Clinical demonstrations on ophthalmic subjects / by J.R. Wolfe.

24

CLINICAL DEMONSTRATIONS

ON

OPHTHALMIC SUBJECTS.

CLINICAL DEMONSTRATIONS

ON

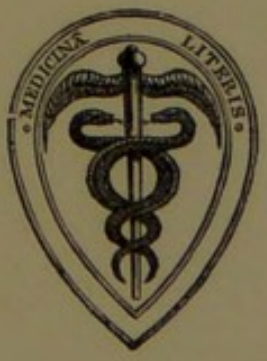
OPHTHALMIC SUBJECTS.

BY

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

SENIOR OPHTHALMIC SURGEON TO THE GLASGOW OPHTHALMIC INSTITUTION;
LECTURER ON OPHTHALMIC MEDICINE AND SURGERY IN ANDERSON'S COLLEGE.

WITH ILLUSTRATIONS.



LONDON:
J. & A. CHURCHILL,
11, NEW BURLINGTON STREET.
1884.

LONDON :
R. CLAY, SONS, AND TAYLOR,
BREAD STREET HILL.

CONTENTS.

TRANSPLANTATION OF CONJUNCTIVA

FROM THE

RABBIT TO THE HUMAN SUBJECT.

(*From the* PRACTITIONER, *January*, 1884.)

IN a notice of my work on "Diseases and Injuries of the Eye,"[1] which appeared in the *Practitioner*, the reviewer expressed a desire for more information as to the transplantation of conjunctiva from the rabbit, to which the attention of the profession had been drawn by the cases exhibited by me at the annual meeting of the British Medical Association in Edinburgh in 1875. I cannot help complying with the desire thus expressed, by giving a short record of successful cases of this operation and presenting it in its new phases, along with other original contributions to ophthalmology.

Of all the various injuries of the eye, burns of the conjunctiva have been considered the most tantalising and unsatisfactory to deal with. When the whole cornea has been rendered opaque, the

[1] Churchill, 1882.

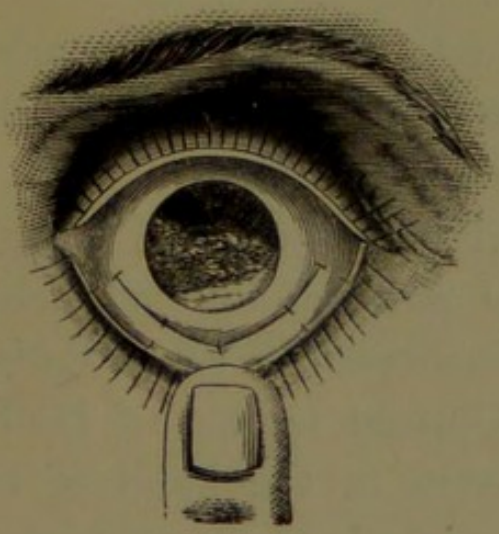
case is hopeless, and there is an end to all surgical interference. But in cases in which the cornea has escaped, or is only partially implicated in the injury, and the burn is principally confined to the conjunctival sac, there is adhesion of the lid to the eyeball (symblepharon), and we have a difficult problem to solve. The condition of things is as follows :—The lower lid, generally, and sometimes also the upper, is adherent to the eyeball, which is covered and rendered immovable. Immobility of the globe and inability to raise the lid takes place even when the conjunctiva of the upper lid is not implicated in the burn.

Here, then, we have an eye, which is otherwise useful or capable of being rendered tolerably so, but which is tied down—buried, as it were—under an adherent lid, and rendered immovable. All the contrivances resorted to by surgeons to separate the lids from the globe have proved a mere waste of ingenuity—have, in other words, ended in disappointment. Impelled by a feeling of perplexity, and a conviction that something might be done to save such eyes—to bring them to the light of day, and restore their mobility—I tried to fill up the lacuna by conjunctiva from the rabbit.

The result of my first operation was submitted to the Glasgow Medico-Chirurgical Society in December 1872, and at the meeting of the British Medical Association held in Edinburgh in August 1875, I exhibited two cases.

Case I. was that of a boy aged nine, who had had his right eye burnt with lime. The whole conjunctiva and also the greater part of the cornea was implicated. Having first made an artificial pupil, and thus restored some measure of sight to the eye, I then operated for the cure of symblepharon by transplantation. The patient was exhibited ten days after the operation, when some of the ligatures still remained in the conjunctiva. It could thus be seen that some portions of the transplanted membrane had assumed a pinkish appearance, while other spots had still a greyish look. This was a case particularly favourable for demonstration. Fig. 1 shows the extent of the injuries done by the

Fig. 1.



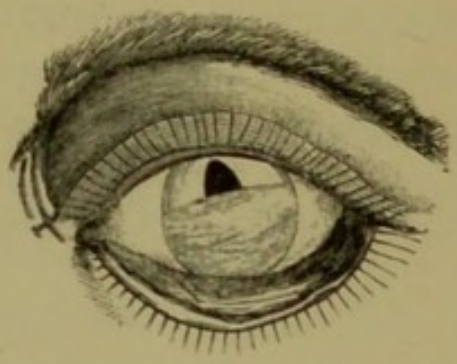
burn to the conjunctiva and cornea, and the sight and mobility restored by the operation. It shows also the position of the ligatures in the transplanted membrane.

Case II.—The second case which I exhibited at the meeting was that of Peter Campbell, quarryman, then aged twenty-two, who had received an injury in his face and eyes from an explosion of gunpowder in January, 1872. His whole face was riddled by the powder. His left eye was completely closed by symblepharon and the greater part of its cornea burned. Both the upper and lower lids of the right eye were completely everted and adherent and the cornea ulcerated by exposure. In the

left eye I made an iridectomy upwards, which resulted in tolerably good sight when the upper lid was raised, as seen in Fig. 2.

In January 1873 I remedied the symblepharon by transplantation from the rabbit.

FIG. 2.



This case was a remarkable one, and I shall return to it presently in connexion with the formation of the lids of the right eye.[1]

This method of conjunctival transplantation has been practised successfully by such eminent surgeons as Professors von Wecker, Paris, Otto Becker, Heidelberg, Albrecht Graefe of Halle, and others, and I have been in the habit of resorting to it whenever I wished to supply a deficiency of conjunctiva.

In July 1883 I had a case which I had intended to exhibit at the meeting of the British Medical Association in Liverpool. To my great regret I was unable to attend that meeting. The following notes of the case were taken by my assistant, Dr. Thomson :—

CASE III.—"Symblepharon and ankyloblepharon (total) cured by transplantation from the rabbit:

[1] See photograph, p. 15.

FIG. 3.

"Jeremiah Jones, steel worker, aged twenty-two, 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. 3 is the photograph taken of the patient after the operation.

In my two last cases the operation has been performed as follows:—The patient is put under chloroform, and also, at the same time, two rabbits; one being kept in reserve in case of accident. In this connexion I may mention that I find the grey wild rabbit more suitable than either the white or black; the conjunctiva in it is tougher and stronger and stands handling better. Dr. Noyes of New York also recommends black instead of white

rabbits. I then separate the adhesions, so that the eyeballs can move in every direction. I then, if necessary, enlarge the external palpebral opening of the rabbit so as to enable me to evert the lid better for dissection. Ligatures are then introduced into the conjunctiva of the rabbit to mark the extent of the membrane to be removed; by means of the ligatures it is put on the stretch and dissected with strabismus scissors. The membrane is spread out on the back of my hand and left to dry there while I finish the preparation of the part for its reception. The flap is cleaned and trimmed, after which it is slightly moistened and then removed to its new site. It is now at once stitched to the free border of the lid which is at the same time strongly everted, spread out carefully, and secured at the *cul-de-sac*. I generally find eight ligatures sufficient to keep the transplanted membrane in its place. The ligatures are left in for four or five days before they are removed.

M. Marc Dufour, in the *Revue Médicale de la Suisse Romande* (December, 1881), reports four cases in which he transplanted the conjunctival membrane of the rabbit to the human eye. In an early case, that of an old woman, the operation failed. A little later the operation was performed on a child aged eleven, the success was complete as well as in two subsequent cases. He recommends that the revivified place and the transplanted membrane should be washed with salicylic acid.

For the last contribution to the literature of the subject I am indebted to Dr. Noyes of New York, who has in some particulars modified my method of proceeding and some of whose suggestions merit consideration. He reports that, soon after the operation was announced by me, he made trial of it, and that he was on more than one occasion aided by Dr. Little, who was then (1873-4) his assistant in the New York Eye and Ear infirmary, and who has recently published a case of his own. In describing his operation Dr. Noyes says—"When it [the flap] has been separated, I put it into a saucer of tepid water and fasten it on a submerged piece of cork by the points of threaded needles. I now trim it to proper shape; next I carry it on the cork to the eye, and run two of the threads from the piece into their places in the patient's eye. Then, taking out the needles from the cork, draw their threads from the piece and pull it into its place and lay it out smoothly. I apply it to the eyeball, and cover as much of the lid and globe as possible. To make the *cul-de-sac*, the stitches are brought through the eyelid and tied over a bit of stick on its outer surface. As many as ten stitches or more may be required to hold the piece in place." [1]

Among American surgeons Dr. Noyes first applied this operation to the formation of the sac for the purpose of fitting in an artificial eye when

[1] *New York Medical Record*, March 3, 1883.

the natural cavity has become contracted, but Professor Cohn of Breslau had previously performed the operation for a similar purpose.[1] Dr. Noyes immerses the conjunctival flap in salt water (1 per cent.) as he thinks that it protects the epithelium of the conjunctiva.

Dr. Noyes's cases now number about a dozen, and he reports that, "in no instance have I met with an entire failure, while the degree of benefit has been various."

During the last eleven years I have operated in thirty-five cases by this method, and my own experience is that the operation proves highly satisfactory, considering the hopeless character of the cases we had to deal with. But I attach great importance to putting the flap down in such a way that there is no curling up or twisting, and so that no mistake can be made as to which is the epithelial surface. Unless this is strictly attended to, success cannot be expected.

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? I have just now (November 30, 1883) come across one of the patients whom I exhibited at the Edinburgh meeting mentioned

[1] Prof. Cohn presented the case before the Schlesische Gesellschaft für vaterländische Cultur, July 23, 1875. Berl. Kl. Wochenschrift. No. 26.

FIG. 4.

above (p. 9, Case II.), and could not resist the temptation of having his photograph taken (Fig. 4).

In his case the conjunctival sac is still as perfect as it was eleven years ago. Both eyes are perfectly good. He has been all the time working at the quarries. The upper and lower lids of the right eye which we had corrected by skin flap from the arm are good and serviceable. It will be seen that 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—somewhat abundant, and out of shape to be sure, but still there they are. There was no hair on his forearm when we removed the skin from it (he was then a young man of twenty-two), but now it has grown. The vitality of the transplanted skin-flaps is thus also demonstrated.

A full description of the case is given in next paper, page 16.

ON

TRANSPLANTATION OF SKIN-FLAPS

FROM

DISTANT PARTS WITHOUT PEDICLE.

(*From the* PRACTITIONER, *December*, 1882.)

ABOUT nine years ago, I brought before the notice of the profession a new method of transplanting skin-flaps from distant parts without pedicle for the purpose of correcting eversion of the eyelids.[1] This operation has since been adopted by ophthalmic surgeons of different countries to a greater extent than I could have expected in so short a period, and has been favourably reported of by them. As the operation has a wider range of applicability, and may be practised for correcting deformities in other parts, I propose to give in this communication 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

[1] *British Medical Journal*, September 18, 1875.

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 nearly 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 fundamental law and *sine quâ non* to the success of the operation, that the flap must retain its connexion with the adjacent living structures by a pedicle to be severed only after complete union and cicatrization 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 connexion 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.

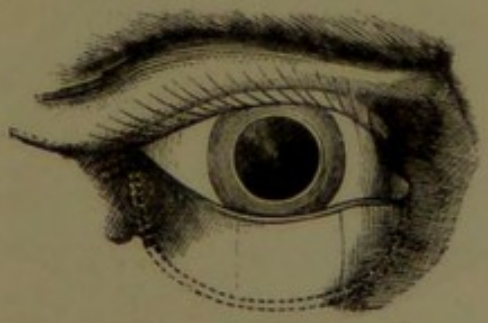
M. Reverdin introduced a method of skin-grafting in which little bits of the size of a pin's head are taken and arranged in mosaic fashion upon the ulcer, or upon the site of deficiency of skin. While practising that operation, I was never satisfied with the macadamised appearance of the parts. I also noticed a very important fact in connexion 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 C., 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-

Fig. 5.

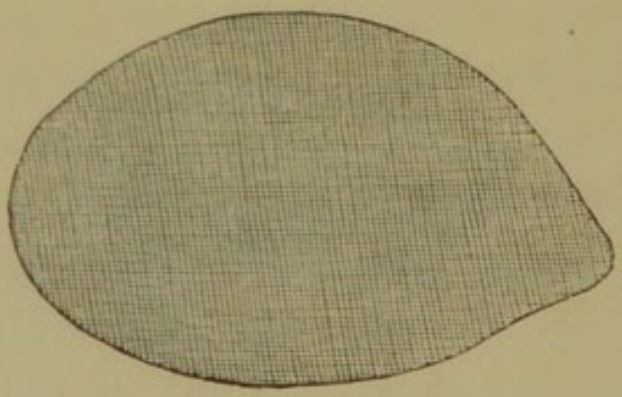


transplantation. Fig. 5 represents the lower eyelid as formed with skin from the fore-arm. As the eyelid was completely everted, its integument totally destroyed, and the skin of the face consisted of discoloured cicatrices, not by any means suitable for plastic operations, I formed a new one in the 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 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

FIG. 6.



it larger all round to allow for shrinking. Fig. 6 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 Ophthalmological 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*,[1] as on the whole satisfactory.

[1] Compare reprint in *Medical Times and Gazette*, February 21, 1880.

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 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 killed his flap either by ligatures or exposure, or by constantly worrying it with fresh dressings and Listerian appliances.

In America the operation has been taken up and 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. His interesting paper was published in the *Specialist*.

Dr. Noyes, of New York,[1] 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 shows the complete success in correcting the eversion of the upper lid.

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.[2] "In five cases some of the transported flap lived;

[1] *New York Medical Record*, March 27, 1880.

[2] *Medical Press and Circular*, April 26, 1882.

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."

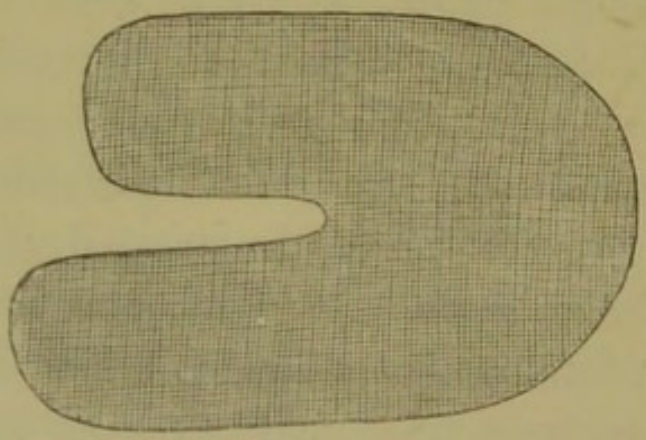
Dr. Benson's paper, which he read before the Chirurgical Society, and the discussion which followed, are valuable contributions; and I cannot help expressing my great satisfaction at the thoroughness with which he treated the various points of the question. In the course of his paper he says: "Of the 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."

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

FIG. 7.



We have lately applied this method to a case of epithelioma involving the inner canthus as well as part of the upper and lower lid. The case was published by Dr. Thomson.[1]

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, I did not even perform staphy-lorrhaphia, but, after removing the epithelioma, simply transferred a skin-flap from the fore-arm, of the size and shape of Fig. 7, and covered the gap. The results were very satisfactory.

[1] *Medical Press and Circular*, August 2, 1882.

The case may be considered as a surgical and therapeutic success.

A word or two regarding *claims of priority* :—

Every new operation proposed has, if successful, two stages or periods to pass through. It is at first pooh-poohed, and spoken of as one that cannot be expected to succeed; afterwards, when its success has been established, some one comes forward to say that he, so many years before, had done the same thing, or something very like it. The operation described in this paper suffered considerably in its first stage. There were voices from some quarters raised against it, but its success very speedily became established. It has now reached the second stage, and claims of priority have been advanced in favour of Mr. George Lawson, and Prof. Le Fort of Paris. With regard to the first, it is stated that in 1870, Mr. Lawson corrected an everted eyelid by putting two bits of skin from the arm, one of the size of a threepenny piece, and the other of a fourpenny piece; these were not prepared as I have described, but simply cut out with a pair of scissors, and put upon the raw surface to take their chance. That such small grafts may sometimes live, if they happen to be free of subcutaneous tissue, there can be no doubt, but it is equally certain that such a procedure cannot be recommended for general adoption. This is proved by the fact that in his manual on diseases of the eye, published four years later, Mr. Lawson recommends

the borrowing of skin from the neighbouring parts, forehead and cheek, but never mentions the transference of skin-flaps without pedicles from distant parts.

With regard to the second claimant, M. Charles Monod has published a pamphlet, in which he states that Prof. Le Fort, after failing completely in one effort in 1870, performed a similar operation successfully in 1872, three years before my operation was published. But he adds the remarkable fact that, notwithstanding Prof. Le Fort's operation, until 1875 only five attempts had been made in that direction, whilst, "après l'apparition du travail de Wolfe, les faits se multiplièrent d'année en année avec une rapidité surprenante." That the successful operation of that eminent Paris surgeon should have been left unnoticed in a field where the materials abound, whilst my operation was at once taken up and adopted in France and elsewhere, speaks for itself. The fact is that from time immemorial attempts have been made in this direction. These attempts have sometimes succeeded by chance, as in Mr. Lawson's case, but failed in subsequent trials until I demonstrated the principles upon which the operation should be conducted to insure a successful issue. I have only to say in conclusion that I do not expect that this operation will prove in every case successful. Indeed, I had one case where both upper and lower eyelids, in an old man of sixty, were charred; in this case the skin was taken from

the fore-arm of his son. One eyelid proved successful, and the other completely failed. Considering the short period which has elapsed since I introduced the operation to the profession, and the favourable reports received from different countries, I think it is deserving of proper cultivation.

ON

AN OPERATION FOR THE CURE OF DETACHMENT OF THE RETINA.

(*From the* PRACTITIONER, *March*, 1883.)

THE anatomical relation between the choroid coat and retina may be disturbed by an effusion of serum between the two membranes. The effusion may be so slight that it cannot be detected even by the ophthalmoscope, so that we have in our diagnosis to depend entirely on the subjective symptoms. The patient complains that an opaque spot intervenes between him and the object when he looks in a certain direction, whilst there are no *muscæ volitantes*, and no tremor of any part of the retina is visible. In some cases again the obscuration extends over a larger spot, and then the ophthalmoscopic mirror shows undulation, or a wrinkled portion or fold of the retina caused by some fluid underneath. The fold is generally transverse, but sometimes it runs obliquely and becomes visible under the mirror when the patient moves his eye

in various directions. The effusion may accumulate until a bluish-grey mass screens part of the fundus, and the retinal vessels are seen crossing its surface. It may even increase in size until very little of the fundus remains visible. The detachment may be in one spot only, or in two different places, and occurs more frequently in the lower part. Even when it begins in the upper portion it generally gravitates downwards, and the originally detached portion of the retina again adheres and resumes its functions.

Retinal detachment occurs more frequently in one eye only, but may occur in both, and may be the result of simple serous infiltration without change of structure, or may be complicated with such structural changes as softened vitreous disorganisation of the retina, apoplexy, or other disease of the choroid. It may supervene idiopathically, or may be the result of an injury by a blow on the head, wound, contusion of the eyeball, or of the bones of the orbit.

When the detachment is limited to one spot of the retina, the patient may see perfectly well, and may even be able to read small print when the eye is rotated in such a manner as to displace the fluid, but when it becomes extensive, vision is interfered with. As the margin of the detachment approaches the macula, objects appear slanted or crooked, and when the macula is invaded there is eccentric fixation, *i.e.* a neighbouring portion is used for

that purpose, and the visual axis deviates in that direction. When the effusion gains ground and screens the entire fundus, vision becomes entirely abolished. In this aggravated form the disease was known, even before the discovery of the ophthalmoscope, under the name of sub-retinal dropsy, but its existence could be recognised only when the retina was much elevated and floated behind the crystalline lens, where it could be seen with the naked eye in the form of a bluish mass, whilst by the aid of the ophthalmoscope we can discover it at its early stage, watch its progress, and determine its various forms.

The cause of the idiopatic form of the disease is generally obscure. In some cases, however, it can be traced to a chill caused by a sudden exposure to cold after being heated. This is a fruitful source of mischief, and plays a most important part in all forms of internal inflammation. Desmarres [1] records the case 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 her carriage, and was instantly taken with detachment of the retina of the right eye. I can recall analogous cases from my own experience.

Indeed the vascular relation between the skin of the face and the retinal vessels, as well as the

[1] *Maladies des Yeux*, iii. p. 479.

nervous supply of these parts, will account for the phenomenon in question in a case of chill to an overheated face and neck. With regard to the treatment of detachment of the retina, the ophthalmoscope has, until very recently, only revealed to us that we were in the presence of an affection which we must put under the category of incurable diseases.

Von Graefe introduced an operation in which he punctured the retina with a needle, and allowed the fluid to burst into the vitreous or into the choroid. Sir William Bowman performed the same operation with two needles, but I am not aware that it had ever been adopted by any other surgeon.

De Wecker tried to drain off the infiltration by means of gold wires introduced through the sclerotic, but had to abandon the procedure.

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 puncture.

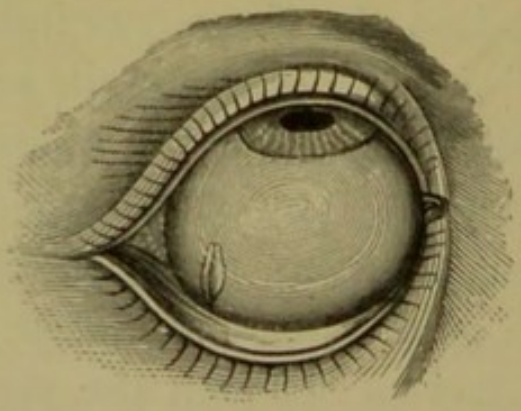
Before resorting to operative interference we must ascertain (1) that there is no opacity or softening of the vitreous, or at any rate, if present, that it is not general but is confined to the region of the detachment. (2) That the retina is healthy. (3) That the effusion is purely serous. We must

then determine the exact site of the detachment, so that the lance enters the pendent portion of the retinal bulging.

Operation.

The patient being put under chloroform and the speculum introduced, the assistant fixes the eyeball with forceps. A vertical slit is made with scissors into the conjunctiva and sub-conjunctival tissue,

FIG. 8.



laying bare the sclerotic at a point corresponding to the site of the detachment, which is generally below the equator at its anterior aspect (Fig. 8).

The lips of the wound are separated by two small strabismus hooks, and the assistant steadily maintains the position of the eyeball to prevent the

FIG. 9.

exposed portion of the sclerotic from shifting. The sclerotome (Fig. 9) is introduced into the sac formed by the fluid. The incision through the

sclerotic is made 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. Gentle pressure is made upon the eyeball in the track of the receding lance by means of a fine spatula. The lips of the external wound are brought together with a fine silk ligature or two, and both eyes are strapped with court plaster. The patient is kept in bed in a dark room for three days. The plaster and ligatures are removed on the sixth day, and the eye is gradually accustomed to light. On the eighth day the result of the operation may be tested.

Case I.—My first successful case was recorded[1] as follows :—

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

[1] *The Lancet*, October 12, 1878.

fare unaided. The following year I received a letter addressed to me in her own handwriting.

Case II. was reported by a former assistant, Dr. Cappie-Shand.[1] Mrs. G., æt. 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 sub-retinal 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.

Case III. was reported by my present assistant, Dr. A. T. Thomson.[2]

A. B., æt. 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

[1] *Medical Times and Gazette*, March 11, 1882.
[2] *Medical Press and Circular*, August 16, 1882.

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 Jaeger with perfect ease. The patient was examined three months later, when it was found that the improvement of his vision was still maintained.

Case IV. was published by Dr. Thomson.[1]

A. L., æt. 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

[1] *Medical Press and Circular*, October 11, 1882.

simply as a retinal detachment. 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 retina 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 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.

I have operated in other three cases with similar good results, and in no instance has there been any reaction or prejudicial effects from it.

As the operation has not yet been adopted in this country,[1] I think it desirable to bring the subject again before the profession; especially when we consider the harmlessness of the operation, and the great advantage which we derive from it in cases which would otherwise be considered incurable, as

[1] One London surgeon, indeed, tried it in two cases. He put in Graefe'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.

seen in the following case in which I recently operated.

Case V.—Mr. James L., æt. 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.

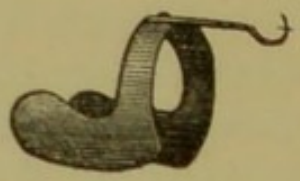
January 29th.—Fifth day after the operation. The eye was opened and examined. He can see and count fingers in all directions. Can distinguish features of all parties in the house; sees small objects.

February 1st.—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.

With regard to this operation, when the patient is

under chloroform, the steadiness of the eyeball can be properly maintained, but without it there is a risk of the eyeball rotating, and the incision made getting out of sight. To guard against such an occurrence, and to keep the eyeball under complete

FIG. 10.



control, I have devised the instrument shown in Fig. 10.

It is put like a thimble upon the index finger of the left hand of the operator, and the point, which is provided with a stop, is pushed through conjunctiva and sclerotic, and keeps the eye steady.

While these sheets are going through the press I have shown an interesting case from my clinique to the Glasgow Medico-Chirurgical Society on the 4th April, 1884.[1]

CASE VI.—Sylvester H——, aged 38, tailor, applied for advice at the Glasgow Ophthalmic Institution on the 5th of September, 1883. About three years before he had lost the sight of his right eye. The cornea of that eye is hazy, the lens is opaque, the pupil is undilatable, being fixed by posterior adhesions, tension, ⊥ i. The blindness of that eye is complete; he can but slightly

[1] See *Medical Times and Gazette*, April 12, 1884, and *British Medical Journal*, May 3, 1884.

distinguish the flicker of a lamp when held at the temporal side, but the perception of light is lost in front and at the nasal side. Viewing, therefore, the cataractous condition of that eye with so many complications, it must be considered as absolutely incurable. The left eye, however, had been apparently free from disease till two years before, when it commenced to be affected, and gradually became worse. On the date of admission he was quite blind and had to be led. That eye also has a nebulous cornea, the pupil acts freely, tension is normal. The ophthalmoscope revealed a detachment of the retina and the presence of large flocculi floating in the vitreous. The light of a lamp held in front of the eye could scarcely be perceived by the patient in any direction. This prognosis of the eye was therefore pronounced also unfavourable, and I was reluctant to risk an operation upon it. On February 3rd, 1884, the patient returned most anxious that something should be tried for that eye, and as his condition could not, at any rate, be made worse, I yielded to his solicitations.

February 14th the operation was performed under chloroform. The conjunctiva and sub-conjunctival tissues having been opened, laying bare the sclerotic, which was punctured in the posterior hemisphere of the globe, in a line of the vertical meridian. Instead of the gush of fluid which generally follows the withdrawal of the lance, only small quantities of serum came each time the flat probe was introduced. The operation was concluded by applying a silk ligature to the wound and closing the eyes with adhesive plaster, lint, and a bandage. After five days the ligature was removed. Vision, then, had so far recovered that the patient could see faces, count figures at a distance of eighteen inches, but the vision was limited to the outer part of the field, the inner being still a blank. The ophthalmoscope showed the existence of a detachment at the lower and outer part of the fundus. Tension being normal, I determined to repeat the operation in the region indicated. This was done on the 21st March. A section was made in the space between the external and inferior

recti muscles, and the eyeball being rotated upwards and inwards, the lance was introduced through the sclerotic in the posterior hemisphere of the globe corresponding to the position of the detachment. This time there was a considerable gush of serum on the withdrawal of the lance. No ligature was applied to the wound, the lids were closed with adhesive plaster, lint, and bandage. On examination, four days after the operation, the field of vision was found complete. The patient could make out Snellen's type, No. 20, at fifteen inches distance, and read No. 16 of Jaeger, and could tell the time to a minute on a watch, and follow with his finger accurately the movement of the small seconds pointer, and see a ring on the finger at fifteen feet distance.

This case is the more satisfactory inasmuch as I have only just now learned that the patient, previous to admission, 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, and also because this was the first time when I ventured to repeat the operation on the same eye.

The publication of this case is *fort à propos*, as this subject has lately been discussed at the annual meeting of the Société Française d'Ophthalmologie, held on the 28th January, 1884,[1] when all the orators confessed their inability to cope with that disease. M. de Wecker stated that "he tried all

[1] *Revue clinique d'Oculistique*, Fevrier, 1884. See also *Centralblatt für Praktische Augenheilkunde*, March, 1884.

the operations which have been proposed for detachment of the retina, but had to abandon them for want of success. Lately he had been trying the repeated application of the cautery (*pointes de feu*) to the surface of the sclerotic." It is evident, however, I think, that M. de Wecker could not have tried my operation, of which frequent mention has been made in the *Annales d'Oculistique* and in other Continental journals, and which has given me such good results.

History of the Operation.

After the publication of my first case in the *Lancet* as an original operation founded upon clinical observation in cases of injury to the sclerotic, I became aware that my excellent friend, Prof. Hirschberg, operated successfully for detachment of the retina the preceding year, and published some results in the *Centralblatt* with his characteristic lucidity and thoroughness. In my work on diseases and injuries of the eye, therefore, I have given to him the credit of priority. In a letter, however, which I have received from Prof. Sattler, that eminent ophthalmologist states: "Among the German surgeons, to Prof. A. Graefe is due the credit of having first performed the operation in the summer of 1876 and published it in the beginning of 1877. There can be no doubt

that you hit upon the same idea totally independently of Prof. A. Graefe, as often occurs to eminent surgeons of different countries."

I may state, however, that although the idea is the same, my operation differs from Graefe-Hirschberg's procedure, for, whilst in their method the eyeball is rotated and the puncture is made through the conjunctiva, fibrous capsule, and other soft parts, and the serum is allowed to well under the conjunctiva to be absorbed, in my operation the fluid is withdrawn entirely. The one is an operation done under cover, in the dark, and may prove a miscarriage; my operation is done in open light, and can be managed with more precision.

Medical Treatment.

In bringing before the profession the merits of surgical interference in this disease, I cannot omit referring to the medical treatment which has lately been recommended, namely, the hypodermic injection of pilocarpine.

M. Dianoux,[1] after having experienced twenty-nine failures in thirty cases, has ultimately succeeded in curing seven in eight cases by the systematic hypodermic injection of pilocarpine. The injections are administered to an extent so as to produce ptyalism, but without perspiration. The reason for this discrepancy of result is stated by

[1] *Archives d'Ophthalmologie*, November, 1880.

himself: "Dieu sait si c'est la médication mise en usage (mercure et iodure) qu'il faut en faire honneur?" Must we give the credit to the iodine and mercury which has been administered at the same time? The reason why I did not refer to it in my work on *Diseases of the Eye* is that I reported only what has proved successful in my own experience, and that, as a rule, I look with suspicion upon potent drugs like these. As, however, it appears to be in favour just now, I cannot pass it by unnoticed here.

Very recently, Dr. Landesberg[1] has experimented with that drug, and his report goes to throw some doubt on its ultimate success. Dr. Landesberg states that in four cases of detachment of the retina, and one of serous choroiditis in which the crystalline lens was perfectly transparent up to the commencement of the treatment, it afterwards rapidly became opaque. The result was the same in the case of a horse, which he treated by the infusion of Jaborandi-leaves and injecting pilocarpine under the skin. The morbid process was rapidly arrested, but during the fourth week of treatment the crystalline lens was observed to become opaque.

In the incipient stage, however, or in cases where operative interference is contra-indicated, the drug deserves a cautious trial.[2]

[1] *Philad. Med. Times*, July, 1882.

[2] Pilocarpine seems to have run its course.

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 1st, 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 tumified, 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 tissues which are subject to tubercular eruptions, viz. the lungs, intestinal canal, lymphatic glands, larynx, brain,

spleen, liver, etc. 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 9th, 1879. It had been observed by M. Parinaud. 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).[1]

The case which I am about to bring before your notice 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.

[1] 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*, which I gratefully acknowledge.

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 recommended 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 tumified ; 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.

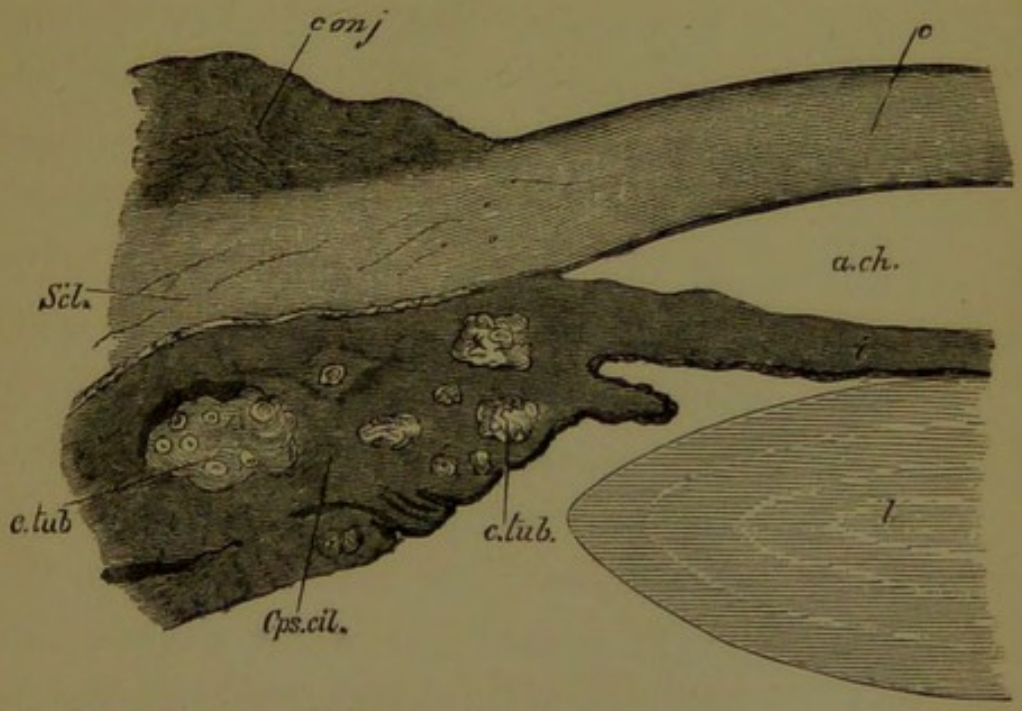
2. Conjunctiva, especially the upper part, infiltrated with round cells.

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.

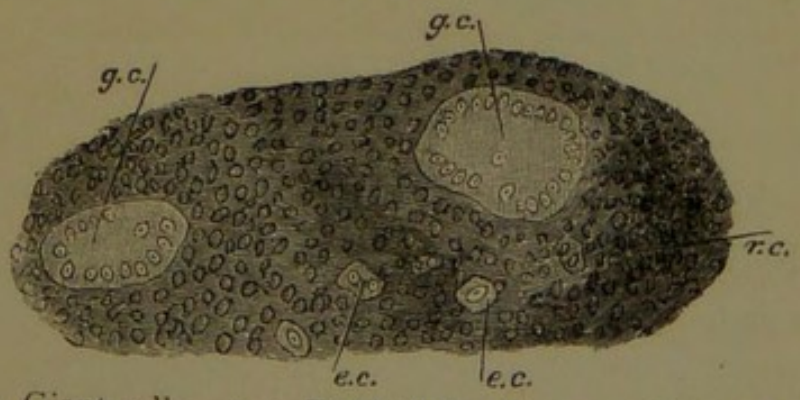
Fig. 11 represents the condition of the different parts; Fig. 12 the ciliary body under a magnifying power of 200.

FIG. 11.



conj. Conjunctiva. *c.* Cornea. *Scl.* Sclerotic. *a. ch.* Anterior chamber. *l.* Lens. *Cps. cil.* Corpus ciliare. *c. tub.* Conglomerated tubercles.

FIG. 12.



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 29th, 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.

LONDON: R. CLAY, SONS, AND TAYLOR.