blindness. Ophthalmoscopic examination on admission revealed detachment of the retina limited to the lower and outer part, while the optic disc and the upper and inner segment of the fundus were quite visible. This apparently healthy part of the fundus presented a fine subretinal infiltration. He could see the shadow of a finger moved downwards and inwards, but in the upper and outer side of the field he could not distinguish even shadows, nor point out the movements of a burning lamp. As the abolition of sight was out of all proportion to the retinal detachment, the case was considered as affording little encouragement for surgical interference. The operation was, however, resorted to in July, 1882, with the result that on the fourteenth day after the operation, he could see to move about the house when the other eye was closed, and could read No. 20 of Jaegar with perfect ease. The patient was examined three months later, when it was found that the improvement of his vision was still maintained.

* *Medical Press and Circular*, August 16, 1882.

CASE V. was published by Dr. Thomson.*

A. L., aged 29, stonemason, admitted into the Glasgow Ophthalmic Institution, August, 7, 1882. He always enjoyed good health and sight until the middle of January of last year, when dimness of sight came on suddenly one morning. Has been addicted to taking whisky in excess. On the margin of the left orbit on its temporal region there is a vertical cicatrix caused by a wound with a piece of iron, which was inflicted three years ago. He applied to two ophthalmic hospitals for relief, in both of which his case was pronounced incurable; from one of these he holds a card stating that he suffers from "amblyopia potatorum and separation of the retina." He was indeed greatly addicted to drink, but as the other eye was never affected we regarded it simply as a retinal detachment, more likely of traumatic origin. Ophthalmoscopic examination showed general infiltration of the retina of the left eye, but there was in addition one prominent central portion more elevated than the rest. This central rag of the regina was floating in the effusion. The operation was performed on the 9th August, 1882, in the usual manner, but instead of making the incision in the vertical meridian, it was done rather in the outer angle in the interval between the inferior and the external recti muscles. The fluid was withdrawn by a puncture, and the lips of the wound brought together by a silk ligature. August 13, fourth day after the operation, vision was restored to such an extent that he could see objects distinctly in every direction, could distinguish also between a florin or shilling and a penny-piece, read

* *Medical Press and Circular*, October 11, 1882.

No. 20 Jaeger, and see to walk about when the right eye was closed. Ophthalmoscope shows still the small central floating detachment, which has only slightly been reduced in size, but the rest of the infiltration has disappeared, and the greater part of the fundus is perfectly visible.

CASE VI.—Mr. James L., aged 72, farmer, consulted me ten years ago about the condition of his right eye, which I pronounced incurable, and at present this eye is totally blind, and the pupil closed by posterior synechia. Six years ago he had an alarming attack of epistaxis which lasted for eight days with intermissions. The left eye had been serviceable until October, 1882, when blindness came on, and advanced rapidly until the beginning of January of the present year, when perception of light was almost completely lost. He could follow the light of a lamp at a few inches distance only at the lower part of the field, but upwards and inwards not at all. The retinal detachment rendered the state of the fundus totally invisible, pupil not dilatable beyond one-half, tension normal.

I performed the operation on the 24th January. Chloroform was administered by Dr. Thomson, but when about two drachms were used he had to discontinue the anæsthetic on account of sudden cessation of the pulse and lividity of the face. So completely and rapidly was anæsthesia produced, that an incision was already made through the inferior rectus, and the sclerotic exposed. The patient rallied as quickly, and the remainder of the operation was performed without chloroform. About half a drachm of serum was withdrawn.

January 29.—Fifth day after the operation. The eye

was opened and examined. He can see and count fingers in all directions. Can distinguish features of all parties in the house; sees small objects.

February 1.—Ninth day after the operation. Very little mark of an operation visible, and vision steadily improving. He can describe minutely the dress and ornaments of persons, and can move about independently of assistance. Tension is normal; has so far recovered as to be able to return home.

CASE VII.—Detachment of the retina, with complete loss of sight, cured by an operation. Reported by Dr. M'Gregor-Robertson.*

On September 5, 1883, S. H., tailor, aged 38, applied for advice. Three years before, he had lost the sight of his right eye. On examination, that eye was found quite blind; there was almost no perception of light. If the lamp were held at the outer side, a faint flicker of light was perceived, which disappeared as soon as the lamp was moved to the front or nasal side. In other respects, the condition of the eye was bad; the cornea was hazy; there was an opacity of the lens; and the pupil was fixed, and could not be dilated, owing to posterior adhesions. Tension + 1. In addition to the cataract, hazy cornea, and adherent pupil, the nature of the limitation of the visual field indicated a probable detachment of the retina. The condition was, therefore, considered hopeless. With the left eye, the patient could see quite well till two years

* This case was shown to the Glasgow Medico-Chirurgical Society on the 4th April, 1884, and at the annual meeting of the British Medical Association in Belfast in August, 1884, when the sight was still improving.

before; at that time, it also became affected, and gradually grew worse, till the patient was unable to see to walk about. At the date of his presenting himself, the blindness was complete. He could not see the light of a lamp held before him in any direction. This (left) eye also had a nebulous cornea. Examination revealed complete detachment of the retina, and the presence of large flocculi floating in the vitreous humour. The pupil dilated normally; and tension was normal. Previous to admission, the patient had attended another eye infirmary, and his card, dated July, 1883, from that hospital is marked "*iridochoroiditis and separation of the retina*," so that there can be no question as to the nature of the case.

On February 3, 1884, the patient returned, most anxious that something should be tried for the left eye, as he thought he could not be worse after an operation than he was. On February 14, accordingly, Dr. Wolfe operated under chloroform. The conjunctiva and fibrous tissue having been opened, the sclerotic was laid bare, and punctured in the posterior hemisphere of the globe in the line of the vertical meridian. Instead of the spurting out of fluid which usually follows the withdrawal of the lance, only a small quanity of serum oozed out each time the flat probe was introduced through the wound. The wound in the conjunctiva was closed with a silk ligature, the eyelids closed with adhesive plaster and lint, and a bandage applied over both eyes. On the sixth day after the operation, when the ligature was removed, vision was found so much improved that the patient could see faces and count fingers at 18 inches distance. The vision was, however, limited to the outer part of the field, the inner

part being still a blank. The ophthalmoscope showed a detachment to the lower and outer part of the fundus. The tension of the eye being almost normal, Dr. Wolfe determined to repeat the operation. This was done on March 21. The patient having been put under the influence of chloroform, the section was made in the space between the inferior and external recti muscles, the eyeball was rotated upwards and inwards, and the lance pushed through the sclerotic in the posterior hemisphere, at the region of the detachment. This time, unlike what happened on the previous occasion, a considerable quantity of serum gushed out as soon as the puncture was made. No ligature was applied; the eyelids were closed with adhesive plaster, lint, and a bandage.

On March 25, four days after the second operation, the patient could count fingers with ease, even at a distance of several feet; the field of vision was complete; he could read Snellen's type 20 at 15 inches distance, and tell the time, almost to a minute, on an ordinary white-faced watch.

REMARKS BY DR. M'GREGOR-ROBERTSON.—This is the first time that Dr. Wolfe has ventured to operate a second time, and with such satisfactory results.

This case is the more interesting, in view of the discussion on Detachment of the Retina, at the sitting of the Société Française d'Ophthalmologie, on January 29. In this discussion, M. Wecker is reported (*Revue Clinique d'Oculistique*, February, 1884, p. 45) as advocating treatment of this affection by the actual cautery applied to the sclerotic, and M. Dor treats it by placing the patient on his back for four weeks, enjoining abstinence from every

movement, and by applying a suction apparatus, and injecting pilocarpine; while M. Parinaud commends excising a portion of the sclerotic and repeated tapping, and adds that the tapping can be repeated by the patient himself. No wonder Hirschberg's commentary (*Centralblatt für Pract. Augenheilkunde*, March, 1884) on such practice should be of the inarticulate sort, expressed by a mark of exclamation.*

I may add, that this operation has not been practised in this country. One London surgeon, indeed, tried it in two cases. He put in Gräfe's knife in one place through the soft parts, and no fluid having come out, he put it into another, when welling under the conjunctiva took place. When the operation is thus carried out in the dark, a satisfactory result is scarcely to be expected. In Germany, a form of it, recommended by Hirschberg and Gräfe, has not been successful to the same extent. This Dr. Wolfe attributes to the fact that they puncture through conjunctiva and sclerotic without previous dissection of the conjunctiva, and the serum is permitted to diffuse itself through the fibrous tissue and become absorbed. Thus the operation cannot be performed with the same precision, and is, in some respects, haphazard.

* One of the orators said—"Dans tous les cas, il faut beaucoup insister, dans le traitement, sur la position horizontale du malade, qui devra être conservée pendant plusieurs mois sans discontinuer un seul instant" (*Nerve Clinique d'Oculistique, Fevrier*, 1884), and in 1887 the same confrere went all the way to the Washington Congress and astonished his audience by telling them to treat detachment of the retina by injecting antiseptic material into the eyeball. Such doctrines are sure to produce a heavy crop of damaged eyes.—W.

CASE VIII., reported by Dr. M'Gregor-Robertson.—Hugh S., aged 70, storekeeper in a shipbuilding yard, applied on the 23rd of August, 1884, for admission to the Ophthalmic Institution, because of blindness of the right eye.

The man's history was unusually good. He had always enjoyed perfect health, was of regular habits, and looked a hearty, hale old man.

He began to be troubled with his eyes about 18 months ago. One evening while walking along Argyle Street, Glasgow, he noticed that each of the lamps on the opposite side of the street appeared to have two lights instead of one, one of which was white the other blue. He stopped and then walked across towards the lamp, and as he approached it the two lights came nearer to one another till at a certain distance they merged into one. On going away again the two lights re-appeared. He then tried shutting one eye, and found that the white light was perceived by the left eye, and the blue one by the right, but the lights were crossed so that the blue light, perceived by the right eye, was to his left side. He thus became aware that something was wrong with the right eye, which gradually grew worse until he could not discern shadows with it. Lately he began to see floating objects before his left eye.

In Dr. Wolfe's absence I examined the patient. The following was the condition of the right eye:—Pupil imperfectly dilatable, tension normal, a large retinal detachment at the lower and outer portion of the fundus and some floating pigment. The detachment completely obscured the fundus when one looked straight into the eye. But when the eye was rotated strongly inwards a glimpse of the

disc could be got. It appeared only moderately clouded. There were a few floating shreds in the part of the vitreous not implicated in the detachment. Vision was almost completely abolished. The patient could not see the lamp held before him, nor could he discern the shadow of a hand held in front of him. Away to one side, however, he could catch a glimpse of the white cuff on the wrist of the hand held up, though when trying to touch it he missed it. As he himself expressed it he was "perfectly blind but for a wee bit blink away to the one side." In the left eye no floating bodies could be discerned through the undilated pupil. I considered the detachment one suitable for operation and requested the man to return on the following Monday, August 25, when Dr. Wolfe confirmed my diagnosis, and thought it a favourable case. For, although the blindness was altogether out of proportion to the extent of the detachment, and although the remaining clear portion of retina failed to form images, the chances afforded by an operation should not be withheld in such a case, since, when a large retinal surface becomes detached, the rest becomes torpid and then loses sensibility. It is remarkable that after the withdrawal of the effused fluid, the retina not only regains its function but the detached portion applies itself to its old site. When the macula is not involved, normal vision becomes re-established; but when the macula loses perception of light by long detachment there is eccentric fixation—that is, a neighbouring portion of the retina is used for it. In this case the signs of commencing embarrassment in the other eye also indicate the desirability of the operation to remove the effused fluid.

The operation was performed on the 2nd September, Dr. Kirkwood, of Rutherglen, along with myself assisting. Having introduced the speculum, Dr. Wolfe made a vertical incision into the conjunctiva and fibrous capsule at the outer and lower angle of the cul-de-sac. The edges of wound were separated by two small strabismus hooks, and the eyeball having been rotated upwards and inwards, Dr. Wolfe entered the sclerotome through the sclerotic into the sac of the detachment. A large quantity of brownish fluid followed the withdrawal of the instrument. The wound was brought together by two fine silk ligatures, and the patient was put to bed.

On the sixth day after the operation the ligatures were removed. There was not the slightest reaction in the eye, which looked healthy and clear. With the exception of a red mark where the conjunctival incision was made it bore no marks of an operation. The left eye was blindfolded, and it was found that with the right he could see everything and every person in the room, and walk to any part of it without hesitation. He could see with perfect distinctness a ring on the little finger of a hand held up at 6 feet distance, and could with very little trouble tell the time to a minute on a white-faced watch. He could also read Snellen's CC at 10 feet, C at 5 feet, XL at 3 feet, and XX at 12 inches.

In *The British Medical Journal* for 3rd May, 1884, I reported a case of detachment of the retina, cured by Wolfe's operation. That case and the present one are remarkable testimonies to the value of the operation. It was performed on a man of the age of 38, this on a man aged 70. The former case was complicated with irido-

choroiditis and nebulous cornea, the latter was uncomplicated. After the lapse of seven months the regained sight of the former has not at all diminished in quality, the man at this date being able to tell the time, to a second, on a watch, and to pursue his occupation as a tailor, and that in spite of the worst possible hygienic surroundings. Is it too much to expect that the present patient, a man of still vigorous health and of strictly regular habits, will benefit still more by the operation, and to conclude that the operation whose simplicity is one of its great merits is destined to occupy an important position in eye surgery?

CASE IX.—In the *Lancet* of July 11, 1885, Dr. M'Gregor-Robertson, in recording another successful case from my Clinique, gives a historical sketch of this operation. The *case* is that of E. D., aged 55, forgeman, residing at Coatbridge. He attended at the institution in March, complaining of inability to see with the left eye, which had begun to grow dim two years before. Hand held in front of eye is quite invisible, but a faint gleam of white from the cuff on the wrist is perceived downwards and outwards. Large detachment occupies the external and lower part of the fundus. The disc is visible, but cloudy. The operation was performed on May 18. Six days after the operation the patient was examined. He could see well in all directions, could readily count and distinguish fingers, and could tell the difference between a half-crown, two-shilling piece, and a penny by the unaided sight. Three days later he could read Snellen's XX at a distance of 15 inches. Five days later he read Snellen's

XX at 20 inches, could tell the time on a watch to a minute, and with good light pointed the position of the seconds' hand. A few days later reading was found the same, but he said things and persons were clearer to him than before, and he could walk about perfectly easily with the sound eye shut up. Three weeks later he could read Snellen's XX at 3 feet with the aid of a 14-in. convex lens, accommodation being paralysed by atropine.

The results obtained in the three cases I have myself seen and examined, both before and after operation, were all very much alike, and akin to that of the last case. In all three cases the affected eye was practically blind, so that when using it only the patient required to be led about. The tailor, whose case was reported in the *British Medical Journal*, was so led about, since his other eye was useless. Yet this man after the operation resumed his work; his wife threads the needle, but he does the sewing.

Now, as to the *results* of Wolfe's operation. They are remarkable because of their almost uniform success in appropriate cases. I shall speak specially of those I have myself seen, three in number, which left little to be desired. Dr. Wolfe has operated on fourteen cases in all; *in only one (the tailor's case) was the operation performed twice.* Of these, ten were successful and eminently satisfactory. The four unsuccessful cases were practically hopeless, and the operation was performed as much to satisfy the solicitations of the patient as for anything else.

The *permanence* of the benefit is the next point to be noticed. The woman operated on in 1878 still pursues her usual business. For seven years her sight remained good, but since the beginning of this year it has been

beginning to fail, and cataract is developing, for which Dr. Wolfe proposes, when necessary, to operate. The tailor above referred to was operated on in April, 1884. He occasionally presents himself at the institution as desired. On the 16th of this month (June) I could detect no diminution in the amount of vision. In the beginning of June the patient, S., operated on in September last year, was examined, and his sight found still as satisfactory as before. In the *Medical Press and Circular* of 1st April, 1885, Dr. A. T. Thompson has noted the entirely satisfactory condition of a patient operated on in 1882. These cases ought to afford sufficient evidence that the benefit obtained is not of the fleeting nature characteristic of the cases of Gräfe, described by v. Kries.

I have been led to write this paper because my own observation has impressed upon my mind the simplicity of the operation, its freedom from risk in all cases when carefully performed, and the value and duration of its results, and because its reported failure in other hands seems to me to be due chiefly to its being confused with that practised by Gräfe, from which it so markedly differs.

Of the unpublished successful cases, the following may be mentioned as an instance :—

CASE X.—Mr. V., aged 35, implement manufacturer, Devonshire, had lost the sight of his right eye some years previously, and about eighteen months before consulting me, the sight of the other eye also began to decline very

rapidly. He consulted several oculists, among others Mr. Anderson Critchett, all of whom pronounced his case to be detachment of the retina, and therefore incurable. Mr. Critchett, however, mentioned to him, that I had reported some successful operations for that disease, which induced the patient to apply to me, and I first saw him at my hotel in London, where he met me by appointment in April, 1887. It was painful to see him led about in a most helpless condition, and on examination, I found his right eye affected with partial cataract, adherent pupil, and detachment of retina, the left also with detachment of the retina, vision entirely abolished, and luminous perception nil.

I considered the case so highly unfavourable, that I could not advise him to undertake the journey to Scotland with such slender prospects of a successful result. However, he was determined to take his chance, and came to Glasgow in May, 1887. I operated upon one eye two days later, and a fortnight after, he was able to walk alone in the streets, could read large type, see the time on a watch, and return home cured.

The following year he wrote, that as his sight still continued good, he was anxious to know whether the excitement of preaching and public speaking would be prejudicial, as he was a lay preacher in the denomination to which he belonged.

With regard to the medical treatment—viz., the hypodermic injection of pilocarpine and the infusions of jaborandi leaves—recommended some years ago, as those suggestions have proved futile, I need not refer to them. Neither have I mentioned the operation re-

commended by a Paris Surgeon, namely, the introduction of a gold wire through the sclerotic and the detached retina, with the view of getting rid of the serum by means of drainage. Out of regard for the author of that method, I would even now pass it over in silence, were it not for the fact that, that operation has been lately revived in a new form, which consists in the substitution of cat-gut for the gold wire, and at the last meeting of the Ophthalmological Congress in Paris in July, 1889,* the subject was again discussed. It seems to me to be fairly established from clinical observations, that if a wound in the sclerotic is left open, and *a fortiori* two perforations made, the eyeball is sure to become soft and atrophied. There is, however, one question which deserves consideration, viz.:—Is iridectomy a proper means for the cure of detachment of the retina?

At the annual Congress of the French Ophthalmological Society in 1886, M. Warlomont reported to the meeting that he and M. Dransart had been successful in the treatment of some cases of that disease by iridectomy. In the following year, M. Coppez reported to the same meeting that in eighteen comparatively recent iridectomies he obtained only one complete and one partial cure. Five times the operation had proved injurious. With Wolfe's operation in seventeen cases, he twice obtained complete reapplication of the retina, and in almost every case a considerable improvement, which was still maintained, though several months had elapsed since the operations. M. Coppez, therefore, concludes that iridectomy rarely cures even recent detachments, and frequently

* *Annales d'Oculistique*, August-September, 1889.

makes matters worse, while Wolfe's operation is more rational and more efficacious. It is also less painful, less serious, and, above all, more reliable than iridectomy.

I have only to say that, when the serous effusion is encroaching upon the zonula of Zinn, pushing the lens aside I found iridectomy performed at the scleral border, a very valuable remedy. I have at present under observation the following:—

CASE XI.—J. L., age 28, bleachfield worker, Mearns, had lost the sight of the right eye some years ago. At the end of February, 1889, when at his work, found that "something gave way" in his left eye which rendered him totally blind, so that he had to be led home. He came to the Ophthalmic Institution on the 1st March, when we found the right eye completely atrophied, and partial cataract and adherent pupil. The left eye was affected with complete detachment of the retina. The serous infiltration extended to the aqueous chamber. Pupil sluggish, and dilated only slightly by atropine. Vision entirely abolished, tension – 2. Dr. M'Gregor-Robertson put the patient under chloroform, and I performed an iridectomy at the extreme periphery of the corneal border, und the quantity of serum withdrawn was unusually large; four times did I introduce the probe, and each time a large quantity came away. The eye was dressed in the usual manner, and on the fourth day, when the eye was opened, he could see and recognise the faces of his friends. On the 8th day he could see the time on the watch. I showed him again to the members of my postgraduate class on the 10th

May, and then again in July, when he could see to walk about, and see the second pointer on the watch. On the 2nd September, he called again to show himself. Vision the same as last.

The *British Medical Journal*, of June 4, 1887, in referring to the discussion of the French Ophthalmological Society above referred to, puts the merits of the question in the following sentences, which, in my opinion, goes to the root of the matter, viz.:—"Subsequent to Dr. Wolfe's successful demonstration of his operation for detachment of the retina in Paris in 1884 (*Journal*, December 25, 1884), the attention of the profession in France was directed to the subject, and in the following year it was discussed at the Annual Congress of the Ophthalmological Society. . . . This discussion is a satisfactory indication of the interest and study bestowed upon the subject. It is the first step towards bringing the positive and negative conclusions into harmony. We would mention only one point which must not be left out of consideration—namely, that detachment of the retina should not be studied *en bloc*. The serum effused behind the retina may involve various regions, and the amount of loss of vision may either correspond to the site of the detachment, or the abolition of sight may, through other complications in its train, be out of all proportion to the apparent local lesion. This will determine the nature of the surgical interference. It is evident when a detachment is situated on the border of the ora serrata bulging into the zonula, an iridectomy performed at the border of the sclerotic may evacuate the fluid, and a beneficial result will also

be obtained in the state of general infiltration of the deep structures, whilst in other conditions Wolfe's operation seems to be the only means at our disposal for the emergency."

Mr. Simon Snell, Sheffield, has published there cases of detachment of the retina in which he operated by my method, with decided improvement of sight. His maps of the visual field are interesting, as they show that, in one case, the detached retina had been restored to its place and resumed its function.

III.

ON A NEW METHOD OF PERFORMING PLASTIC OPERATIONS.

In 1875, I brought before the notice of the profession a new method of transplanting skin-flaps from distant parts without pedicle.*

This operation has since been adopted, by ophthalmic surgeons of different countries, for correcting eversion of the eyelids. As the operation has a wider range of applicability, and recent publications have shown that it may be successfully practised for correcting deformities of the face and for supplying skin deficiencies in other parts, I propose to give a *résumé* of our experience with regard to it.

Cicatrices caused by burns, wounds, and ulcerations have always proved difficult and perplexing to the surgeon who has to deal with them, and when these cicatrices are situated in the neighbourhood of joints or coverings of important organs, their proper treatment becomes of very serious importance.

It is now 300 years since Tagliacozzi published his great work on plastic operations, and in it laid down the rule, which has ever since been considered as the funda-

* *British Medical Journal*, Sept. 18, 1875.

mental law and *sine quâ non* to the success of the operation, that the flap must retain its connection with the adjacent living structures by a pedicle to be severed only after complete union and cicatrisation of the raw surfaces. This principle, as applied to the transplantation of skin, has in my experience been a source of great embarrassment, and has tended to retard rather than further the progress of plastic surgery. I noticed this many years ago in La Charité of Paris, in connection with the labours of the late eminent surgeon, Prof. Velpeaux ; and my subsequent observations in the transplantation of structures from the lower animals and in skin-grafting have, in my opinion, demonstrated that in most cases the pedicle is not essential to the vitality of the flap.

M. Reverdin introduced a method of skin-grafting in which little bits of the size of a pin's head are taken and arranged in mosaic fashion upon the ulcer, or upon the site of deficiency of skin. While practising that operation, I was never satisfied with the macadamised appearance of the parts. I also noticed a very important fact in connection with skin-grafting, namely, that the graft which was taken clean adhered satisfactorily, while the bits which had a bleeding under-surface did not adhere to their new site. I thus became convinced that the cause of non-success in transplantation was the areolar tissue underneath, and that, if we could transplant a skin-flap free of that subjacent tissue, we should secure its adhesion and incorporation. To put this to the test, I operated in one case in which the skin required for the eyelid was two inches in length by one inch in breadth.

I removed the flap from the fore-arm in three portions, separating the first from its cellular tissue as closely as compatible with the integrity of the flap, but turning up the other two after removal, and with a knife slicing off the areolar tissue so as to leave a white surface, which I then applied to the eyelid. The difference between these flaps was very remarkable. The two which were previously prepared, healed by agglutination, without even desquamation of the cuticle. Twenty-four hours after the operation, the surfaces looked pale, but the next day the temperature was normal, and the appearance healthy. The part which had been applied without previous preparation looked rather livid the first day, improved for the next two days, but on the fourth began slightly to suppurate, and, after a hard struggle for life, only a portion of it remained and the rest shrank. This, however, did not compromise the result of the operation, which was on the whole satisfactory; and I was therefore enabled to formulate the conclusion that, *if we wish a skin-flap to adhere to a new surface by first intention or agglutination, we must be sure that it is free of all areolar tissue, and properly fixed in its new place.* When thus prepared, we may cut the flap of any shape or size from any other part, or from another person, and transplant it without pedicle.

CASE I.—My first case—that just referred to—was that of Peter Campbell, quarrier, twenty-five years of age, who had had his face, eyes, and eyelids injured by an explosion of gunpowder. The upper lid, which was strongly everted, I partially succeeded in correcting by Reverdin's method of skin-grafting; the lower I corrected

by this new method. I was thus able to compare the two operations, and to report the striking advantage of my flap-transplantation. Fig. 7 represents the lower

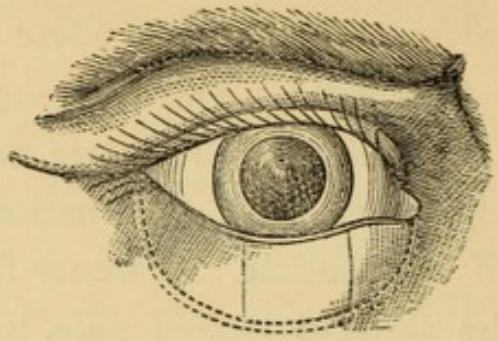

Fig. 7.

eyelid as formed with skin from the fore-arm. As the eyelid was completely everted, its integument totally destroyed, and the skin of the face consisted of discoloured cicatrices, not by any means suitable for plastic operations, I formed a new one in the following manner:— The edges of the upper and lower eyelids having been vivified at the expense of the inner border of the lids, leaving the outer lip and the lashes untouched, I introduced three ligatures into the border of the lower eyelid, and intrusted them to my assistant. By means of these ligatures he used traction, while I dissected the whole of the cicatricial tissue, and thus liberated the lid from the adjacent structure. The ligatures were then introduced into the upper eyelid, and the edges of the upper and lower lids thus united. I then elevated the edges of the wound, preparing them to receive the new flap like a watch-glass. This patient was exhibited at the Glasgow Medico-Chirurgical Society in April, 1876, eight months after the operation, along with an additional case; and

the cases were published in the *Medical Times and Gazette* in June of the same year.*

The shape and size of skin required must be carefully

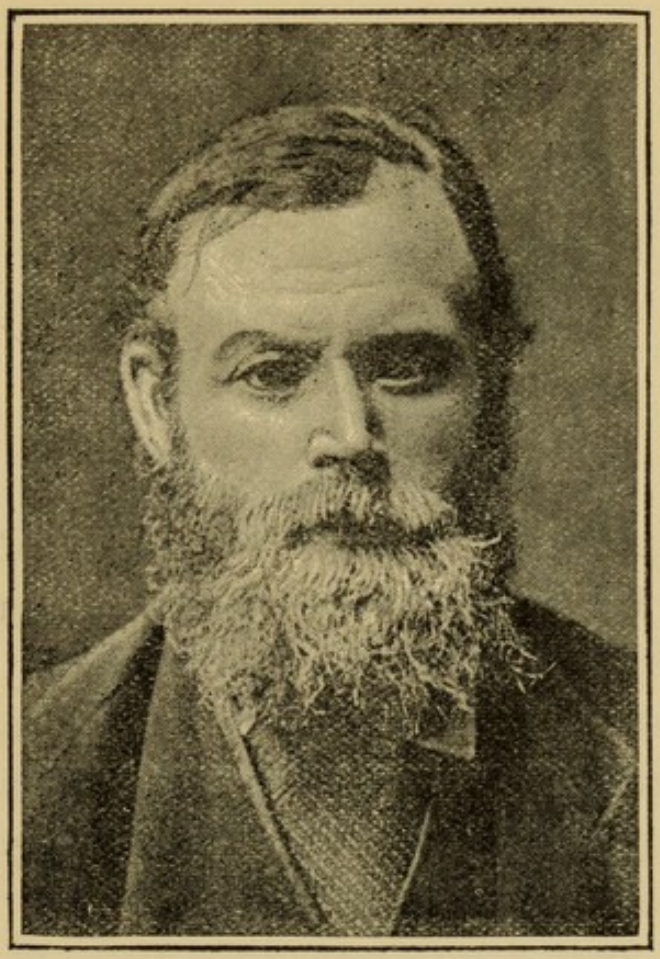

Fig. 8.

* Peter Campbell, whose photograph is given in fig. 8, is a remarkable patient. The injuries which he had sustained to both eyes and eyelids were extensive, so that I had to practise in his case several operations before his eyes were rendered serviceable and his face presentable. Left eye—1, artificial pupil; 2, conjunctival transplantation from the rabbit. Right eye—1, paracentesis for onyx and hypopion; 2, skin-grafting on upper eyelid; 3, plastic operation on lower eyelid. He returned to his employment in the same quarry, where he is still engaged. In the lower lid the skin which we had transplanted from the arm is not only intact, but bears a row of hairs at the border representing the lashes. There was no hair on his forearm when we removed the skin from it (he was a young man of twenty-two), but now it has grown. The vitality of the skin-flaps is thus also demonstrated.

cut out in lint. The piece of lint is then laid on the fore-arm which is in a state of semi-supination, and the shape traced by the point of a knife, *making it larger all round*

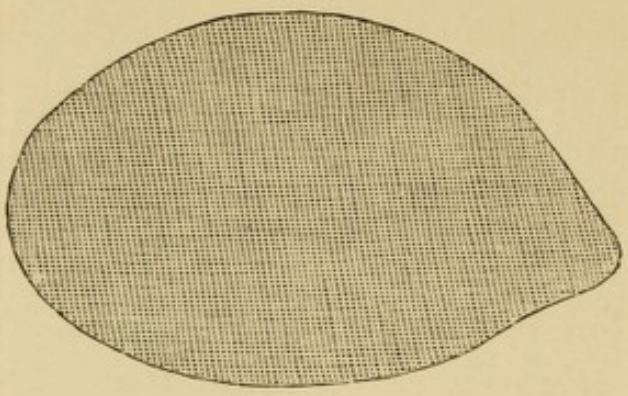

Fig. 9.

to allow for shrinking. Fig. 9 shows the size of one of the flaps which I have transplanted for the formation of the lower eyelid.

I find that the most satisfactory way of removing the subcutaneous tissue is to snip it off with sharp scissors from the flap spread out on the left forefinger, then dip the flap in tepid water, and dry it properly.

Dressing and After-Treatment.—After the flap has been prepared, it is put on its new site and moulded into position. I prefer not to use sutures for keeping it in place, as the very finest threads sometimes give rise to exudation of pus when the ligature is withdrawn. The best method, if practicable, will after all be that adopted in my first case, namely, to dissect the neighbouring part all round, and push the edges of the flap under it. After the flap has thus been properly moulded into its new site, lint soaked in hot water is held upon it for five or ten minutes, and then a few other pieces of lint wrung out of hot water are laid upon the

new flap, and the whole covered and secured by an immovable bandage. The application of carbolic acid, or any other irritant substance, should be avoided as prejudicial, inasmuch as it is apt to remove the cuticle. The head should be kept steady and warm. The patient is kept in bed well covered, and supplied with warm drinks to keep up the temperature of the body. The eye should not be disturbed for the first three days after the operation, after which the dressing should be carefully removed, the last ply of lint being properly soaked with hot water, that it may be removed easily without any dragging or derangement of the flap. It may then be dressed every twenty-four hours thereafter. I have reason to think that some cases did not succeed on account of the *nimium diligentiæ*, and teasing of the part, which requires peace and quietness for its growth. The plan of covering it only with gold-beater's skin is actually exposing it to a chill when moisture and warmth are requisite.

I would recommend also the exercise of patience in the severance of the lids. This should not be attempted for the first six weeks, and even then only done partially at first, as the too early separation of the lids is not advantageous.

The first to adopt this operation was Dr. Wadsworth, of Boston, U.S., who reported a successful case to the Ophthalmological Congress in New York in September, 1876.

Prof. Hirschberg published another successful case of Blepharoplastik. The following year the operation was discussed at the International Congress at Amsterdam, when Dr. Martin, of Cognac, reported to the Ophthalmo-

logical section a successful case treated by my method. At the same meeting, Prof. Zehender reported three operations for the formation of new eyelids by this method. Although these did not all come up to his expectations, they may still be regarded, as I have shown in my analysis in the *Centralblatt für Praktische Augenheilkunde*,* as on the whole satisfactory.

Prof. Zehender's first case was a boy of weakly constitution, who suffered from disease of the bones and chronic bronchitis, with several scrofulous fistulous openings in the eyelid dependent on caries of the orbital bones, and who ultimately died of basilar meningitis. Secondly, his next case was the formation of an upper eyelid from a flap taken from the arm in a man forty-four years of age. This patient was so much excited by the chloroform that suffocative symptoms set in; and the excitement lasted so long, even after he was put to bed, that he violently tore away the dressings, catgut sutures, and everything, and on the following morning the flap was found pushed out of its place; *and yet this case did not prove an absolute failure.* The third case was almost successful, but the flap somewhat shrank in its dimensions.

In comparing Prof. Zehender's interpretation of the principles which I laid down with regard to this operation, and his manner of carrying out those principles, I was very much astonished that, whilst in his first paper he gave a very exact description of the principles laid down by me, in every one of his operations he has introduced an element of failure. He either put stitches into the

* Compare reprint in the *Medical Times and Gazette*, Feb. 21, 1880.

flap, and sewed the eyelids together with catgut sutures, which ulcerated through on the following day; or changed the dressings twice in twenty-four hours; or left the whole concern quite unprotected in order to watch the results of the operation; or covered it up with Listerian preparations. In short, he irritated his flap either by ligatures or exposure, or by constantly worrying it with fresh dressings and Listerian appliances.

Personally, I must speak with the highest respect of such an eminent *savant*, an ophthalmologist of the first rank, but I may be permitted to say that I mention these facts because they are a source of misunderstandings in scientific discussions.

In America the operation has been practised by various surgeons. Dr. Aub, of Cincinnati, reported a successful case. Dr. Reeve, of Toronto, presented two cases to the Canada Medical Association—one was a complete, and another a partial, success.

Dr. Noyes, of New York,* after reporting some successful and unsuccessful cases of his own, and citing others, says:—"A number of cases have proved failures. In some of these instances, failure is sufficiently accounted for; at the same time, if out of fifteen cases ten have proved successes, it is something remarkable when compared with those generally obtained by plastic operations." Dr. Eugene Smith, of Detroit, has favoured me with a case which he published in the *Transactions* of the American Medical Association for 1881. The photograph in his paper shows the complete success in correcting the version of the upper lid.

* *New York Medical Record*, March 27, 1880.

In this country, Dr. Benson, of St. Mark's Hospital, Dublin, has operated in eight cases in which he performed my operation with Dr. Story.* "In five cases some of the transported flap lived; in two of these the greater portion survived, in two a smaller portion than half retained its vitality, whilst in the other one the flap seemed to slough through some of its depth, leaving the portion of it in contact with the new surface alone vital. Three were complete failures, the last being torn off, with the bandage and dressing, by the patient (a child) during the night."

Dr. Benson's paper, which he read before the Chirurgical Society, and the discussion which followed, are interesting contributions; and I cannot help expressing my great satisfaction at the thoroughness with which he treated the various points of the question. In the course of his paper he says:—"Of the various plans which have been previously recommended and practised for the cure of ectropion, such as twisting of flaps, transplanting flaps from the face with pedicles, &c., all possess the serious disadvantage from which Wolfe's operation is free, namely, that if union does not take place, and if the flap sloughs, the deformity resulting after the operation is greater than before, and the last state of that man is worse than the first; whilst, in the most successful case, the deformity of the eyelid is diminished at the expense of increased deformity of the face.

An important contribution to this operation was given by Dr. Swanzy of Dublin, who performed seven operations in four patients. Three of the patients he has

* *Medical Press and Circular*, April 26, 1882.

shown to the Academy of Medicine, where he is reported to have said :—"Wolfe's method is one with which the members of the section are already acquainted, so that it is needless for me to point out the advantages it possesses over other methods of dealing with these cases. The early accounts of the results of these operations were not to me sufficiently attractive to induce me to abandon the old plans in its favour, and it was not until forced by the circumstances of a case that I employed it. Now, having found it a most satisfactory proceeding, I much regret that I postponed its trial so long." *

Application.—This operation is applicable to cases of deformity or loss of skin of the face, and especially of the eyelid. Its advantage over other methods is tersely put by Dr. Benson, as stated above, but is more particularly noticed in cases in which the neighbouring parts of the face and forehead are also implicated in the burn, and so

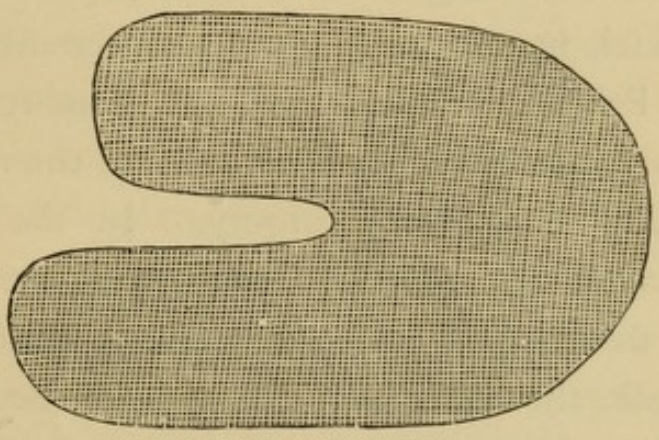

Fig. 10.

are unfit for plastic operations. In such cases this operation is the only remedy.

We have lately applied this method to a case of epithe-

* *Medical Press*, Feb. 25, 1885.

lioma involving the inner canthus as well as part of the upper and lower lid. The case was published by Dr. Thomson.*

CASE II.—A. M'D., aged 65, had, besides the epithelioma, the integument of his forehead and cheek covered with warts and melanotic nodules, and therefore unsuitable for flap-formation. Owing to this touch-me-not of the neighbouring skin, Dr. Wolfe did not even perform staphy-lorhaphia, but, after removing the epithelioma, simply transferred a skin-flap from the fore-arm, of the size and shape of fig. 10, and covered the gap. The results were very satisfactory. The case may be considered as a surgical and therapeutic success.

The foregoing cases have reference to operations on the eyelids, but the most interesting recent contribution to the subject is the Inaugural Dissertation published by Dr. Hahn, of Kiel, in which he gives an account of thirteen cases from Privy-Councillor Prof. von Esmarch's clinique. This is highly interesting, as it establishes the applicability of the method to general surgery. In the *Brit. Med. Journal*, March 10, 1889, I have given an outline of Dr. Hahn's dissertation, which contains a historico-critical review of all the attempts which have been made in that direction previous to the publication of my operation in 1875. I consider Dr. Hahn's publication valuable, also, because it led to the publication of Prof. von Esmarch's paper in *The Lancet*, which I give here in full:—

* *Medical Press and Circular*, August 2, 1882.

On Transplantation of Skin-Flaps by Wolfe's Method.

By Fr. von Esmarch, *Professor of Surgery in the University of Kiel.*

(From "The Lancet," June 8, 1889.)

In an inaugural dissertation published by Dr. Hahn of the Kiel University,* a detailed account having been given of a number of plastic operations from my clinique, in which Wolfe's method † of transplanting skin-flaps from distant parts without pedicles had been employed, it may be of some interest to the readers of *The Lancet* to have my views as to the merits of that operation.

Hahn reports thirteen cases in which skin defects had been supplied, mostly with satisfactory results, by Wolfe's method of transplantation. These defects were the result in three cases of the existence of cancer of the face, in one of extirpation of nævus pigmentosus, and in four of rhinoplasty from the forehead. Wolfe's flap was in three cases taken directly for the purpose of partial rhinoplasty, and in two others for the formation of eyelids. The defects varied from 1 cm. to 5 cm. in diameter. Adhesion of the flaps took place in from five to ten days. Some entirely healed at once, and the transplanted flaps differed from the neighbouring skin only in retaining for some time a paler colour. In most cases there were exfoliation of the cuticle and necrosis of small spots of dermis, but without in the least prejudicing the successful result of the operation. Entire failure only resulted in one case,

* *Ueber Transplantation ungestielter Hautlappen nach Wolfe mit Berüchsichtigung der übrigen Methoden.*—Kiel, 1888.

† Wolfe: *Diseases and Injuries of the Eye*, p. 417.—Churchill, 1881.

in which there existed the most unfavourable condition of the patient's skin. The following cases may serve as examples of the operations on the face:—

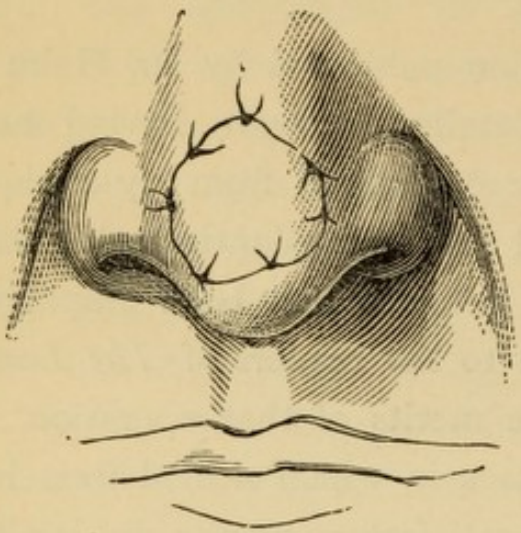

Fig. 11.

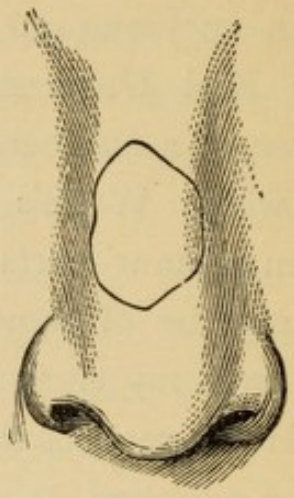

Fig. 12.

Fig. 11 represents a case of cancer rodens of the nose in a young girl seventeen years of age. The right wing of the nose was destroyed, and the nostril almost closed, being only kept open by a drain. By two arched incisions the cicatricial tissue was removed, and the defect covered by a skin-flap from the upper arm. In six days adhesion was perfect.

Fig. 12 shows another case of cancer rodens. Madame K——, wife of a lieutenant-colonel, was first attacked in 1876, and for seven years recurring attacks caused most excruciating pain. Various surgeons were applied to, and all sorts of means (homœpathic included) adopted without avail. I resolved in 1883, by which time the bridge of the nose was almost entirely covered with cancer, to remove the diseased tissue, and to cover with a flap from the left arm. The flap united perfectly in ten

days, and since then there has been no return of the disease.

Fig. 13 illustrates the following case :—G——, five years of age, daughter of a landed proprietor, was very much disfigured by a nævus pigmentosus. Attempts had been made to remove the nævus in three sittings, but it returned. In 1884 I removed the whole nævus, and covered one-half of the place with a flap from the left arm, and the other with a flap from the forearm. Within seven days adhesion had taken place, and in about three weeks the appearance of the flaps was normal.

The advantages of transplantation by Wolfe's method are the following :—1. His method enables us at once and completely to cover fresh wounds. 2. We can

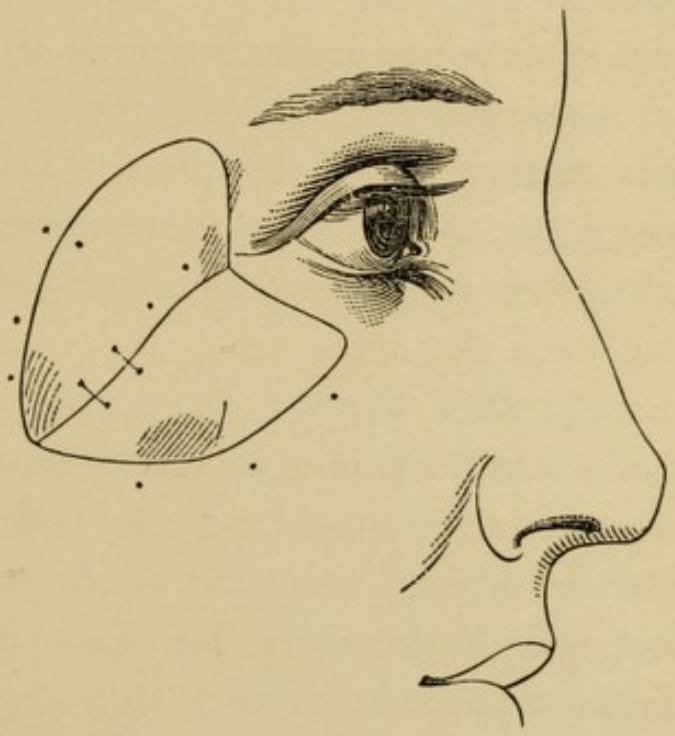

Fig. 13.

replace skin with cicatricial tissue by true skin, which offers greater resistance to external deleterious effects.

3. It gives better cosmetic results than any other method of transplantation, and this is specially important in operations on the face. The only disadvantage which this method has, is that the flap is liable to subsequent shrinking, but this can be obviated by making it larger than is necessary, so as to provide for the shrinkage. Wolfe's method is peculiarly applicable to plastic operations, and cases in which we have to deal with large wounded surfaces in the face, incapable of being closed with sutures. In such cases it is to be preferred to any other method.

IV.

TRANSPLANTATION OF RABBIT'S CONJUNCTIVA TO THE HUMAN EYE.

WHEN the conjunctiva of the eyeball and the corresponding palpebral conjunctiva are destroyed by gunpowder explosion, by a burn with hot metal, quicklime, or other chemical substance, adhesion or *symblepharon* is the result. Iron moulders, puddlers, and labourers in chemical works being most exposed to such accidents, cases of symblepharon are frequently met with in towns like Glasgow. I need not here refer to the numerous expedients which used to be resorted to for the cure of this affection. They all had for their object the mechanical separation of the lid and eyeball, until the raw surfaces cicatrized. This, surgeons tried to effect by repeated dissection, and by keeping the surfaces apart by the interposition of foreign bodies, such as sealing-wax, leather, or glass shields.

After repeated trials I found such measures useless. They are based on the supposition that a delicate physiological action can be replaced by a coarse mechanical contrivance. Abhorring friction of surfaces, nature consequently frustrates such expedients, for whenever the surfaces rub upon each other, they adhere and the foreign bodies are squeezed out by gradual constriction.

I tried first to effect the radical cure of symblepharon by plastic operation on the conjunctiva. The operation

consisted in taking a portion of the neighbouring healthy conjunctiva of the eyeball, wherever I could get it, and with it replacing the palpebral conjunctiva which had been destroyed. For, experience has taught me, that loss of conjunctiva oculi, even to a very large extent, is generally regenerated without prejudice to the neighbouring tissues, whilst loss of the conjunctiva of the eyelid is followed by pannus, ulcerated cornea, and other lesions.

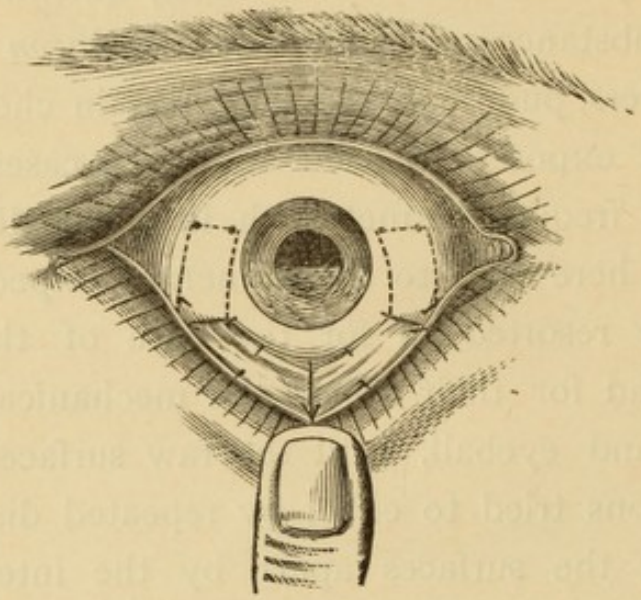

Fig. 14.

Fig. 14 represents the case of Simon M'Kim, aged 20, moulder, who, three years before he came under treatment, had his eye burnt with molten lead, resulting in adhesions of the lower eyelid, which covered the lower half of the pupil. I dissected carefully the eyelid from the eyeball, separating it as far as the *cul-de-sac*, to make quite sure that I had liberated the eyeball completely. I then passed two fine silk threads through each side of the conjunctiva at the outer aspect, which

ligatures marked the breadth of the conjunctival flap to be removed. These two I put on the stretch, and with a pair of scissors I first cut horizontally, and then on each side of the ligatures, then putting the scissors behind, I cut it from the eyeball. In cutting the flap on the stretch by means of the ligatures, I take care that the conjunctival flap is removed without any of the sub-conjunctival tissue. The same process is followed at the inner side, and these two flaps are brought together in the middle line, and secured with stitches, as marked in the diagram.

The operation was performed in September, 1869, and when examined some months after the operation he had free movement of the eyeball; there was scarcely any perceptible trace upon the eyeball whence the flaps were borrowed; the cornea only presented some traces of leucoma where the adhesion formerly was, and these latter were also gradually disappearing.

Mr. Teal, of Leeds, published a paper, in which he described an operation similar to my own, and yet essentially different from it. From each side of the conjunctiva he takes a flap: the one is stitched across the raw surface of the eyelid, and the other is fixed across the raw surface of the eyeball, and the two flaps are thus dovetailed into the wound. It is evident that in this operation a large supply of conjunctival tissue is requisite to repair a comparatively slight injury; while, in my operation, the conjunctiva of the eyeball is entirely disregarded and the palpebral conjunctiva alone repaired. Besides, I take my flaps from the whole breadth as far as the cul-de-sac, if necessary. The result is that, while

Mr. Teal interferes only with a case of symblepharon, "provided it be of moderate extent,"* my operation is applicable to extensive adhesions, provided only that there be sufficient transparent cornea to make an artificial pupil, as shown in fig. 15, which represents the case of John Muir, aged 15, tinsmith, who had burnt his right eye with strong hydrochloric acid two years before, and caused extensive symblepharon. On presenting himself at the Institution I found the lower eyelid completely covering the upper margin of the pupil; vision was therefore impossible. The first step accordingly was to make

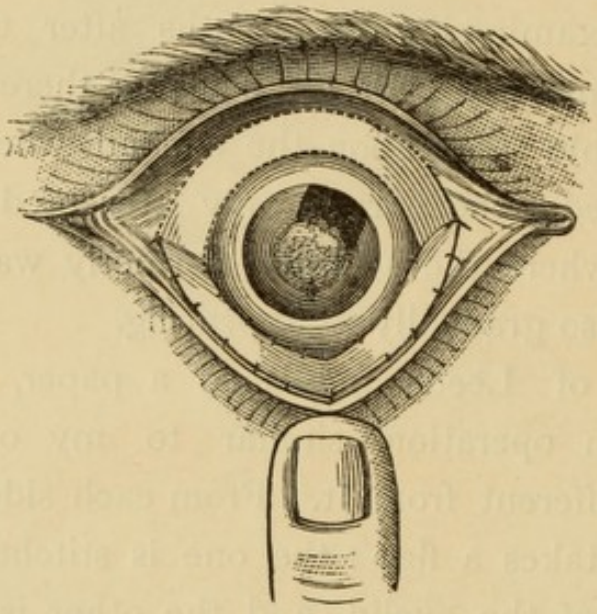

Fig. 15.

an iridectomy upwards and inwards, and two months later we proceeded to the plastic operation of the conjunctiva.

But it will be seen that the lateral flaps were, in this case, impossible, because the burn extended above the

* *Ophthalmic Hospital Report*

meridian. I therefore took one large flap from the upper hemisphere of the ball, and secured it upon the eyelid as above described.

There is a limit, however, to the extent to which we can go in borrowing conjunctival substance from an eye which has been previously injured. If we surpass that limit, the corneal opacity is sure to extend still further, and our last chance of saving vision is lost. Indeed, we sometimes meet with cases in which the infliction of a new wound amounts to disorganisation of the eye. As the operation already described is inapplicable in such cases, I was at one time about to give up all idea of surgical interference, when it occurred to me that I might give the patient some chance by supplying him with conjunctival substance from the rabbit.

One such case is represented in fig. 16. Edward M'Kay, aged 31, iron-smelter's labourer, was, on the 17th September, 1872, struck on the left eye by a ball of red-hot iron,

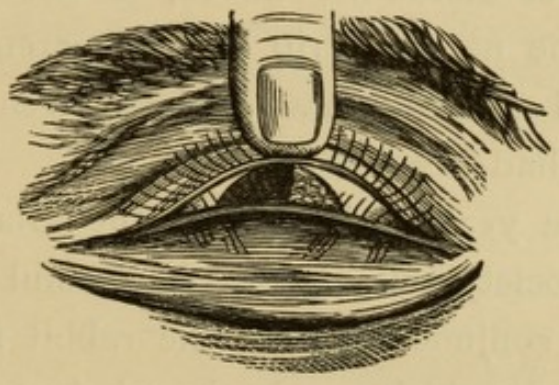

Fig. 16.

which caused the disorganisation of the lower conjunctiva and the greater part of the cornea. When he first came to the institution on the 24th September, seven days after the accident, the conjunctiva of the lower eyelid was

completely destroyed, and also the corresponding conjunctiva of the eyeball—the whole conjunctival sac was in a state of serous chemosis, and the greater part of the cornea burnt. Emollient applications were used. After a week's stay in the institution he was sent home to come back when the swelling had subsided. He returned shortly after.

On examination, the lower eyelid was found completely covering the cornea above its upper pupilary margin, the eyeball, quite fixed by the upper and lower eyelids, and sunk in the orbit. On lifting the upper eyelid with the finger, the sclerotic was seen as it were receding, and no dragging upon the eyeball could turn the upper border of the cornea sufficiently forward and downward even for making an iridectomy. The attempt to take a conjunctival flap from the upper hemisphere of the eye, as done in the previous case, was altogether out of the question, for there was no room to manipulate either with scissors or bistouri. Indeed, it was pretty certain, considering the narrow strip of transparent cornea, that opacity would certainly have ensued, even if section at its periphery had been practicable.

In the same year, I showed to the Glasgow Medico-Chirurgical Society this my first successful case of transplantation of conjunctiva from the rabbit for the cure of symblepharon, in which nearly the whole conjunctival sac was implicated. In August, 1875, I exhibited the same case along with another at a demonstration which I gave to a large audience at the annual meeting of the British Medical Association in Edinburgh. The second case was that of Campbell (see fig. 8, p. 61).

This operation has been generally adopted by surgeons of various countries. It is, in fact, due to the favourable results of transferring conjunctiva from the rabbit to the human eye, that surgeons have become familiarised with the idea of borrowing tissues from the lower animals, and the principle has been further developed by the transplantation of nervous tissue from the rabbit to the human subject.*

I deem it therefore necessary that the details of conjunctival transplantation should be well understood, for, upon attention to these details, the success of the operation depends. At a meeting of the British Medical Association in Glasgow in 1888, I had another opportunity of performing an operation in one case, and of

* NERVE TRANSPLANTATION FROM ANIMAL TO MAN.—A novel operation is reported from Vienna as having been performed by Dr. Gersung on the person of Prof. von Fleischel, who accidentally wounded himself sixteen years ago while performing a *post-mortem* examination. The result was severe inflammation of the whole right upper limb, which was followed by the formation of neuromata on various branches of the median nerve, to relieve the pain of which, resection of the nerve at various sites was resorted to, causing anæsthesia of the parts supplied by it. Fresh neuromata, however, occurred, and finally the pain became so severe that a further operation became necessary. On March 4 the patient was anæsthetised, and the neuroma, which was situated behind the volarcarpal ligament, was excised. A piece of the sciatic nerve of a freshly-killed rabbit was then obtained and sutured to the ends of the cut nerve, and to the connective tissue between. Healing took place by first intention, and as two months have now elapsed since the date of operation, and the pain has not returned, it is hoped that the so-far favourable result will prove to be permanent. Sensation is gradually returning in the anæsthetic areas. The success of this novel attempt shows that surgeons have not yet attained the limits of the possible in this department.—*Medical Press*, 1888.

showing another operated on six days previously, to enable those who were present to judge of the hopeless condition of an extensive symblepharon before, and the results obtained after, transplantation from the rabbit. This was the more necessary as, since first recommending it to the profession, I have considerably modified the procedure and rendered it more simple. From the account given in the journals of that date, I extract the following :—

* "At the close of the meeting of the Ophthalmological Section, on August 10, Dr. Wolfe gave a second demonstration at the Ophthalmic Institution, which was attended by London and Foreign oculists. The subject was symblepharon ; one operation was performed and a patient operated on five days previously was shown. In the case operated on, the lower lid was adherent to the eyeball for the greater part of its extent, the angles only being free. . . . The operation being successfully completed, the patient previously operated on by the same method was shown. An accident had completely destroyed the right eye, the left was also very extensively damaged, only a small part of the cornea towards the lower and inner-angle being transparent. An iridectomy had been performed there, but the extensive adhesions of both upper and lower lids rendered it nearly valueless. When the adhesions had been cut through, very extensive raw surfaces were found on both lids, on both of which the rabbit's conjunctiva had been implanted, and when the patient was shown, no doubt remained of the success

* *British Medical Journal*, August 20, 1888.

of the operation. The eyeball was comparatively free, and sight was good. In showing the patient, Dr. Wolfe commented on the fact that it was nearly fifteen years since he introduced this operation, and in spite of the fact that the rabbit's conjunctiva gave perfect results, efforts to transplant mucous membrane from the human subject, from the mouth and even vagina were being made."

The operation is performed in the following manner :—

1. I first separate the adhesions by means of blunt pointed scissors, so that the eyeball can move in every direction. The conjunctival sac and the cornea are cleared of nodules, so as to obtain an even surface.

2. Two rabbits are then put under chloroform, one being kept in reserve in case of accident.

3. I take from the rabbit that portion of the conjunctiva which lines the inner-angle covering the "membrana nictitans" and extending as far as the cornea, on account of its vascularity and looseness. If the palpebral opening is too narrow, I enlarge it at the external angle and introduce a ligature through the whole thickness of the free border of the lower lid, and, by means of this ligature, the lid is drawn open and kept steady and the conjunctival *cul-de-sac* exposed.

4. Into the middle of the flap to be removed a black silk ligature is introduced, a knot is tied, and the ligature cut short. This knot is intended to mark the epithelial surface of the membrane, for without it the flap is apt to curl up and leave us at a loss how to adjust it.

5. Next I mark the boundary of the portion of the conjunctiva of the rabbit which I wish to transplant, by

inserting four black silk ligatures, which I secure with a knot. The ligatures having been put on the stretch, I separate the conjunctiva to be removed with scissors, and, by means of a fine spatula, I spread it upon the back of my left hand. The four ligatures are then cut off, and the conjunctiva trimmed to the requisite size. It should be somewhat larger than the lost substance, which it is to replace.

6. I now return to the patient and see that the bleeding has subsided, and that the parts are in a fit condition to receive the transplanted flap, which has in the meantime become dry, like a piece of parchment, and adherent to the dorsum of the hand.

7. It is then lifted by means of a spatula, and transferred to replace the lost conjunctiva of the patient. It is secured in its place by six or eight ligatures, or even more if necessary. This is a very difficult process, requiring delicate manipulation, and the assistant must keep the flap in its place by a spatula, while it is being stitched in its new site.

Both eyelids are closed with lint and a bandage, and kept so for four days. The ligatures are kept in for six or eight days.

With regard to the patient, it must be borne in mind that it is a tedious operation, so that it is impracticable to administer chloroform. To young subjects I administer it only during the first stage—*i.e.*, during the separation of the eyelid; for the remainder of the time, moral suasion must be resorted to. In cases of grown-up people I generally perform the operation without anæsthetics.

The following case is very interesting, as it marks the transition from the old to the new method of procedure :—

Symblepharon and Anchyloblepharon (total), Cured by Transplantation from the Rabbit (July, 1883).

"Jeremiah Jones, steel worker, aged 22, got his left eye burned by a flash of slag from the forge-hammer nine years ago. He was under treatment at Workington for four months, after which he was sent to the Manchester Eye Infirmary. Here (he states) attempts were made to keep the eyelids apart by means of strings and lead and a ring round his nose. When he came to the Glasgow Ophthalmic Institution, on March 17, 1883, the eyelids were completely closed, the free borders of the lids were obliterated, so that the dissection of the upper and lower lids from the globe was effected with great difficulty. 'Buried under the lids' is an exact description of the state of the eye in this case. When the lids had been dissected, we found that only the upper and outer quadrant of the cornea was transparent —the rest was quite opaque. By means of ligatures inserted into them the lids were kept separate, and an artificial pupil was formed in front of the transparent cornea. The symblepharon was subsequently remedied by transplanting conjunctiva from the rabbit. The conjunctival sac is now free through its whole extent, except at the inner angle, where there is a slight adhesion. The eye is movable in every direction, vision is restored,

so that the patient can see the time on a watch-dial distinctly."

Fig. 17 is the photograph taken of the patient after the operation.

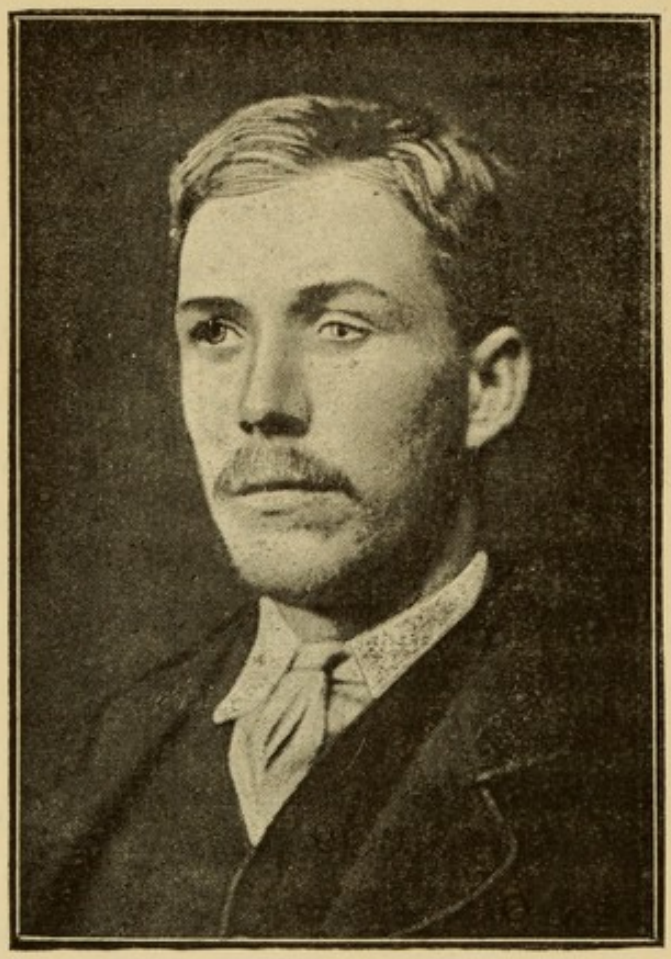

Fig. 17.

This method of conjunctival transplantation has been practised successfully by Professors Otto Becker, of Heidelberg; Albrecht Graefe, of Halle; de Wecker, of Paris; and Marc Dufour. Among American surgeons, Dr. Noyes (whose cases now number about a dozen) first applied this operation to the formation of the sac for the purpose of fitting in an artificial eye, when the natural cavity has become contracted, but Professor

Cohn, of Breslau, had previously performed the operation for a similar purpose.

There is one question, and that a most essential one, as to the durability of the operation. It is satisfactory to make a conjunctival sac, but how long will it last? Do the surfaces by constant friction tend to adhere? We frequently have an opportunity of examining patients long after the operation, and have always found them satisfactory. The photograph of one of the patients whom I exhibited at the Edinburgh meeting mentioned above (p. 61) was taken eight years after the operation, and in his case the conjunctival sac is still as perfect as it was then. Both eyes are good, and he has been all the time working at the quarries.

V.

TOTAL STAPHYLOMA OF THE CORNEA CORRECTED BY AN OPERATION.*

WHEN asked by the President of the Glasgow Medico-Chirurgical Society, some time ago, to make some remarks on a paper which had been read on an operation for staphyloma of the periphery of the cornea and limbus, I said that, the only remark I could offer was that I hoped the author would not repeat the operation. I explained at the time that I regarded it as an established principle that the ciliary region is a dangerous one for the surgeon to operate on. So strongly do I hold this opinion that I am in the habit of laying it down as a rule that, in cases of cuts or tears of the cornea and sclerotic, causing an escape of the vitreous, the conjunctiva covering the sclerotic should be brought together by sutures, but the limbus left alone, thus giving nature an opportunity of healing the wound gently by contraction and cicatrisation. A ligature in that region might strangulate the ciliary nerves, and thus prove fatal both to the injured eye, and also, by sympathy, to its fellow, as in cases of traumatic tetanus. I was reminded of this incident the other day, when I read in the *Annales d'Oculistique* a paper written by one of the leading ophthalmologists in Belgium.† The case described was

* Read before the Glasgow Medico-Chirurgical Society.

† "Ophthalmie Sympathique après Excision d'un Staphyloma Cornéen" par Dr. Van den Burgh. Bruxelles, Oct., 1888.

that of a boy aged five years, who lost the sight of his right eye by an attack of conjunctivitis, which was thought to be of a diphtheritic character. The eye became distended by a staphyloma of the cornea; the left eye was perfectly healthy. The staphyloma was excised with all the usual antiseptic precautions, not omitting the sterilisation of the instruments; and yet on the third day photophobia commenced in the other eye, which ultimately became blind, notwithstanding the subsequent but, as it proved, too long delayed enucleation of the staphylomatous stump. The author concludes the history of the case with the following words in capital letters: "Such are the facts with their brutal eloquence."

With regard to the pathology of sympathetic ophthalmia, I shall only remark, in passing, that I consider the ciliary nerves to be the primary, if not the only cause. As to the theory of infection by the migration of microbes along the sheath of the optic nerve of one eye to that of the other, I appeal to Professor Sattler, who, in my opinion, is the highest authority on that subject. He thinks that the microbes found in an eye suffering from sympathia are not the "staphylococcus pyogenes aureus" of Deutschmann, but a special microbe, the nature of which he has not yet determined. Perhaps it may turn out to be the pigment of the choroid altered by disease. Regarding these microbes, therefore, as so many entities and quiddities, I shall adhere to my own doctrine, which is based upon clinical experience. It gives sufficient reason for my objection to surgical interference with a partial staphyloma which involves the border of the cornea and sclerotic. If the eye be troublesome, or if it disfigure

the face, enucleation is the only safe remedy. The case, however, is quite different when the staphyloma is situated at the anterior pole of the eye and the distension has taken place at the expense of the cornea alone. In such a case, I correct the deformity and relieve the pain without sacrificing the eyeball.

John H——, miner, aged 35, while working in the pit thirteen months ago, received a blow with a stone on the right eye. Three days after the injury the sight was gone, and the pain, which was slight at first, became excessive. Poultices, fomentations, and other remedies were applied, but without relief. For seven months, during which he was off work, he spent sleepless nights. He was admitted into the Ophthalmic Institution on October 14. The eyeball was distended at the expense of the cornea, which was opaque, soft-looking, and denuded

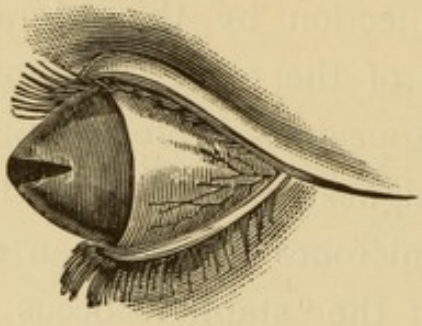

Fig. 18.

Showing the size of the staphyloma; the black shows half of the corneal flap removed.

of its anterior elastic layers. The distension was as big as a large bean and pear-shaped, the point looking forwards. The ciliary region was also distended and out of shape, and the globe was visible when the eyelids were closed. The whole eyeball was highly injected, and tender to the touch.

After several applications to alleviate the pain, I operated on the eye on November 1. The patient was put under chloroform by Dr. M'Gregor-Robertson, who also separated the eyelids, instead of using a speculum. An oval-shaped flap was removed from the centre of the cornea (fig. 18). The lens, which was hard and of a yellow colour, now presented itself, and was removed, its removal

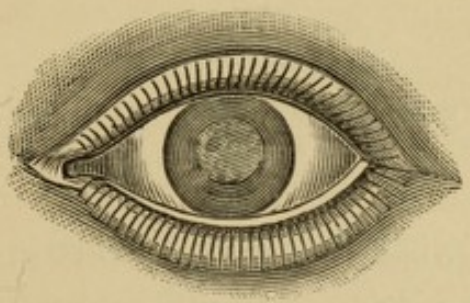

Fig. 19.

Showing the appearance of the eye four months after the operation.

being followed by a small escape of vitreous. The edges of the wound were brought together by a fine needle and silk thread, and adhesive court-plaster and bandage applied to the eyelid. On the third day the eye was opened and the ligatures removed. The edges of the wound were closely applied, and the eyeball had its natural size and shape. On the eighth day the patient was dismissed cured. Up to the present date, after the lapse of nearly four months, when the patient was shown to the Society, there has been no return of pain, and the eyeball looks as well as we could desire (fig. 19). With a little tinting, it might have almost the same appearance as the other eye.

VI.

TUBERCLE OF THE IRIS AND CILIARY BODY.

From the "British Medical Journal," March 4, 1882.

GENTLEMEN,—I wish to direct your attention to the case of tubercle of the iris and ciliary body, on which we operated some time ago. The case is interesting, not only to ophthalmologists, on account of its rare occurrence —this being the only one on record in this country—but also in this respect, that it may throw some light on a much-debated question in pathology and clinical medicine. You are aware that, whenever the subject of tubercle and tuberculosis comes to be discussed in medical societies, difference of opinion at once becomes manifest. Indeed, it seems that we have not yet arrived at a common definition of tubercle. What is considered as tubercle by one school of pathologists, is not admitted to be such by others. This was shown even so lately as at the last meeting of the International Congress in London, in a discussion in which Virchow had taken part (see *British Medical Journal*, October 1, 1881). So long as the doctrine of Laënnec was generally adopted, we used to regard tubercle as either small, grey, semi-transparent, hard bodies, deposited, or as a mere infiltration into the

tissue. These bodies might then become yellow, opaque, and soft, and a caseous substance formed in their interior. When isolated, they were called miliary tubercles; and, when of caseous consistence, they were designated yellow or crude tubercles.

Virchow, the founder of modern pathology, defines tubercle as a neoplasm, which takes its origin from the connective tissue in the form of nodules, consisting of closely-packed cells. The life of the neoplasm is of short duration, for very soon its elements begin to degenerate, the degeneration always commencing in the middle of the nodules, and in most cases giving rise to caseous consistence. Besides the local malignity, this neoplasm possesses a pronounced tendency to diffuse itself over the whole organism, and this brings it into the category of malignant growths (*Die Krankhaften Geschwülste*, 1865).

Langhans then demonstrated that the nodules invariably possess giant-cells of a peculiar organic formation. And Virchow, in the discussion already referred to, told us that these giant-cells are of a finely-granular structure, to which they owed their peculiar appearance. They developed by a regular gradation from simple cells, and are thus shown to be organic formations. He regards them as a special form of cell-formation.

This precise histological determination of tubercle enabled Köster to point out its existence in the granulations of the fungous joints; and Schüppel discovered it in scrofulous lymphatic glands, and Friedländer has shown that it is also found in scrofulous abscesses and in caries. Our knowledge has thus become more precise as to

the nature of tubercle, and its domain also greatly enlarged.

Villemin made the discovery that tubercles can be inoculated upon animals, especially upon rabbits (*Etude sur la Tuberculose*, 1868). This discovery has been confirmed by the experiments of Cohnheim, who inoculated tuberculous matter into the anterior chamber of rabbits. The inoculated matter gradually absorbed; but, in about four weeks after inoculation, grey nodules made their appearance upon the iris, and multiplied until thirty or forty could be counted. The iris became tumefied, and then purulent infiltration set in. Baumgarten has more recently carried this experiment still further. He injected blood taken from a freshly-killed tubercular-inoculated animal into the aqueous chamber of rabbits, and he invariably found that, in three or four weeks, there was an eruption of tubercle, first in the lower segment of the iris, where the blood had lodged.

Rokitansky, from personal observation of 14,000 cases, has given us a list of the tissue which are subject to tubercular eruptions—viz., the lungs, intestinal canal, lymphatic glands, larynx, brain, spleen, liver, &c. The ocular tissues find no place in the list, for the eye was considered to enjoy immunity from tubercular affections. Although Jäger had called attention to its occurrence in the form of miliary tubercle which he found in the dead body, and Manz. von Gräfe and Leber had also discovered it during life in the interior of the eye, this excited little attention. For when the whole organism is impregnated with the disease, its existence in the eye is regarded as of secondary importance.

The first case of miliary tubercle of the iris on record is that published by Gradenigo in 1869 (*Annales d'Oculistique*, 1870, and *Arch. für Ophth.*). The second is that of Perls. In these two cases there was general tuberculosis—lung-affection. The third case was reported by Saltini in 1875, in a girl sixteen years of age; the affection was confined to the iris, and there was no symptom of constitutional taint. In 1877, Weiss published an observation of the case of a working man aged fifty-one, in which the tubercles first broke out in the iris; and, five months later, a tumour was found to have developed in the lower jaw on the same side, and, on its removal, was seen to consist of caseous tubercle.

A most interesting case was brought up for discussion by M. Anger at a meeting of the Société de Chirurgie of Paris, July 9, 1879. It had been observed by M. Prinaud. A child of twelve years of age, of phthisical parents, had already suffered from discharge from the ear, then the cornea was affected, and a small tubercle became visible upon the iris, which involved the whole eye. This case is particularly interesting, as the discussion which has taken place with regard to its pathology and treatment shows how little the subject of local tubercle is still understood. The sixth case is that by Samelsohn, December, 1878; and the last on record is that reported by Rütter, June, 1880, from Hirschberg's *Clinique* (Knapp and Hirschberg's *Arch.*, 1881).*

The case which I am about to bring before your notice

* I am indebted to Prof. Manfredi, of Modena, for his very interesting papers, with illustrations, published in 1878 and 1879, *Di Tuberculosi primitiva dell' Iride.*

is that of Joseph L., eight years of age, with fair hair and blue irides, and of healthy complexion, had always enjoyed good health, and had no cough or glandular affection. He is the tenth of a family of eleven, of whom five are living. Five of them died at the age of five, four, three, one year, ten weeks, and another was still-born. The causes of death were teething, bronchitis, and hydrocephalus.

The patient received a stroke on the left eye in March, 1881, when the eye became swollen. The swelling gradually subsided, and, by the end of April, a white swelling became visible in the anterior chamber, at the upper margin of the iris. He was brought to the Ophthalmic Institution in the beginning of May, when the eye appeared quite healthy; but a small tumour, the size of half a pea, could be seen situated upon the upper segment of the iris. It took its apparent origin from the junction of the cornea with the sclerotic, and was attached to the anterior surface of the iris. The tumour was of a yellowish-white tinge, and divided into two lobules, with very fine vessels permeating its surface. The pupil was dilatable, with the exception of the upper border. There was no change of colour of the iris, vision was normal, and tension normal. In short, with the exception of the ciliary injection, which was limited to the upper segment, there was no sign of disease in the ocular tissues.

The patient was kept under observation for a whole month, and we found the tumour gradually, though very slowly, enlarging. Our diagnosis was tubercle in the iris, which probably extended to the ciliary body. We recom-

mended an operation, to attempt the removal of the iris along with the tubercle; but, at the same time, we warned the mother that the disease was probably more deeply seated, and that the operation would not effect a cure. I made an incision under the conjunctiva, at the extreme corneal periphery, and succeeded only in removing a part of the tumour; the rest of it was found to lie deeper, whilst a very small bit, the size of a pin-head, became detached, and dropped down, and lodged in the lower part of the aqueous chamber. The wound healed tolerably well, but the part became tumefied; and, after the lapse of a fortnight, there were seen small lines or greyish threads proceeding from the detached part, and shooting upwards towards the other portion of the iris, which also became studded over with little nodules, until by and by the whole iris was swollen, and the pupil completely closed. I then removed the eyeball, and sent it to Professor Hirschberg, who examined it, along with Dr. F. Krause, and reports as follows:—

1. Cornea and sclerotic, normal.

2. Conjunctiva, especially the upper part, infiltrated with round cells.

3. Iris: anterior surface covered with an exudation of round cells, and thickened by the infiltration of round cells. Its pigment-epithelium is glued to the lens capsule by means of a thin exudation.

4. Ciliary body is very much thickened, as well as its adjacent iris-segment on the same side. The thickening is composed essentially of round cells. When this mass is treated with hæmatoxylin, it is intensely coloured, while other round bodies lodged in the interior remain

pale. These latter are true tubercles, and show, in their centre, giant-cells, with many nuclei. No caseous matter is anywhere to be seen. The thickening passes into the choroid only to a limited extent, and the deep structures of the eye are normal.

Fig. 20 represents the condition of the different parts; fig. 21 the ciliary body under a magnifying power of 200.

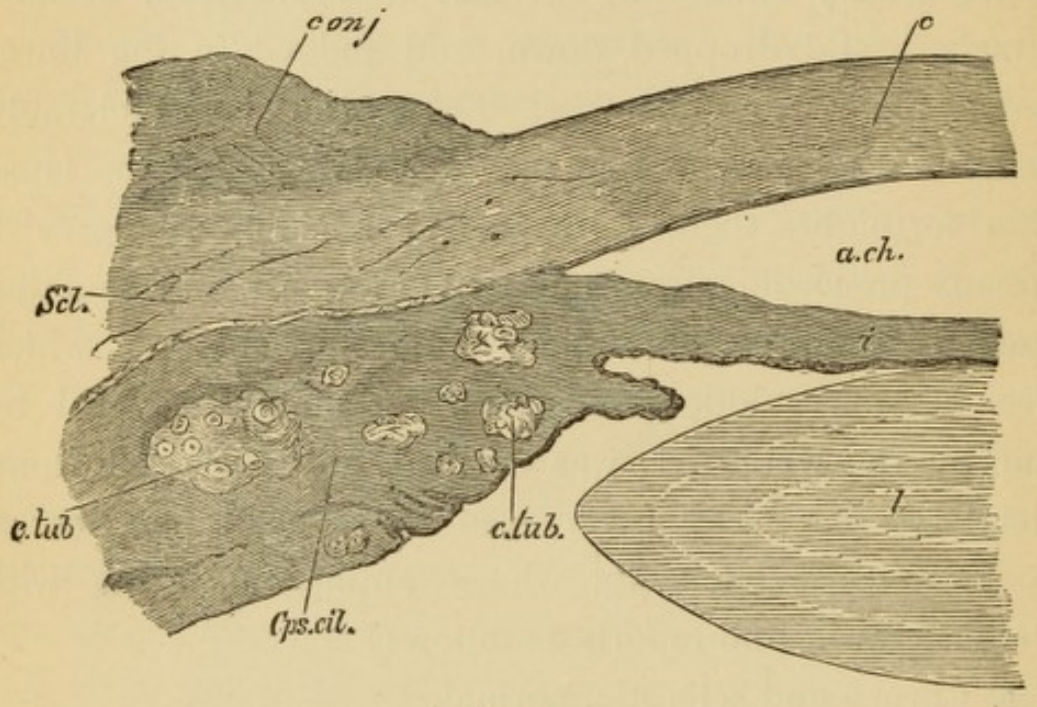

Fig. 20.

conj., Conjunctiva; *c.*, cornea; *Scl.*, sclerotic; *a.ch.*, anterior chamber; *l.*, lens; *Cps.cil.*, corpus ciliare; *c.tub.*, conglomerated tubercles.

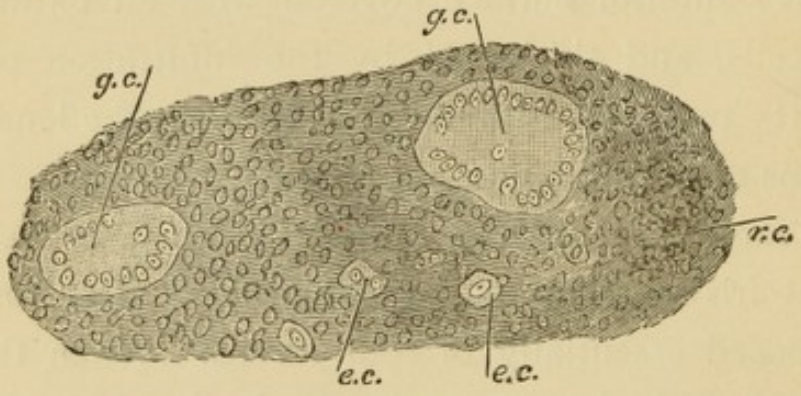

Fig. 21.

g.c., Giant-cells; *e.c.*, epithelial cells; *r.c.*, round cells.

We, therefore, took this to be a case of true tubercle of the iris and ciliary body, limited to these structures, without manifestation of disease in any part of the organism, although it is true that it was brought on by an injury in a constitution predisposed to that affection, as shown in the family history. But the most remarkable feature of the case is that, on November 29, the patient returned with ulceration of both legs. Large sores, with running ichorous and caseous discharge, were situated at the front part of the legs. There is an induration at the margin of both tibiæ. This had broken out about the beginning of September.

We have thus established that tubercle, in its highest development, consists of simple nodules containing giant-cells, without any caseous matter; and that the eruption may be confined to one spot, and that may be in any of the ocular tissues; and, further, that it is inoculable, although in this case the inoculation took place only in a different segment of the iris, and not in a different animal.

Since the publication of this paper, Prof. Koch has made the observation of tubercle bacillus. This new discovery, however, does not in any way call for a modification of the views advanced above.

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