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UPON

EXCISION OF THE SUPERFICIAL LAYERS OF
AN OPAQUE CORNEA,

AS A METHOD OF RESTORING VISION.

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EDINBURGH EYE INFIRMARY.

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REVISION OF THE SUPERFICIAL LAYERS OF
AN OPAQUE CORNET.

AS A METHOD OF RESTORING VISION.

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ON EXCISION OF THE SUPERFICIAL LAYERS OF AN OPAQUE CORNEA, &c.

(Read before the Medico-Chirurgical Society of Edinburgh, Feb. 9, 1844.)

Last session, I ventured to bespeak the favourable regards of this Society to some recent suggestions for the improvement of ophthalmic practice; and with this object in view had the honour of reading two short memoirs,—the one upon the minute care to be observed in undertaking the principal operations on the eye, referring particularly to the times and seasons at which they may most safely be performed; and the other, upon the cure of inveterate pannus, by the inoculation of the matter of blenorrhœa.¹ Another subject I had then especially in view, was the one just announced: but fearful of making unbecoming demands upon the patience of the Society, I postponed its production to the present time—a course which is all the more fortunate, since, during the interval, together with many of my fellow-members, I have had the pleasure of much personal intercourse in this city, with my amiable and talented friend Dr Gulz, whose success in the not very rare, and truly distressing circumstances on which we are about to dwell, forms a prominent part of the present brief communication.

Dr Gulz, lately *chef de clinique*, and assistant to Professor Von Rosas at the great Ophthalmic Hospital in Vienna, has lately succeeded in restoring vision to one of those unfortunate individuals who had become blind from extensive opacity of the cornea, by excising the opaque anterior portion, leaving only the posterior normal part, which healed without losing its transparency, and left permanently a clear aperture available for all the purposes of useful vision. This success to an almost unlooked-for extent, together with very decided relief in some other cases, has led him to anticipate a like result in similar instances; and has induced him to support the thesis, that there are cases in which excision of the

¹ MONTHLY JOURNAL, vol. for 1843, p. 201, and p. 579.

opaque cornea will be effectual in restoring permanent vision to the blind. This important proposition in ophthalmology, together with a brief narration of the cases just referred to, will form the subject-matter of the following memoir.

It is of primary importance that the *precise nature of the cases to which the proposed method is applicable* be clearly understood; as otherwise, mistakes and injuries will be the necessary consequence.

In these cases, then, as in the somewhat allied class belonging to the head of artificial pupil, it is absolutely necessary, that the *sentient portions of the eye be in their normal condition*, and that the defect of vision arise solely from some obstruction of a mechanical nature interfering with the admission of the rays of light. The morbid conditions inducing such obstacles need not here be enumerated; but in all, though the obstacle to distinct vision be complete, yet the perception of light must never be destroyed; and the practical surgeon will seldom or never have any difficulty in discovering whether the nervous parts of the organ still preserve their integrity.

Again, and to be somewhat more particular, there must be no *anterior synechia*, nor any *closure of the pupil*. No words are necessary to enforce this proposition. Were the cornea rendered ever so clear, both the abnormal states here specified would form insuperable obstacles to vision; and we are not yet in a position to advise that the operation on the cornea should be attempted, in the hope that a second one for artificial pupil might restore the sight. The existence of *staphyloma*, we may add, must always diminish the prospect of success. With the majority of oculists, we hold that in staphyloma the iris is usually involved, adhering to the remaining cornea, or to the cicatrix-tissue which supplies its place. Notwithstanding this unfavourable state of matters, it is interesting to know, that some such cases have been noticed in which very tolerable vision has been retained. Two instances of this kind will be brought under review in the sequel, so that even in these cases all hope must not be abandoned;—hence then, the appropriate cases for the method about to be detailed are reduced to those affections of the cornea which are classed as *simple opacities*. And even here it is necessary to discriminate. The obscurity of the cornea arising from the thickening of its conjunctival covering, constitutes the proper pannus of oculists, and is to be treated upon the general principles alluded to in the paper previously read to the Society. The slighter varieties of opacity, whether of general cloudiness or of local film, and even the more obstinate forms of albugo and leucoma, must be treated upon other principles; and hence the fitting cases for this operation come to be those in which there is a very considerable obscuration of the cornea proper, covering the whole surface of the membrane but not extending throughout its entire thickness, without synechia, and with the integrity of the sentient apparatus.

And such cases are unfortunately too common. They are found in strumous subjects as the result of that obstinate disease known as the vascular albugo of oculists; also, of Egyptian and other virulent purulent ophthalmiæ; likewise, in cases of severe corneitis, with effusion of blood and lymph between the layers, and, not to dilate more, in certain of those cases of violent inflammation, induced by the introduction of lime and such matters, which, by their chemical action, almost immediately destroy the superficial layers of the membrane, and penetrate to a certain but limited extent. The result of accidents and diseases such as these, is to induce a state of the cornea, in which useful vision is lost, and where all attempts at relief are usually abandoned in despair.

Certainly it is not a little vexatious to the surgeon to know, that in all these cases the more noble and important parts of the organ are still entire, and that a mere chink or aperture is all that is desiderated for satisfactory vision. It is this condition of the parts which has led the first oculists of their time so much to tax their ingenuity and skill in endeavouring to overcome the apparently trifling obstacle;—that led the University of Munich to offer an honorary prize to the individual who would indicate how the difficulty might be overcome;—that has led such men as the elder Autenrieth, Beer, Ammon, Henle, and Guthrie, in cases of opaque cornea, and of staphyloma, themselves to undertake, and to recommend to others, the operation of *sclerectomia*,—the operation of simply removing a minute portion of the sclerotica and choroid, near the corneal margin, so hoping for a vicarious or artificial pupil;—or the modification proposed by the celebrated Wutzer of Bonn, of substituting, in the same spot, after the Talicotian method, a portion of the transparent cornea instead of the natural and opaque membranes;—that has moreover led Febure, and more recently Dieffenbach, to advise, and, it is stated,¹ successfully to execute the complete excision of the central opacity of the cornea, and to unite the lips of the wound thus made by sutures;—and finally, that has led Reisinger, and more lately Dr Biggar of Dublin, to propose, and in the lower animals, to execute with success the removal of the opaque cornea, substituting a transparent one in its place, and so restoring useful vision.² All these anxious and persevering efforts of ingenuity and skill must, we fear, be conceded to have failed; and hence the proposal before us will readily be received with a larger share of favour and consideration.

The *history* of this proposal, we believe, is as follows:—

The ophthalmologists of Vienna were not, of course, ignorant of the state of the science regarding the class of cases on which we have been dwelling, and particularly respecting the forms of simple

¹ See Stoeber, *Man. Prat. d'Ophth.*, p. 260; Ammon's *Zeitschrift*, i. p. 177.

² See Dr Biggar's able Inquiry into the Possibility of Transplanting the Cornea, in the *Dublin Journal of Medical and Surgical Science*, vol. xi. p. 403. 1837.

opaque cornea, and the methods which have been proposed for remedying the distressing complaint. Meditating upon the peculiar texture and organisation of the cornea, and upon that variety of the disease we have indicated above, it had long been the opinion of Professor Von Rosas, that the diseased part of the cornea might be sliced away, so leaving a clear portion beneath; and, moreover, that this operation might so be managed that the resulting increased action would not produce a new film, but leave the parts in a translucent or transparent state.

This speculation was converted into a kind of certainty, by there appearing at the Clinical School, in the year 1833, a man in whom the left eye was atrophied, and whose right exhibited a complete obscuration of the cornea, with the exception of a small portion in its centre about the size of the natural pupil, which was clear, and which served all the useful purposes of vision. Here the unaided powers of the constitution had wrought an excellent cure; and art was as it were challenged to accomplish that which nature had so well effected.

Accordingly, in the Ophthalmic Clinic of the session 1833-4 Professor Rosas undertook the performance of this operation in two cases. In the former, he may be said to have removed by far the greatest number of the layers of the cornea, and the trial was not unsatisfactory, inasmuch as the patient was quite cured of his wound, and left the Hospital with very decided improvement of sight. The subsequent history of this case, however, was unfortunate. It was ultimately ascertained that after leaving Vienna, fresh inflammation attacked the eye, and the advantage which had been gained was completely lost. In the latter, the external and opaque layers of the cornea only were removed; the remaining part was found in its normal state, the healing process advanced to its close without any opacity being superinduced, and a cure was effected by means of a clear membrane. Six months afterwards it was ascertained from good medical authority, that the patient continued to see as well then as he did upon leaving the Hospital. In both these cases, the greatest care was taken after the operation to regulate the re-action which necessarily followed, by the antiphlogistic regimen, and by cooling local remedies.

In subsequent years the operation was occasionally performed with mingled, rather than with marked success; but with a sufficient measure of it to encourage still farther trials.

The next event in the history of the proposal to which we have to direct attention is a case which presented itself in the Ophthalmic Clinic of Vienna in the session 1841-2, and which fell under the immediate care of Dr Gulz. In this instance, there was a cure effected in both eyes; in the one, which was in a staphylomatous state, by nature; in the other, by the hand of the surgeon: and so far as our knowledge extends, this is the most detailed and remarkable instance of the success of the method which has hitherto occurred.

Salomon Maschkowits, Oct. 28,¹ from Hungary, a tailor by trade, of leucophlagmatic temperament, and having about him the traces of struma, two years previously was attacked, in his native country, with purulent ophthalmia, after being in frequent and close communication with a fellow-workman labouring under the disease. For the cure of this complaint he resorted to an hospital, from which, after a treatment of eighteen weeks, he was dismissed, with no greater power of vision than that of distinguishing between light and darkness. After dismissal, as might be expected, there was no improvement, but the reverse. The left eye gradually augmented in size; the corneal portion at the same time projected more and more, and the blindness continued as bad as ever. These symptoms advanced for about a month, when, one morning upon awaking, the patient, to his great joy, observed that he could perceive objects with his left eye, though it was more than ordinarily tender and painful. From all that could be learned, and from a careful examination, it appeared that the ophthalmia had produced spherical staphyloma in this eye, which ran its usual course, getting larger and larger till at length it had burst, after which the cicatrization had finally stopped at that stage in which there was the formation of a transparent membrane, a termination not more fortunate than rare. At all events, upon his presenting himself at the Vienna Clinic, this eye was found with the remains of a genuine staphyloma, the most projecting portion of which was smooth, as if it had been shorn with a plane, also transparent and shining, to the extent of half a line; so permitting the passage of light to such an amount that the patient could readily distinguish larger objects and colours; and clearly demonstrating that there are circumstances in which, even after the rupture of a protruded cornea, with adhesion of the iris, a clear and useful aperture might still be left.

The disease in the right eye had run a different course. The external layers of the cornea had been more or less inflamed, ulcerated, and destroyed, and the healing powers of nature had operated by substituting in their place a substance, whitish and opaque, over the whole surface of the cornea. On the patient's presenting himself at the hospital, granulations were found in the palpebral conjunctivæ of both eye-lids, and the right cornea was somewhat flattened, in all its extent obscured by a cicatrix, the result of the previous ulceration, whilst at the same time, the organ readily discriminated between light and darkness. It was thought, or at all events, hoped, that the obscuration and ulceration of texture in this instance did not extend throughout the whole depth of the membrane; and the case was deemed a fair one for attempting what could be accomplished by the slicing off of the opaque portion of the cornea and leaving the transparent part as little injured as possible.

¹ Dr Gulz read the history of this case to the Medical Society of Vienna, and published an account of it in the *Oesterreichische Medicinische Wochenschrift*, No. 24, June 1842.

As preliminary to any thing in the shape of operation, the removal of the granular state of the palpebral conjunctivæ, with the consequent inflammation, was first essayed, and accomplished without difficulty.

The operation was performed by Dr Gulz, under the direction of M. Von Rosas, in the following manner;—the instruments employed being the cataract knife, with a double cutting edge of Rosas, and the pyramidal knife of Beer, together with a small toothed forceps, and a delicate pair of scissors. The eye-lids of the patient were conveniently fixed by the fingers of an assistant, and the cutting consisted in the continuous and repeated introduction of the knife, following the motion of the eye-ball through the external layers, so gradually approximating the internal parts of the cornea. The manœuvre required to be repeatedly and adroitly performed, until the transparent part of the cornea was at length reached; it was then, by the help of the different instruments, bared to the extent of a line and a half in diameter, the innermost layers of the cornea being fortunately uninjured throughout, and consequently the anterior chamber of the aqueous humour remaining unopened. The operation occupied about a quarter of an hour in its performance; and after its completion, the vision was improved to such an extent that the patient could perceive different shades of colours, and the smallest objects, such as the hands of a watch, with facility.

The subsequent treatment consisted in the application of plasters over the eye-lids, so preventing their motion; these again were covered with cold and ice-water, to moderate every thing like excess of action; the patient was placed in a dark room, and the strictest regimen was enjoined. All appeared to progress favourably, and no alteration was made during the first eight days. At the end of that time the plasters were removed, and a collyrium, first of a solution of hydriodate of potash, (1 gr. to the ounce,) and subsequently of the solution of muriate of ammonia, was used.

All went on most promisingly for the first four weeks; after which the eye was attacked with ophthalmia, the result probably of cold, or some irregularity in diet. The inflammation invaded the iris as well as the cornea; and to such a degree, that the thinned cornea was pushed forward, forming a keratocele, to such an extent that the bursting of the membrane was seriously apprehended. By venesection, however, leeching, and the application of solution of alum and ice, and by the use of calomel internally, the danger was arrested and the attack subdued. In a few days the vision, to the great joy of all parties, was found uninjured; and after the additional period of five months, it continued to exhibit the same degree of perfection which was enjoyed previous to the inflammatory attack.

The patient, as may be expected, is near-sighted, requiring to hold objects near to the eye, and to place them in a good light. This is readily explicable, from the greater convexity of the cornea, the small size of the pupil, and from the fact that the new made

aperture is somewhat more distant from the retina. Glasses could effect much in these circumstances; but even without them, the amount of vision is most satisfactory, and to the patient invaluable.

On examination, the white and opaque portion of the cornea near its centre is found removed, whilst the internal transparent part preserves its natural appearance. In this way, much of the old deformity is removed; so that in addition to the more substantial benefit of good sight, the general appearance of the patient is greatly improved.

Concerning this operation and its fortunate results, nothing is further from Dr Gulz's mind, than the assumption of any supposed merit arising from the dexterity of its execution, or the superior wisdom with which the after treatment was conducted. That it requires considerable dexterity and steadiness of hand is undoubtedly true, and not less, great attention and care in the after treatment. The claims of the case to consideration, rest mainly perhaps on its comparative novelty and rarity, and especially on its unexpected success, whereby the utility of the art may be extended, and not a few miserable sufferers restored to comparative enjoyment and comfort.

On the *rationale* of the success in this, and the few other similar cases here recorded, it is unnecessary to dwell. It is clear that the opaque cornea, which is the subject of operation, is far from being in its normal condition; and even when the lower and transparent portion is reached, it is surrounded with an opaque areola very different from the healthy cornea. As throwing additional light on this important point, we quote a case which occurred in the extensive experience of the late Mr Tyrrell. A man, aged 37, applied to the Moorsfield Hospital, having acute purulent ophthalmia of the right eye, with commencing disease in the left. Severe depletion measures were adopted, but in forty-eight hours afterwards, sloughing had commenced in the right cornea, and there was chemosis of the left, with haziness of the upper part of its cornea. Further depletion, and other remedies, were had recourse to, and the inflammation was subdued, but not before a part of both corneæ had lost its vitality. The separation of the sloughs left deep ulcers of a crescentic figure at their upper margins, which in the right communicated with the anterior chamber, producing prolapsus of the iris, which was reduced by belladonna. The reparative process was excited by the use of local stimuli and improved diet; and instead of the usual deposit of opaque matter, the cavities were gradually filled up with a perfectly transparent substance, resembling very much the original texture. Two years afterwards, the man returned to the hospital, at which time some very slight irregularity of the surface alone indicated the previous seat of the disease.¹ The opaque and normal condition of the cornea, therefore, though from

¹ Tyrrell on the Diseases of the Eye, i. 261.

circumstances a common, is not at all a necessary preliminary of the cure; and the conclusion, as it regards both the more chronic and the acute cases, is evidently this, that what nature can do, art should attempt to imitate.

From our present very limited experience, it is not easy to draw any very decided conclusion as to the amount of benefit likely to accrue from the practice now proposed. That our art, in cases of severe and chronic cases of opacity of the cornea, is considered ineffective and powerless, by the great majority of authors and practitioners, is beyond a doubt. Beer and Walther, high continental authorities, contended, we believe, that all prospect of success in such cases was chimerical,—a proposition whose accuracy, however, was contested by Scarpa and Von Ammon. British surgeons, as will readily appear from a reference to their works, are almost unanimous in expressing their conviction that benefit in such cases from any remedial means now employed is not to be expected. We shall exhibit these sentiments in a couple of sentences recently written by two of our most respectable authorities. “Ulcer of the cornea, extending at all deeply, is followed by some degree of opacity, which can never be completely removed at that part where a considerable number of the corneal layers have been destroyed.”¹ And again, “It is useless to attempt, by medical or surgical means, the removal of these dense opacities.”² Such opinions, though weighty, are fortunately not conclusive, else there would have been long ere this time an arrest to all progress in the healing art. Sound judgment and discretion must here guide and direct on the one side as on the other. That such cases and proposals as those above detailed, should be received with much careful scrutiny, we not only allow, but would enforce. That, on the other hand, they should be met with blind prejudice and impatience, we are equally prepared to deprecate and condemn. We cannot probably better convey our own sentiments on the point, than in the remarks with which Dr Gulz concludes his account published in June 1842. By the foregoing case, says this able oculist, the possibility of obtaining a clear aperture in the middle of a generally opaque cornea by surgical operation, and in certain cases of staphyloma, which may be styled *kerectomia*, is placed beyond a doubt. And that this will frequently prove of incalculable value to unfortunate sufferers, can as little be matter of dispute. Such cases, usually abandoned to their sad lot, are not very uncommon in society, and too often, in the long run, find their way to the poor-house or some blind asylum. They will, moreover, ever be recurring to our notice, so long as the cornea is exposed to so many accidents from without, is so often the subject of purulent ophthalmia, and the still more frequent ravages of disorders of serofulous origin. The suggestions here offered, and the operation accomplished, are as yet only on their trial; I cannot, however,

¹ Middlemore on Diseases of the Eye, i. 180.

² Tyrrell, op. cit. i. 263.

but entertain the hope, that from the wonted energy and combined efforts of those who are favourably situated for investigating these subjects, they will ere long assume an honourable position among the remedial agents for the management and cure of ophthalmic disorders.

After the treatment of the several cases above referred to between the years 1834 and 1842, and the publication at length of the last of them in June of the last named year, in one of the leading journals of Europe, and its notice unquestionably in others, it is not a little curious that the celebrated Parisian surgeon, Malgaigne, could, on the 3d April 1843, entertain the Académie Royale des Sciences, with such intelligence as the following, reported on by MM. Roux and Breschet:—"When opacities of the cornea," says M. Malgaigne, "are of long standing, and have resisted all remedial means, Surgery, up to the present time, has owned its incompetency to afford relief. At the same time, numerous dissections have satisfied me, that, generally, these opacities affected only the external layers of the cornea, and that the internal ones remained transparent. Hence the question naturally arose, If it were not possible by the knife to remove the abnormal layers? To this there was but one objection, viz., that the newly made wound might leave an opacity as bad as the previous one. Bearing, therefore, on this point, I undertook a series of experiments upon living animals. I removed about half the thickness of the cornea, and in the end preserved a cicatrix, which was perfectly and absolutely transparent. Here, then, is one new fact reaped for science!

"Satisfied upon this point, I conceived myself entitled to apply the fact to the human subject; and I have now performed one operation upon a girl in the Clinical Hospital, where I had the honour of acting for M. Jules Cloquet. No sooner was the incision concluded, than the girl exclaimed that she had received her sight.

"I limit myself at present to the mention of this first attempt to the Academy, and at a future period will furnish the ultimate results of these operations."

I cannot forbear making a remark or two upon this note of M. Malgaigne.

Here we have one of the most distinguished surgeons of Paris condescending to make *L'Académie des Sciences* the arena in which he lays claim to the discovery of a new fact in science, as it regards the lower animals, and its first and successful application to the removing of an important defect in man, in his young patient of the Clinical Hospital, and using the *Comptes Rendus* (t. xvi. 659), and *L'Archives de la Médecine*, as the vehicles of publishing his discovery throughout the world. The complacency with which this is done—for we would avoid all harshness of expression—is not a little interesting. Are we to suppose that the operations above reported from the Vienna Ophthalmic Clinic, and their publication nearly a year before, were unknown to the Parisian surgeon? And, are we

to conclude, that M. Malgaigne was ignorant of the fact, that it is one thing temporarily to remove a mechanical obstruction to vision by section of the cornea, and another to maintain this happy result in permanence and perpetuity? A direct answer to these inquiries would be both curious and instructive. We should be unwilling to imagine that any French surgeon would be slow to concede scientific merit to others, and especially to foreigners, where that merit was due. And sure we are, that if an offence of this kind, at any time, through inadvertency, or otherwise, appears in the commonwealth or literature of science, it should, on all hands, and promptly, be exposed and redressed.

P.S.—Since the foregoing observations were written, I have read in the late numbers of the *Annales d'Oculistique*, first, A criticism, communicated to the Académie des Sciences, of M. Malgaigne's *Memoir*, by M. Desmarres; and, secondly, Remarks to the same learned Academy, by M. Magne, on the sentiments of M. Desmarres.

We subjoin, in a few words, the opinion of these gentlemen.

M. Desmarres proves incontestibly that M. Malgaigne's claims to novelty of discovery are baseless, and that both Dr Mead and Baron Larrey have stated that the practice has succeeded in their hands. Notwithstanding this, he contends, somewhat inconsistently, we should think, that the practice should invariably be proscribed, except in cases where central opacity is the result of the deposition of oxide of lead, or other such substance, and that the operation for artificial pupil should in all instances be preferred. But how could any operation for artificial pupil be available in the many cases in which the opacity extends over the whole surface of the cornea?

M. Magne again contends, that all cases of leucoma are incurable by this, or by any other method; but, on the other hand, that albugo is curable by nitrate of silver without the knife; whilst, in those cases in which the opacity extends over the whole surface, he considers that the surgeon is warranted in making the attempt here discussed, to relieve.