Historical and critical remarks on the operations for the cure of cataract / by Alexander Watson.

With Compliments from the Author.

HISTORICAL AND CRITICAL REMARKS ON THE OPERATIONS FOR THE CURE OF CATARACT.

BY

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I have been induced to publish the following remarks chiefly because several distinguished authors have published erroneous statements regarding many of the points here referred to, which were in danger of being perpetuated by being copied by others, instead of the original sources being consulted. I adopted this view after examining the publications of the original authors from whence my information has been derived.

In treating of the modes of operating, I have given the results of my own experience, and have introduced some improvements, as well as endeavoured to give precision to the best forms of instruments.*

A. W.

* The instruments here recommended may be obtained from Mr RUDDIMAN, Cutler, 5 South Hanover Street, Edinburgh.

HISTORICAL AND CRITICAL REMARKS

ON THE OPERATIONS FOR THE CURE OF

CATARACT.

Of the operation for Cataract by Extraction.

§ 1. *History of Extraction.*

One hundred years having now elapsed since the operation for the cure of cataract, by the extraction of the crystalline lens, was first practised, it may neither be uninteresting nor useless to take a brief retrospect of the success which has attended this operation.

The introduction of this operation as a mode of curing cataract, forms one of the most interesting epochs in the history of ophthalmic surgery. This was indeed a brilliant achievement, accomplished by the introduction of one of the most perfect and beautiful operations of which surgery can boast,—an operation, too, for the cure of one of the most grievous privations to which humanity is subject.

During many preceding ages, the depression or couching of the opaque lens within the eye, so as to remove it from the axis of vision, had been extensively practised in Eastern countries, as well as in Europe, although the anatomy of the eye was, at that period, very imperfectly understood.

In more recent times, the world has been indebted to England for another mode of cure,—that by the solution of the cataract within the eye, effected by the action of the aqueous humour upon the lens when divided into fragments.* The merit of this operation is due to the late Mr Pott of London. It has since been improved and perfected by the late Mr Saunders.

The introduction of the operation for cataract by extraction is generally conceded to Daviel, a surgeon of Marseilles in France. According to his own account, some of the ancients had conceived the practicability of extracting membranous cataracts through the cornea. In later times, an opening had been made through the cornea, for the purpose of extracting the crystalline lens from the

* See Pott's Surgery, also Saunders on the Eye.

anterior chamber of the aqueous humour, when it had accidentally got into that situation. Such operations had been performed both by St Yves and Petit in the years 1707–8. About the year 1744, a similar case having occurred to Daviel, he was led by their example (he acknowledges) to operate in the same manner. And subsequently to this, from a want of success in his operations for cataract by couching, he resolved to try the expediency of extracting the opaque lens from the eye, by an operation somewhat similar to that of St Yves and Petit.

In making this attempt and bringing the operation into form Daviel seems to have been occupied for several years, from 1744 to 1747. And it was not until the year 1753 that he published to the world his adaptation of this operation to the cure of cataract.*

The merit of Daviel, therefore, in regard to this operation consisted, in proposing and demonstrating the practicability of its success for the cure of cataract. The instruments he used for this purpose may now be considered clumsy and imperfect; and, although it was reserved for the ingenuity of his followers, and the experience of after times, to bring this operation to its present state of perfection, still to the genius, skill, and dexterity of Daviel we are indebted for this beautiful triumph of art,—the *chef-d'œuvre* of surgery.

This novel operation for the cure of cataract by extraction, such as it was in the hands of Daviel, having been followed by much greater success than couching, he resolved in 1750 to continue to practise it; and, since his account of it was published, as already stated, it has been adopted by others as one of the regular operations of surgery.

In order to extract the opaque lens from the eye, Daviel made an opening or puncture through the cornea with a lancet-shaped knife; which opening he enlarged to the proper size by means of scissors. He then divided the anterior part of the capsule and scooped out the lens with a small sharp-pointed instrument. He afterwards improved the operation, by substituting a small blunt-pointed knife, to enlarge the puncture of the cornea, for the scissors.

This operation,—in its nature so perfect, and in its object so important, was happily destined to undergo rapid advances in improvement towards perfection.

The first great improvement made upon the operation was that of making the opening in the cornea, through which the lens was to be extracted, by one incision with a knife adapted to the purpose, instead of Daviel's more complex mode. This seems to

* Mem. de l'Acad. de Chir. T. ii. Paris, 1753.

have been first done by Pallucci and La Faye in Paris 1752.* This mode of operating has since continued to be practised as the best; and, although the operation, in different countries, has been subjected to every change and modification which ingenuity could devise, scarcely any improvement upon it has been made. Nor can we conceive how the operation could be performed in a manner more perfect,—with more simple instruments,—or with less injury to the eye, than when it is effected by an incision of the cornea made at once, followed by a puncture of the capsule of the lens, without any other injury being done to the eye. What is wanted now, therefore, is, instruments of a proper size and form, guided by the dexterous and steady hand, united to skill and experience.

During the hitherto short career of this operation, it has been subjected to a greater variety in the form of the instruments employed than any other operation in surgery. In the small work of Lachmann, already referred to, upwards of eighty different instruments are described and delineated, as having by different individuals been employed for making the section of the cornea, to which several others might now be added. These vary from the simple narrow knife, to the complicated phleme-shaped lancet projected from its concealment with a strong spring. The invention of the multiplicity of instruments here alluded to, has obviously arisen from a desire to render an operation more easy, which was found to be attended with difficulty in its execution,—to accomplish by instruments that which can only be done by manual dexterity,—to make up what is wanting in dexterity by mechanical contrivance,—an object which has not, in this case, been attended with success.

The extraction of cataracts has been very successfully practised by many distinguished surgeons; in particular I may mention the familiar names of Richter,† Wenzel,‡ Barth,§ Beer,‖ and Ware,¶ who, though they lived in times now gone by, have left behind them lasting testimonials of their high talents, dexterity, and well-earned reputation.

These very celebrated operators performed this operation with instruments very similar to each other; the chief of which is the knife for making the section of the cornea. The knife employed by Richter, Wenzel, and Ware, was nearly the same in form, and such as had been previously in use by others. (Plate I. Fig. 2.) But Barth was the first to make a modification of this knife, which

* Fig. 1. See Lachmann, de Historia Instrumentorum.
† Richter de Extract. Catar. Gottin. 1770.
‡ Description détailée de l'instrument, &c. Paris, 1786.
§ First Professor of Ophthal. Surgery at Vienna, 1795.
‖ Treatise on Ophthalmology. Vienna.
¶ Treatise on Cataract. London, 1795.

has been considered to be an improvement so great, that it has been generally adopted since his time. (Fig. 3.) As he died without having published any description of the instrument or operation, this was afterwards done by his successor Beer, under whose name the knife is now generally known.

§ 2. *Success of the operation by Extraction.*

Let us now inquire into the success with which this operation has been practised,—considered *per se*, and also in comparison with that of couching.

It is very desirable that some tolerably correct account of this should be made. But from the want of accurate data it is impossible, I apprehend, to do more than to give the opinions of some of the most distinguished surgeons upon the subject; for, several of the greatest operators, such as Richter, Barth, Wenzel, Ware, and others, have not left on record any detailed account of their cases or the success of their operations. Hence, the statistical accounts of the success of this operation, which have been attempted, have been extremely imperfect.

When Daviel wrote an account of this operation, he mentions his having then practised it on 206 cases of cataract, of which 182 were successful. This success was the more remarkable, that he operated with very imperfect instruments which were not well adapted to the purpose, and probably did not make any particular selection of his cases.

In consequence of the success of the other distinguished operators I have mentioned, they severally became strong partizans in favour of this operation in preference to couching. From their experience, therefore, as well as from that of others under similar circumstances, we cannot expect an unbiassed opinion in regard to the comparative merits of these two operations. But this much we may infer, that the extraction of cataract is an operation which has been, and therefore may be, eminently successful; so that when we find others depreciating it, we may conclude that they did not possess the manual dexterity necessary for its successful performance. The converse of this may also be asserted; namely, that all those who have been able to perform this operation successfully have become advocates in its favour, though very properly, not always to the exclusion of other operations. I may also remark further that, the most successful operators always used the simplest instruments in performing this operation.

At the school of ophthalmology in Vienna, where Barth was the first professor, and which has now become the most celebrated in Europe, such has been the attention bestowed upon this operation by Barth, Beer, and their successors, and such the expertness and success with which it is practised, that it is always esteem-

ed to be the most desirable operation for cataract, if no circumstances exist, in particular cases, to contra-indicate it.

Extensive experience of this kind, in the hands of such eminent individuals as Barth, Beer, Rosas and Jaeger, certainly speaks volumes in favour of this operation. In Germany cataract appears to be a more common disease than it is in this country, so that extraction and other operations for its cure are practised in Vienna and in other parts of Germany upon a very considerable scale, and that of extraction, in particular, with almost uniform success. This shows (as I shall afterwards have occasion to mention more fully) what may be done by the experience which extensive practice affords, combined with minute attention to the details of the after treatment.

The most celebrated operators for cataract, who have practised in England since the operation by extraction was first introduced, have shown a decided preference by their adoption of it where the cases were favourable. Among those to whom I allude may be enumerated Ware, Phipps, Sharp, Adams, Alexander, Lawrence, Wardrope, Travers, Guthrie, and Tyrrell. The published opinions of some of these upon this point we shall now quote.

"The operation of extraction," says Mr Travers, "is by far the most perfect ever devised for the cure of cataract. * * When the operation is perfect, its pre-eminence is too conspicuous to admit of illustration. It exacts the homage of admiration beyond any other effort of art."*

"The operation of extraction is particularly applicable to cases of firm cataract, especially in persons advancing in years. * * The advantages of the operation are the complete removal of the cataract, and the speedy restoration of sight."†

"The result of the operation of depression has not, under my observation, been so successful as extraction; for which reason I adopt the latter, when the case admits of it, in preference to the former."‡

"The operation of extraction," says Mr Guthrie, "or the removal of the opaque lens and part of the capsule from the eye, is a radical cure of the complaint, as it cannot possibly return. It is performed in a very short space of time, and, when completely successful, causes the least disturbance to the internal parts of the eye, and is the most certain of all the methods recommended for restoring vision in this disease."§

Dr Mackenzie of Glasgow states it as his opinion, that "extraction is the only proper mode of removing a hard cataract."‖

* Travers on the Eye, p. 322 and 332.
† Lawrence on the Eye, p. 634.
‡ Tyrrell on the Eye, vol. ii. p. 447.
§ Guthrie's Lectues on the Oper. Surg. of Eye, p. 365.
‖ Mackenzie on the Eye.

These are the opinions of the most eminent surgeons in this country on the subject; and, they are of the greater weight, that these gentlemen do not operate exclusively by extraction, but perform the other operations with equal success, in cases where this is proper; for, as Mr Lawrence justly remarks, "no person, who understands the subject, would advise any one operation to be employed exclusively."

The chief objections to the operation for the extraction of cataract arise from the difficulty of performing it; and, therefore, apply to the operator rather than to the operation; for while the operation is, in its nature, simple, obvious, and effectual, it is requisite for the operator to possess several rare qualifications, which are not often combined in one individual. These are, skill, dexterity, and experience.

To those who have seen this operation well executed, but never performed it themselves, the difficulties attending it may appear to be exaggerated. But, on trial, they will soon find that the statements of practical surgeons on this point are well founded and correctly stated.

In regard to the difficulty of the operation, Mr Travers says, "No operation in surgery, I am well satisfied, requires an equal degree of temper and experience for its accurate and successful performance." He then shows that the chief objections which have been urged to the operation apply rather to the performance than to the principle of it.

"Another objection to the operation of extraction," says Mr Lawrence, "has reference rather to the operation (operator?) than to the patient; it is the difficulty of performing it,—the degree of manual dexterity required for its successful execution. Unless a person has frequent opportunities of operating, he will not become familiarised to the various difficulties of the proceeding, nor acquire that confidence which is essential to success. The unsteadiness of the eye, the little control which the patient has over it, the alarm which the dread of the operation, and still more the preliminary measures, occasion, and the convulsive or spasmodic exertion which the actual contact of the instrument often excites, are sources of real difficulty."*

"The operation of extraction," says Mr Tyrrell, "which is best adapted to a very large proportion of the cases of hard cataract, is so difficult of performance, and requires so much experience in ophthalmic operations, besides an unusual extent of manual dexterity, that very few can perform it well, and with confidence."†

"Now, then, the extraction of the lens," says Mr Abernethy, "is a very difficult operation, very difficult. If a man sets about

* Lawrence on the Eye, p. 635. † Tyrrell on the Eye, p. 481.

it hesitatingly he makes some blunder or another; and, therefore, it is an operation which always should fall to the lot of surgeons who have been in the habit of practising it."*

The chief obstacles to success and dangers of this operation, therefore, resolve themselves into the difficulty of its execution. But this is far from being insurmountable by attention and experience. A careful study of the subject, and assiduous practice on the dead body, followed by experience on the living, are necessary for acquiring that degree of skill and dexterity which are requisite for performing this operation with success; but which, (as has been stated above,) may by labour and diligence be attained, as it has been, by many celebrated operators.

§ 3. *Of the performance of Extraction of Cataract.*

From what has been above stated, and the high authorities which have been quoted, the surpassing excellence of this operation must be obvious. But although much has been written in praise of the operation, all its advocates admit the difficulty which attends the execution of it.

This difficulty arises from the mobility of the eye, which the patient cannot control,—the very minute and limited space for the operation,—the great delicacy of the parts which are so easily destroyed by pressure or rash manipulation,—the number of circumstances requiring the operator's attention during the different stages of the operation,—the dexterous and skilful movement of the knife that is necessary in making the section of the cornea,—and the difficulty of making the incision of the exact size that is requisite. To sum up all, we may quote, as peculiarly applicable to this operation, what Mr Liston has said regarding the performance of operations on the eye generally; namely, that "the operator must have a good eye; a steady, light, and skilful hand; a fine touch; courage and caution,"—qualifications necessary in addition to steadiness, composure, and calmness, on the part of both patient and surgeon, in order to secure success.

Although the facility, the exactness, and the success of this operation depend much on skill and dexterity in performing it, still, much also depends on the form of the instruments employed for the purpose.

In consequence of the almost unvarying form and size of the parts concerned, the best form of instruments may be ascertained by mechanical principles. By then combining the results of theory and experience, the proper form of the instruments may be fixed and established.

The object of the operation being to extract the opaque crystalline lens from the eye, through an opening made in the trans-

* Lectures, Lond. 1828, p. 531.

parent cornea, with the least possible injury to the eye, the mechanical proposition here concerned is, to ascertain the exact form of knife best suited for making the requisite incision of the cornea.

Having the form, size, and relative position of the parts concerned in the operation fixed, as also the best form and situation for the requisite opening established by experience, it is easy to ascertain the best form and size of the knife to be used.

Let it be assumed that the size and form of the incision requisite to be made is nearly one-half of the circumference of the cornea, as is shown in figure 10, *b f b*, of the annexed plate. Now, the average diameter of the cornea, from *a* to *a*, is $\frac{9}{20}$ths of an inch. Hence, the extreme breadth of the knife required to divide somewhat more than one-half of the cornea, (from *e* to *f*,) by transfixing it, is a quarter of an inch. The length of the knife ought to be such that the broadest part required for the operation should be about half an inch from the point. This admits of the incision of the cornea being completed without the nose being wounded; and, at the same time, the breadth of the knife increases so gradually that it penetrates with facility, without the premature escape of the aqueous humour.

An extracting knife made upon these principles, with two straight edges, forms at its point an angle of 15°, as is represented in Figure 11. A knife of this form, prolonged towards the handle, constitutes that of Beer, now so generally employed. Figure 12 shows that this knife may be considerably reduced in size, and yet be of sufficient breadth to complete the incision. And it will be found to be of the utmost consequence in practice that it be reduced to the least possible breadth; for upon this the facility and safety of using it very much depend.

The blade of the proper knife, therefore, for this operation should, at its point, form an angle of 15°; it should be from an inch and a quarter to an inch and a half in length; and although the breadth is regulated by the angle formed, no part of it requires to be more than a quarter of an inch broad. Both the back and the cutting edge of the blade should form straight lines, at least to the broadest part; sharp on both edges near the point; the back ground off nearly to a cutting edge; the blade thin, but retaining sufficient firmness not to bend in use; and the cutting edge should be set so as to cut by pushing the blade forwards.

This being the most simple and best form of knife which can be devised on mechanical principles, it may be compared with those recommended for this operation by some of the most celebrated and successful operators, which are delineated in the accompanying plate. By comparing these with that above described, it will be observed that those of La Faye, Wenzel, Ware, and Phipps, though possessing some of the same characters, were more

of a lancet shape. Those of Richter, Beranger, Pope, Démours, Arnemann, de Santa Anna, Himly, and Rust, though straight in the back, were convex on their cutting edge, and increased too rapidly in breadth for their easy penetration; while those of Barth, Beer, Rosas, Jaeger, Lawrence, Wardrop, and Tyrrell, are nearly similar to that described above, and delineated in Figure 11. The gradual increase of breadth in these knives, however, is various, as is shown by the angle which the blade forms; that of Barth being 10°, of Beer, 15°, that of Rosas, 18°, while that which I have recommended as the best is 15°.

Knives of various other forms have been invented for the same purpose, which their authors conceived to possess peculiar advantages for lessening the difficulty of the operation. These it would be useless, and therefore it is unnecessary to describe. But one of them, invented and used by Pellier, after several modifications in 1785, having been re-invented by Mr Scott of London in 1843, has been delineated in the plate, Figures 7 and 8. This form of blade will be found to complete the section with greater difficulty than a straight one, in consequence of the convex cutting edge, after transfixing the eye, coming into contact with nearly the whole extent of the part of the cornea to be cut, at once; whereas, the straight knife cuts it gradually.

The double-bladed knife of Jaeger, for using when the operator fails in completing the section with the common knife, has also been figured in the plate, (Fig. 9.) In practice it will be found that the blade intended to fix the eye fails to do so, in consequence of the other blade pushing the eyeball away from that which is fixed, when it is projected forwards to complete the incision.

Having made these remarks on the form of the knife to be used in this operation, I shall now proceed to offer a few observations on the mode of performing the operation.

The most important and difficult part of the operation undoubtedly is, to make the incision of the cornea. When this is successfully completed the difficulty and danger of the operation are over.

The flap or incision of the cornea may be made either upwards, downwards, or diagonally; and this is not material so far as the form of the parts is concerned; for the cornea, pupil, and lens being each circular, a suitable incision may be made at any part of it. But, on account of the facility of execution, the situation of the cicatrix, and the effect of the mobile eyelids upon the flap, a selection is necessary to be made according to the judgment of the operator. I have seen the operation equally successful either way. But, on the whole, probably the incision upwards is to be preferred, because the flap is less apt to be displaced by the

motions of the eyelid, and the cicatrix, if opaque, interferes less with vision than when the incision is made downwards.

During the performance of this operation no pressure is to be made on the eyeball, and the hand must be prepared to follow the movement of the eyeball.

In passing the knife across the eye to effect the second penetration through the cornea, its motion forwards cannot be too quick and unhesitating, consistently with exactness; while the subsequent movement of the knife for completing the incision cannot be too slow and gradual; and, in effecting this, it is safest and best to divide the last portion of the cornea or bridle by a back-sweep of the knive, or by the instrument which I have devised for the purpose, (Fig. 13.)

By attending to these rules, the premature escape of the aqueous humour, and the projection of the iris under the edge of the knife, are prevented.

When, from any untoward circumstance, the incision cannot be completed without the risk of wounding the iris and hyaloid membrane of the vitreous humour, which projects behind it, the knife should be withdrawn, and the small blunt-pointed knife (Fig. 13,) should be employed to enlarge the opening in the cornea to the proper extent. By the cutting part of this knife being confined to a small space, sufficient to act upon the cornea, injury to the iris and eyelids is prevented, which cannot easily be avoided when a knife is used which cuts with the whole extent of its blade.

The proper incision of the cornea being completed, the careful section of the capsule of the lens, without injury to any of the neighbouring parts, forms the next step of the operation. For this purpose, I find the small phleme-shaped knife or curette (Fig. 14.) to be most suitable. Two crucial incisions should be made, and great care is required to preserve the hyaloid capsule of the vitreous humour entire, which forms the only barrier to the escape of this fluid.

The operation being completed, by either pressing out the lens or extracting it by a small hook, (Figs. 6 and 16,) the flap and eyelids are to be carefully adjusted, and the patient confined to bed in a darkened room. When the lens encounters a difficulty in passing through the pupil, it may be necessary to enlarge the pupil by transverse section of the iris at one side of it.

After the operation of extraction and other injuries of the eye, the application of cloths cooled with iced water will be found most efficacious in preventing and subduing inflammation, in conjunction with the other means usually employed.

I must now conclude these remarks, already too long, with a short account of the dissection of an eye from which I had successfully extracted the lens seven years previously. The anterior

half of the eye is represented by Fig. 17, as viewed from behind. No injury was done to the eye by the operation, except the incisions of the cornea and anterior part of the capsule of the lens. The patient made a good recovery. A circle of opaque lenticular substance will be seen within the capsule of the lens at its circumference. It appears to me to be a difficult question to answer, whether this is a portion broken off from the margin of the lens at the operation, which has remained there for seven years undissolved; or consists of new lenticular matter, poured out from the parts by which it is formed, as an attempt at the reproduction of the lens—a circumstance alleged by physiologists to take place after its removal in the lower animals, and one of some practical importance.

In a subsequent communication I shall make a short review of the other operations for cataract, and a few remarks on the comparative merits of extraction and couching.

51 *Queen Street, Edinburgh,*
August 1845.

Description of Plate I.

Fig. 1. Knife of De La Faye, invented and used by him for the extraction of cataract, 1752. He had the merit of being the first to invent a knife of this form, so as to complete the section of the cornea by one incision. Many others subsequently used a similar knife; among these were Wenzel, Ware, and Phipps, whose knives were more completely lancet-shaped.

Fig. 2. Knife of Richter, somewhat similar to that of Berenger. The same was used by Popé, Demours, Arnemann, de Santa Anna, Himly, Rust, and others.

Fig. 2, *a*. Lancet-shaped knife of Richter, Wenzel, and Ware.

Fig. 3. Knife of Barth, drawn from one used by him, preserved in the collection at Vienna.

Fig. 4. Knife of de Santa Anna.

Fig. 5. Knife of Beer of Vienna. Those used by Rosas, Jaeger, Lawrence, Travers, Guthrie, Wardrop, and Tyrrell, are of the same shape.

Fig. 6. Hook needle of Beer, with which he cut open the capsule, then by penetrating the lens, has pulled it out along with the needle.

Fig. 7. Curved knife of Pellier, 1785.

Fig. 8. Do. of Mr Scott, London, 1843.

Fig. 9. Double-bladed knife of Professor Jaeger. One somewhat similar was recommended by Mr Guthrie.

Fig. 10. Circle representing the size and figure of the cornea, *a, a*; line representing the incision for the extraction of the cataract, *b, f, b*; the space from *c, c*, to *d, d*, the breadth required for the blade of the knife to complete the section by transfixing the cornea.

Fig. 11. Knife of most suitable size and form for the purpose, its point forming an angle of 15°.

Fig. 12. Knife reduced to the smallest size for the same purpose, similar to that of de Santa Anna.

Fig. 13. Small blunt-pointed knife, having its cutting edge confined only to the small space (*a. b.*) required for completing the section of the cornea, or for enlarging it, without injury either to the iris or eyelids.

Fig. 14. Curette and scoop, for dividing the capsule of the lens, and removing the cataract when it breaks into pieces.

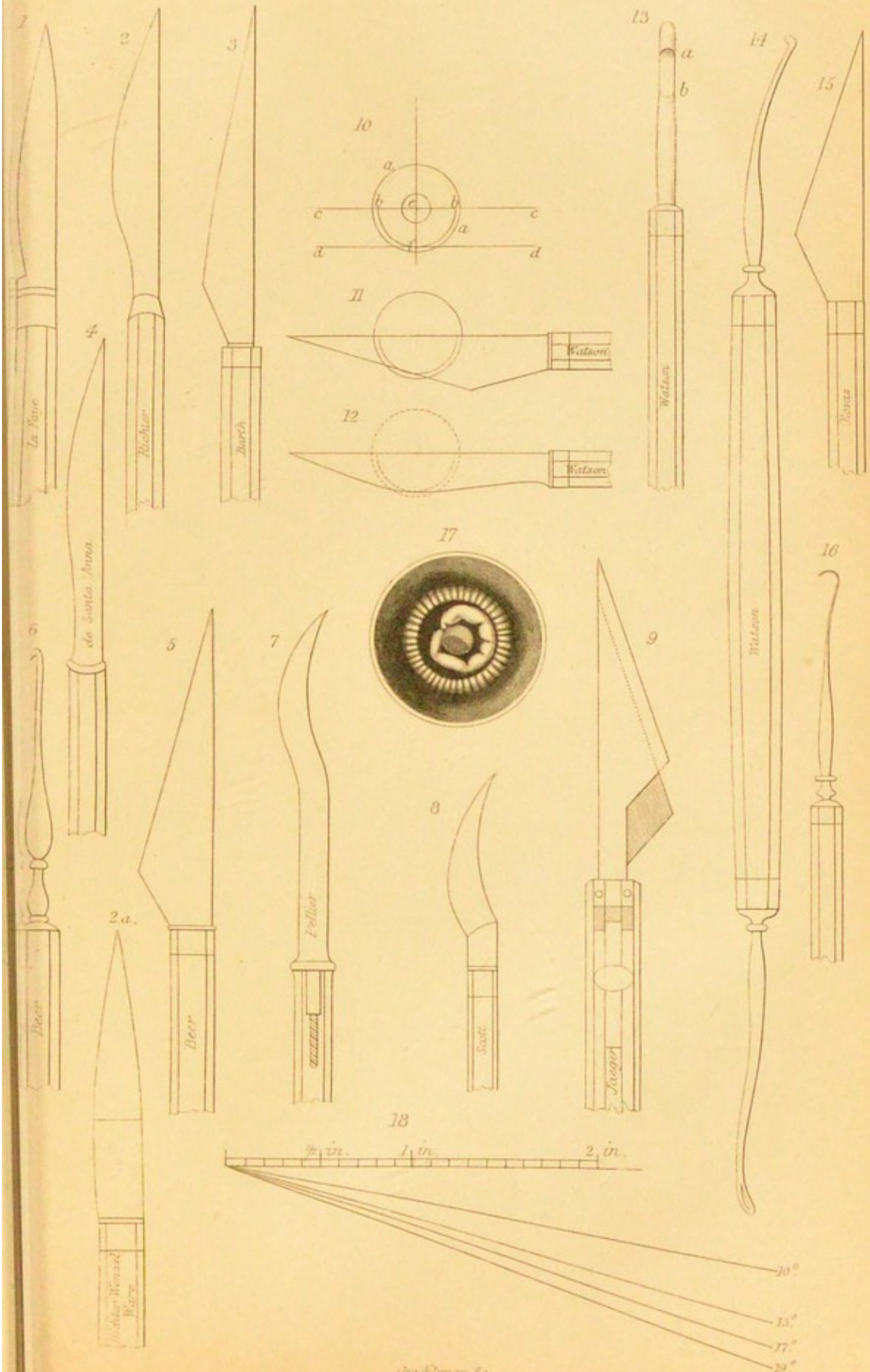
Fig. 15. Knife of Rosas of Vienna, forming an angle of 18°.

Fig. 16. Small hook for pulling out the lens, when it does make its exit by gentle pressure upon the eye.

Fig. 17. Anterior half of eye seven years after the extraction of the lens. See Case, p. 399.

Fig. 18. Lines drawn at different angles, showing the comparative breadth of the knives above described, according to the angle formed at the point.

PLATE I.



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PART SECOND.

ON THE OPERATIONS BY DISPLACEMENT AND SOLUTION, INCLUDING DEPRESSION, RECLINATION, AND DIVISION OF THE CATARACT.

§ 1. *Historical Remarks.*

The disease termed CATARACT had been early observed to affect the human race. This we learn from the earliest medical writings extant. And although the exact nature and seat of the disease were not then understood, remedies of different kinds were employed for its cure. These consisted of external applications and internal remedies, which we now know can be of no avail in removing the disease; and, therefore, when they appeared, in ancient times, to have been administered, in some cases, with success, it is probable that they had been used in different diseases which resembled and had been mistaken for, or were confounded with, cataract.

The want of general success, however, in the use of these means to cure the disease, must have caused attempts to remove it by operation, at length to have been resorted to; and this probably at an early period; for the established maxim was,

"Quod medicamenta non sanant, ferrum sanat."*

"Quodsi inveteraverit cataracta, manu curandum est."†

Accordingly we find a description of this disease given by Celsus,‡ and a particular account of the operations then performed for its removal.

The operations described by Celsus, as at that time currently practised, consisted in the displacement and depression of the opaque body from the axis of vision, within the eye, by means of a needle introduced through its coats. When this depression of the cataract proved unsuccessful, by its rising again and resuming its former position, it was divided into several parts, which were, by farther manipulation, concealed in the eye, and the cure was thus completed.

These are the first operations for cataract of which there is any authentic account upon record; and we recognise in them a close resemblance to the operations by displacement and solution of the present day. But since the days of Celsus, the nature of the disease has become more perfectly understood, and great improvements have been made in the operations for its cure.

* Hippocrates. † Celsus, vi. 35. ‡ Lib. vi. et vii. An. D. 7.

The Arabians, as well as the Greeks, seem to have been acquainted with the operations necessary for the removal of cataract. The Persian surgeon, Ali Ben Abbas,* and the Spanish Arabian Abu'l Kasem,† speak of the removal of the opaque body both by extraction through the cornea and by depression within the eye. But the latter appears to have preferred depression as more easy in performance; and we further find that while Abenzoar thought extraction impossible, Isa Ben Ali, celebrated as an oculist, after describing the manner of performing extraction, allows that it is more easily described than accomplished.‡

The great evil by which the Arabian surgeons appear to have been beset, was their erroneous notion on the nature of the disorder. As upon looking at the eye they observed an opaque, roundish, or globular body, they imagined that this was a drop of a peculiar character, opaque and dense, and therefore impenetrable to light, which had fallen into the eye. They named the disease, therefore, the opaque drop, (*gutta opaca.*) Then, when they found that this was not the sole cause of blindness or obscurity of vision, but that patients came to them with the eye apparently clear, they imagined that a drop was still the cause of the blindness, but that the drop in this case was clear, or transparent, not cloudy, and hence they termed the disease the clear or serene drop, (*gutta serena.*) This term has thus been adopted from the Arabians, and applied by surgeons to the Amaurosis of the Greeks.

The surgeons who flourished in the middle ages and about the period of the revival of literature, borrowed most of their scientific information and practical rules from their Arabian predecessors; and as Roman literature became more general, they added a little from the Roman surgeons subsequent to Celsus. It appears further, that while surgery was mostly in the hands of the servants of the clergy, various laymen practised a method of extraction by exsuction, which made Guy de Chauliac reject this method of operation, because by it the humours unavoidably escaped.§

At this time the ideas of surgeons on the nature of the disease seem to have still partaken of the errors of the Arabians. They imagined that the blindness was produced either by the opaque drop, or a sort of film or pellicle or thin membrane, interposed behind the pupil. It was the middle of the seventeenth century, viz. 1651, before these ideas were rectified.

This ignorance, however, did not prevent many persons from operating; but the operation appears to have been entirely empirical, and very often unsuccessful.

It is a very remarkable circumstance also, that, in Eastern

* Aly Abbas Practic., Lib. ix. c. 28. f. 163. Venetiis, 1492.
† Albucasis, Chirurg., Lib. ii. sect. 28, p. 168.
‡ Jesus de Oculis, f. 17, *b.* Venetiis, 1506.
§ Guid. Cauliac Doctr., Li. tr. 6, 2 c.

countries, where medical science was quite unknown, an operation for cataract, by displacement within the eye, has long been practised by native operators with considerable success, and who have handed down to posterity, by hereditary tradition, their mode of operating.*

The removal of cataract by the operations described by Celsus continued to be practised throughout Europe, gradually advancing and becoming improved with the progress of civilisation. The study of anatomy and the accurate knowledge of the structure of the eye, gave surgeons more just notions on the nature of the disease, and the most probable method of removal. But it also rendered them timid. And the result was, that the operation was very frequently practised by itinerant oculists or eye-doctors, who were for the most part very ignorant of the true structure of the eye. It was the habit of these men to boast much of their success. But it seems now very doubtful whether they had any good reason to do so.

Leopold Dieteric Gosky, in a dissertation published in 1695 at Frankfort on the Oder, relates that, about twelve months previously, one of these itinerant eye-doctors, when he presented himself to the president to be examined, boasted that he had a needle by which he could easily extract the cataract, and that it was sent him from Riga by an old friend, who had used it successfully. A few months before, however, another quack had declared himself the inventor of this needle, and accused the other of acting perfidiously towards him.†

It was only about the middle of the seventeenth century that the true nature of cataract was discovered; and Gassendi informs us that Remi Lasnier, a surgeon of Paris, was the first person who maintained, that cataract depends on opacity of the crystalline lens, and not on the presence of a pellicle or membrane. It does not appear, however, that Lasnier had proved his hypothesis by anatomical facts; and this was done only about the end of the century by Pierre Brisseau, a physician of Tournay and Douay, who, after performing the operation on dead bodies, found, on examining the eye, that the disease depends on opacity of the crystalline lens.

It was afterwards suspected by De la Hire that in certain cases of cataract the opacity was seated in the capsule; and the justice of this was demonstrated by Morgagni.

Towards the end of the seventeenth century, viz. in 1694 and afterwards, it appears that John Henry Freytag, surgeon in Zurich,

* Journal of Science and the Arts, No. III; also Asiatic Magazine and Review, July 1818, and Transactions of the Medical and Physical Society of Calcutta, vol. ii.

† De Cataracta Dissertatio Medico-Chirurgica, quam Praeside Albino, defendit, L. G. Gosky. Francofurti ad Viadr., 1695. Haller Disput. Select. Vol. ii. p. 47.

had practised successfully the operation of extraction; and he had become convinced from the testimony of ocular observation, that the disease is often the result of an opaque membrane surrounding the crystalline lens.*

But even up to the beginning of the eighteenth century, the opinions of the most eminent medical authorities do not seem to have been settled upon this subject. For we find Banister in 1622 defining cataract to be "a heape of superfluous humours made thicke, like to a little skinne betweene the horny membrane and the crystalline humour directly upon the apple of the eye, swimming above the waterish humour in that place which Celsus affirmeth to be void and empty. Fernelius appointeth the place of it between the *membrana uvea* and the crystalline humour."† He also asserts that cataracts in children are incurable.

Purmannus, the learned and distinguished surgeon of Breslaw, states, "The *cataracta suffusio*, or *gutta serena*, as it is called, is a skin growing invariably on the pupil of the eye, which it covers by degrees, and grows all over the *tunica uvea*, that the patient cannot see through it." He further states, that a viscous matter, or *spissatio humoris aquei*, is the true cause of cataract.‡

The works of St Yves, Fabricius, Heister, Dionis, Petit, and others, might here be quoted to the same purport, that the true nature of cataract was at that time but imperfectly understood, and was confounded with other diseases of the eye. Hence, as might be expected, this was the subject of controversy for a long series of years.

In 1740 Sharp defines cataract to be "a disease of the crystalline humour, rendering the whole body of it opaque." But he also mentions the difference of opinion which then existed on the subject.§

Although a difference of opinion had hitherto existed as to the nature and seat of the disease, the same operations for its cure continued to be practised from the time of the Greeks and Arabians down to the middle of the eighteenth century, when the operation by extraction was adopted, as another mode of curing cataract. Since that period modern industry, skill, and ingenuity, have been successfully exerted in advancing the more accurate knowledge of this subject, which has been acquired. So that these have not only given precision to our knowledge of the nature and seat of the disease, to the diagnosis, and to the proper adaptation of operations to different cases, but also to the best

* Dissertatio quam, praeside D. J. Boecler, defendet J. H. Freytag, Argentorati, 1721. Haller, Disput. Select. Chirurg. T. ii.

† See Banister on 113 diseases of the Eyes and Eyelids. London, 1622.

‡ See Chirurgia Curiosa, Trans. Lond. 1706.

§ Sharp's Operations of Surgery. London, 1740.

modes of operating; circumstances which, in former ages, were very imperfectly understood.

While the operations by displacement and division, as described by Celsus, continued to be practised, special attention was not directed to the solution and absorption of cataracts by the agency of the humours of the eye, till a very late period. Our distinguished countryman Pott* seems to have been the first who applied his talents and opportunities of experience to this subject. He ascertained distinctly the fact of the solvent agency of the aqueous and vitreous humours upon the lens; and the beautiful process of nature by which the lens, when its capsule is freely opened, is removed from the eye. Much advantage has since been taken of this in the treatment of cataract; and hence the operation by solution. By the improvements made upon this operation by the further experience of Saunders, Scarpa, Conradi, Beer, Buchhorn,† Jaeger,‡ Langenbeck, and others, the operation by division and solution of the opaque lens, when soft, became adopted by the profession, as one of the established regular operations for the cure of cataract.

§ 2. *Of the success of the operations by Displacement and Solution.*

a. Depression and Reclination.—The antiquity and long-continued practice of the operation for cataract, by displacement within the eye, form strong presumptive evidence of the success of this mode of operating. Nothing could be more surprising and delightful to a patient than the sudden restoration of his sight by an operation which gave him little trouble or inconvenience. But in former times, as well as now, this happy consummation was not always the result. The demerits and occasional unfortunate termination of the operation were observed in all times of its progress. Celsus observed that the cataract often rose again to its original position after it had been depressed; and subsequent observers remarked that the depressed cataract often acted as a foreign body in the eye, which, by the irritation it occasioned, gradually produced blindness. The evils most usually resulting in this way are secondary cataract, the *Nachstarr* of the Germans, and *Iritis.*§ These have been made the subject of a learned dissertation by Schmidt, Professor of Medicine at the Medico-Chirurgical Academy at Vienna.

* Surgical works. London.

† De Keratonyxide nova Cataractæ aliisque oculorum morbis medendi methodo chirurgica, disserit. Guelielmus Henricus Julius Buchhorn, M. C. D. Magdeburgi, 1810, 4to.

‡ Dissertatio de Keratonyxidis usu quam disquisitioni publicae submittit Fredericus Jaegerus Kirchbergensis M. et Ch. D. Viennae, 1812.

§ Ueber Nachstaar und Iritis nach Staaroperationen. Von D. Joh. Ad. Schmidt. Wien, 1801.

These inconveniences still continue occasionally to be felt, and the possibility of their occurrence is inherent and inseparable from the operation. It is, therefore, not uncommon to see a patient in whom a cataract was successfully couched, afterwards attacked with inflammation of his eye, which no remedies can arrest before vision is destroyed. Indeed, when the displaced lens either rises again and presses upon the iris, or afterwards causes destructive inflammation of the internal parts of the eye, no state of the organ could be more painful or hopeless.

In many cases, however, this operation is performed with little or no inconvenience to the patient, is unattended with inflammation, and is followed with complete success,—circumstances which recommend its adoption in cases of old infirm patients, and in those cases, where the state of the eye in other respects, may render the prospect of success, by any other operation, very uncertain.

The operation of depression is much more easily performed than that of extraction, so that while extraction is only performed by those who make it a particular study, depression is attempted by all. This circumstance is probably one cause of a lower average of success than might otherwise attend it.

Some very eminent operators, however, even in our own times, as Scarpa, Dupuytren, and Jungken, have confined themselves almost exclusively to this mode of curing cataract, from having found it much more successful, in their hands, than that of extraction. But this may be said to have arisen chiefly, if not entirely, from themselves, rather than from the nature of the operation; because, it may be said, that they had failed to overcome the difficulty (formerly noticed) attending the operation of extraction. Hence, the most impartial opinion upon this subject, is to be obtained from those, who practise each of the operations, according as they are adapted to the nature of individual cases.

Although I have witnessed the operations of many of the most celebrated operators in Europe, and might remark upon them, I shall not presume to criticise them individually; my object being rather to take a general and comprehensive view of the subject.

The conclusion I have come to concerning this operation, therefore, is, that, when carefully and properly performed, in suitable cases, it is a very important and generally successful operation. It is not an operation which ought to supersede extraction, when this can be equally well executed. But there are many cases and circumstances which render extraction inadmissible, where displacement may be performed with success.

b. Solution and Absorption.—The operations now practised for the removal of soft cataracts, by dividing them into pieces with a needle, in order to effect their solution and absorption within the

eye, are probably the most successful operations for the cure of cataract. This success is owing to the operations now under consideration being more easily performed than either extraction or depression; and also to the more favourable nature of the cases to which they are best adapted, (being those of young subjects), as well as to the circumstance of their occasioning less injury to the eye in their performance. They are, therefore, well calculated to supersede the other modes of operating, in a very great proportion of cases, and with every prospect of success.

§ 3. *Of the performance of the Operations by Displacement, and Solution.*

a. Instruments.—The only instrument required for performing these operations is a needle, or small sharp penetrating instrument with a convenient handle.

The displacement or division of a cataract with the needle may seem to be a very simple and insignificant operation. Hence, many attempt these operations without success. They may be performed, and even successfully, by many, but few do them well.

These operations require to be performed very methodically in all their stages; and this is the more necessary to be attended to, that some of the parts concerned in the operation (the capsule of the lens and hyaloid membrane) are commonly transparent and invisible to the operator. Inattention to, or ignorance of this, are the causes of many failures.

Needles of various forms have been employed for these operations. Their size has been different; some being extremely small, others of a considerable magnitude. Their points have been different in form; some have been round, with a sharp point, others flat and spear-pointed, with cutting edges; some have the point straight, while others have different degrees of curvature, approaching to a hook. In short, every distinguished operator would seem to have fashioned needles for himself, and advocated their superiority above all others.

When we consider the various different operations now performed with these instruments, it is not surprising, that various different forms of needles have been devised to accomplish the special objects in view;—whether for depressing, reclining, opening the capsule, cutting or breaking to pieces the opaque lens, separating adhesions of the iris, or removing membranous cataracts. For accomplishing each of these different objects, operators adopt peculiarities in the size, form, and point of the needles, to which they give a preference from their conceptions of superior suitableness.

The more simple the form of the needle is, however, the better; and the operator, by custom and habit, soon finds it best to ad-

here as much as possible to the same forms of instruments; because he wields these with more precision and dexterity than those to which he is less accustomed.

In the progress of the operations now under consideration, the inventors or improvers of them have generally recommended a peculiar needle for their performance. Hence such needles have been afterwards known by their names. It would lead me too much into detail to enter minutely into the different modifications of the needles alluded to. But from the original works which are now before me, I shall endeavour to make a selection of those most deserving of notice.

The needle of Celsus (Fig. 1 of Plate) and the ancients is now merely a matter of history; that of the native Indians, (Fig. 2), though curious, is clumsy and useless to the surgeon; while those of all the older operators have been superseded by modifications of the needles of Scarpa, (Fig. 3), Beer, (Fig. 4), Langenbeck, (Fig. 5), and Walther, (Fig. 6).

The general properties which all good needles ought to possess are, 1st, that it be from an inch to an inch and a-half in length; 2d, having a fine slender stem tapering slightly towards the point; 3d, possessing sufficient strength not to break, the thickness being so proportioned to the size of the point that it does not allow the escape of the humours when introduced; 4th, the steel is to be well tempered, the point nicely set, and the edges cutting but not too broad—the point should not bend; 5th, immediately behind the point or shoulders, the stem of the needle should be quite round, in order that it may be turned upon its axis, when the point is introduced through the coats of the eye. Needles for operating on infants or children, are generally made of a smaller size than those for adults.

b. Mode of Operating by Displacement.—The complete displacement of the lens, or *depression*, (Fig. 10, *c*), was long the established operation for cataract; but it is very probable that, in many cases, the result of the operation consisted only in its partial depression, or that now termed *reclination*, (Fig. 10, *b*). This last mode of displacing the lens was first practised and recommended as an improvement on couching, by Willberg in 1785, and afterwards by Beer.

Both of these operations were usually performed, by introducing the needle through the coats of the eye posterior to the iris. But Jacques Guillemeau (in 1598) proposed the introduction of the needle through the cornea.* This mode of operating has been called *keratonyxis*, and was revived by Conradi and Beer in 1797. This was followed by Langenbeck and Buchhorn at the beginning of the present century, who recommended it, both in the operations for displacement and solution.

* Ammon, p. 30.

These different modes of operating have their advantages and disadvantages; but, in practice, it will be found that, by introducing the needle through the coats of the eye behind the iris, the operator has much more command of the lens and can displace it with much greater facility, than when the needle is introduced through the cornea. If he is desirous merely to open the anterior part of the capsule, to expose the lens to the action of the aqueous humour, the anterior operation, or keratonyxis, may be sufficient.

In performing any of these operations, the choice of a needle must depend on the object which the operator has in view. If he propose to depress or recline the lens, in the usual manner, a needle is to be selected which is capable of penetrating through the coats of the eye with facility, from its sharp point and cutting edges,—of opening the capsule with facility,—and of depressing the lens without passing into its substance, by having a flat or broad point. The form of the needle must also be such, as not to become entangled with the lens, so as to raise it from its depressed position in withdrawing it from the eye, by being too much curved. But if the object is to divide the lens for solution, or remove a membranous cataract, a curved needle with a cutting point will be found to answer best. If the object is to open the anterior part of the capsule and break up the substance of the lens through the cornea, the needle of Langenbeck is most suitable.

Keeping in view, as the great object to be accomplished in the operation of depression, that the lens is to be lodged in a breach of the vitreous humour, below the axis of vision, with as little disturbance to the parts connected with it as possible; let us consider the effect that is produced by the operation performed, according to the usual directions given upon the subject. The mode generally recommended is, after introducing the needle through the coats of the eye, that the point of it is to be brought forward between the iris and lens,—laid upon the upper part of its anterior surface,—and the lens is then to be pressed down, below the margin of the iris and into the vitreous humour, out of the axis of vision.* Now, in order to depress the lens in the vitreous humour, by this operation, it must be pushed forcibly through the posterior part of its capsule and hyaloid membrane. But from the size and form of the lens, and the strength of these membranes, in place of forcing a passage for itself through these, the lens generally drags them downwards, and displaces the hyaloid membrane from the ciliary processes, (see Fig. 11.); thus producing extensive and serious injury to several most important and delicate parts within the eye.† Besides this, the lens almost always rises up again,

* See Celsus, Sharp, Scarpa, Beer, Guthrie, Travers, Lawrence, Mackenzie, &c.

† Where the hyaloid membrane is disorganised, the lens falls down whenever it is touched with the needle. But these are very rare cases.

from the elasticity of the parts and their disposition to resume their former situation; and, if the anterior part of the capsule has been opened, the lens gets in contact with the posterior surface of the iris, and causes great pain and inflammation, generally followed by the disorganization of the eye.

These consequences may be obviated by an operation somewhat novel, which I shall now describe.

From what has been said above, it forms an important object in this operation, to disengage the lens from its capsule before depressing it. This must be done very carefully and methodically, by making an incision in its posterior part, through which the lens is to be pushed into a breach made in the vitreous humour, not by forcibly pressing the lens against the membranes, but by the needle.

To accomplish this, I introduce the small cataract bistoury (Fig. 7,) through the coats of the eye, about a line and a-half from the margin of the cornea. It then penetrates into the vitreous humour, and is made to form a breach in it, at the proper place for the reception of the lens when depressed. The point of the instrument directed forwards to the lens, is then to be pushed across the eye to the opposite or nasal side of the lens. (Fig. 12.) When it has reached this situation, the point is to penetrate the posterior part of the capsule, and, by drawing it outwards, made to incise it across at its middle, from the nasal to the temporal margin. This being effected, the point of the needle is to be pushed forward between the lens and the iris, (Fig. 13,) its flat side placed on the lower part of the lens, and made to press it backwards and upwards, so that its lower margin may pass backwards through the opening made in the posterior part of the capsule; by then shifting the point of the needle forwards upon the lens, it is gradually pressed backwards and downwards into the breach of the vitreous humour, from whence it never rises. (Fig. 10, *c*.) Thus we accomplish by previously cutting with the needle, what has been generally recommended to be done by forcible pressure upon the lens. Little or no inflammation follows this operation.

If, in this operation, the anterior part of the capsule of the lens remains entire, it is so far well, as the humours in the different chambers of the eye are thus prevented from incorporating, which lessens the risk of subsequent inflammation. If the capsule afterwards becomes opaque, it can be easily removed by a subsequent operation.

In performing this operation, considerable dexterity of management is required for opening the capsule, disengaging the lens, and depressing it into the vitreous humour; and as the capsules, being generally transparent, are invisible, each of the different steps of the operation requires to be methodically executed. The same mode of operating answers for reclination.

If, contrary to expectation, the lens is found to be soft, it may be broken to pieces, and these, or some of them, depressed into the vitreous humour where they will dissolve.

b. Mode of operating by Division of Lens.—The object of this operation should be to get the opaque lens dissolved by the aqueous humour, without injury to the hyaloid membrane of the vitreous humour. It is well suited to all cases of cataract in young subjects, whether from injury or spontaneous. This, like displacement, may be done either by keratonyxis, or by introducing the needle through the sclerotica behind the iris. In the division of the capsule and lens with the needle, too much should not be attempted at once; but the object accomplished rather by repeated operations, when the cataract is pretty firm. The first operation may consist in the division of the anterior parts of the capsule and lens by two crucial incisions, by means of Langenbeck's needle, made sharp on its convex edge. After a few weeks, the lens has been so acted on that, on introducing a curved cutting needle (see Fig. 6) the cataract will be found very soft, easily broken into detached pieces, and removed into the anterior chamber, for the more free exposure of it to the action of the aqueous humour, by which it is dissolved, and then removed by the absorption and renewal of that fluid.

Several other important topics I find still remain to be commented upon, viz. the comparative merits of the operations,—the state of the patient,—and the time most favourable for performing them; but these I am under the necessity of delaying for the present.

Explanation of Plate.

Fig. 1. The couching needle of Celsus.

Fig. 2. The needle or probe used by the native Indians for depressing the lens, after an opening has been made through the coats of the eye for its introduction.

Fig. 3. Side view of the couching needle of Scarpa. 3 *a*, the front view.

Fig. 4. The straight needle of Barth, Beer, Langenbeck, &c.

Fig. 5. Curved needle, sharp on both its edges, used at Vienna for opening the capsule in performing extraction. It might also be used for the operations by solution.

Fig. 6. Curved needle, being a modification of Scarpa's, used for depression by Himly, Walther, Langenbeck, Buchhorn, Jungken, &c. *a*, side view of the same.

Fig. 7. Needle, having its point formed like a small bistoury, sharp on its concave edge, invented by Ritterich of Leipsic, for dividing the iris in closure of the pupil, and operations for cataract. The small projection at *a* shows the operator the distance to which it is introduced into the eye.

Fig. 8. Small straight needle for operating on infants. Curved needles may be made of the same size.

Fig. 9. Small curved needle about the size recommended by Adams and Jacob.

Fig. 10. Perpendicular section of the eye, showing the situation of the lens in its natural position, and when displaced. *a*, the situation of the lens; *b*, its position after reclination; *c*, its position after depression.

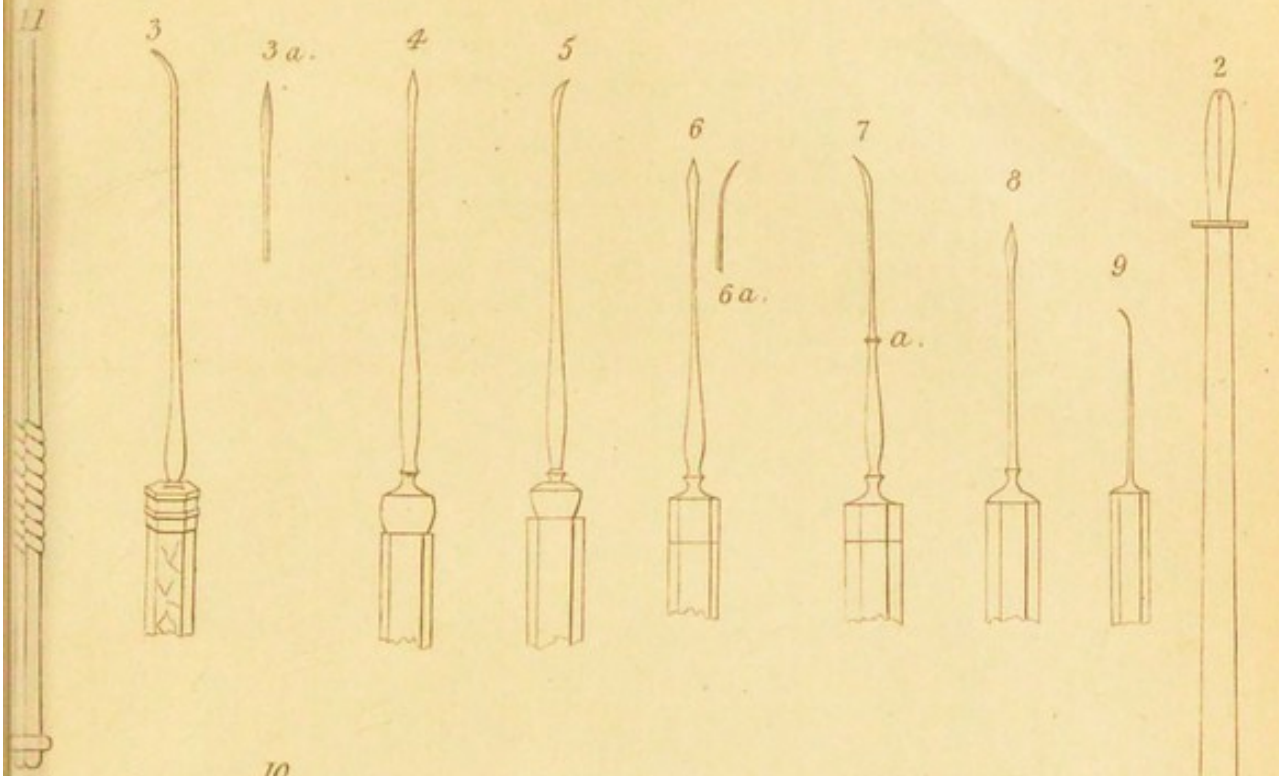
Fig. 11. Diagram, showing the manner in which the hyaloid membrane is torn from the ciliary circle, by the forcible depression of the lens without opening its capsule.

Fig. 12. Horizontal section of the eye, showing the position of the needle when introduced to divide the posterior part of the capsule of the lens.

Fig. 13. The same with the needle brought forward between the iris and lens to depress it.

Fig. 14. The posterior part of the anterior half of the eye, showing the opening in the capsule through which the lens has been depressed.

Fig. 15. Ivory hook, or speculum for opening the eye-lids. I find this to answer the purpose better than the metallic instruments in common use.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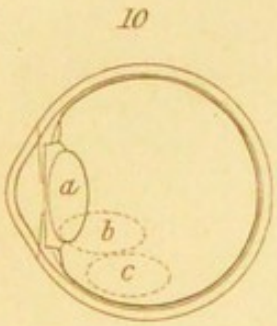
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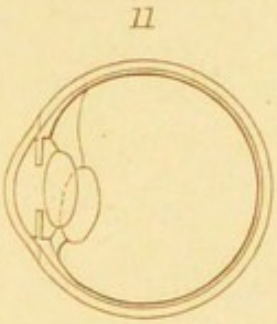
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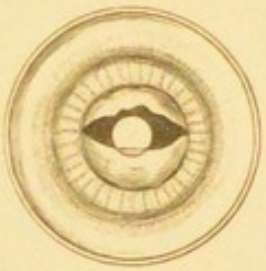
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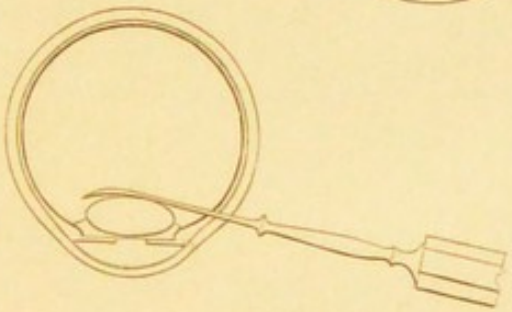
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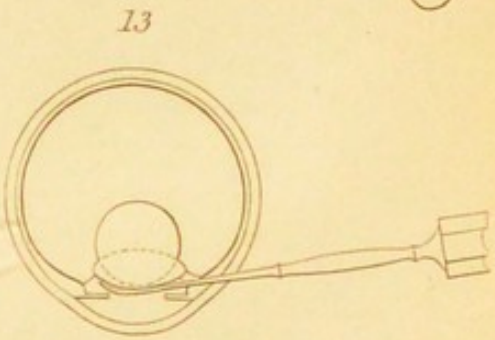
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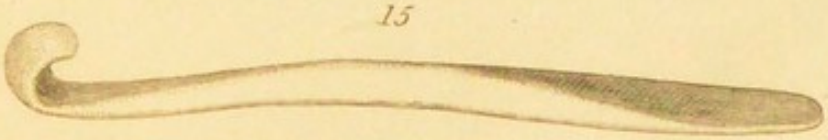
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PART THIRD.

ON THE PROPER TIME FOR OPERATING, THE CHOICE OF OPERATION, &c.

§ 1. *General Remarks.*

I trust that the importance and interesting nature of the subject will plead my apology for adding another part to my remarks on the operations for the cure of cataract. The importance of the subject consists in the very peculiar nature of this disease,—being one which affects the eye without pain or disorder of the general health, but nevertheless, by producing blindness, unfits the individual for useful occupation ;—being a disease which does not tend to shorten life, thereby increasing the anxiety for relief, and being quite incurable by art, without an operation : and hence claiming from modern surgery that the operations for its cure be brought to the greatest possible perfection.

The remarks contained in the preceding parts related to some important particulars, in regard to these operations, which have been suggested to me by experience, and appeared to be deserving of special notice. In the present I shall remark on the several queries relating to collateral circumstances which have been subjects of discussion, and attention to which is of much practical importance in the successful treatment of this disease.

§ 2. *When is an Operation proper in cases of Cataract?*

When the patient is blind either from a complete cataract in both eyes, or in one eye while the sight of the other is wanting, there can be no doubt as to the propriety and expediency of operating. But there are cases of cataract in which only one eye is affected, and even in it the disease may be only partial, while perfect vision remains with the other, so that it is a question whether or not an operation should be performed.

In the cases of elderly persons, whose occupations do not require much exertion of their sight, and are therefore contented

with that of one eye, an operation is scarcely necessary when only one eye is affected with cataract.

In young persons, however, it is of much importance to possess the vision of both eyes; on account of the greater exertion of them required, and the liability to be deprived of the sight of the other eye by injury or disease, when one is affected with cataract. It is therefore proper in such cases to restore the sight where one eye has become blind from cataract, just as we would operate on the left eye of an individual, after having restored the sight of the right. By operating on these cases without delay, the sensibility of the eye has not become impaired by disease; and I have generally found operations on young subjects more successful than those performed on patients more advanced in life. Besides, the deformity which the blind condition of one eye occasions is obviated, which, especially in females, is of very great consequence. But the risk of a collapsed eye by an unsuccessful extraction should be avoided.

There is an antiquated, though still popular, notion that a certain degree of maturity or ripeness of the cataract is necessary, before an operation can be performed. This notion, though wrong in theory, arrives at a correct conclusion; for, though not impracticable, it is improper to operate till the cataract is so far advanced as to deprive the individual of useful vision. Hence, partial or imperfect cataracts, by which the sight is not much impeded, do not require operation; and the phrase, "unripe for an operation," is better understood by the common people than any more lengthened and scientific explanation; and it is, in one sense, a correct enough expression.

§ 3. *Should both Eyes, if affected with Cataract, be operated on at the same time?*

If the patient is in a favourable state of health for it, and if the operations are to be performed with the needle, both eyes may be operated on at the same time with propriety and success. By adopting this course, the patient is subjected to only one period of anxiety and of confinement, which are circumstances of importance to all, but more especially to those who are delicate or much advanced in life.

If, however, the patient does not seem from his constitution to be in a very favourable state for an operation,—if the weakening effects of after treatment upon a feeble frame be dreaded,—or if the operation to be performed is that of extraction, only one eye should be operated on at first, and the other some time afterwards. This mode of procedure subjects the patient to less risk, and we obtain the benefit of the experience afforded by the progress of his case, to guide us in the treatment of the second operation. Moreover, the treatment to which the patient is subjected after the first operation, generally forms a very excellent preparation for

the second; as we almost invariably see much less inflammation follow a second operation, either on the same eye or on the other, than occurred after the first.

§ 4. *Should the Age of the Patient influence the Surgeon in operations for Cataract?*

As this disease affects patients of all ages,—infancy, youth, manhood, and old age, I shall remark shortly on each of these.

In cases of congenital cataract, the importance of early operation is now completely established. It should be done after the infant is three months old, and before the period of dentition. But, if delayed till dentition has commenced, an interval should be selected for the purpose, after the appearance of some of the teeth.

In infancy and youth, operations for cataract generally produce less inflammation and are more successful than in more advanced life. They should, therefore, never be delayed on account of the youth of the patient.

In manhood and more advanced life, inflammation is more apt to follow operations for cataract, than either in infancy, youth, or old age; and hence, greater precaution is necessary in the preparation of the patient, and more activity in the after treatment.

What is the greatest age at which an operation for cataract may be successfully performed?

Banister mentions his having couched successfully the cataract of a lady aged 83 years, after having been blind of that eye 43 years; in another person of 98 years, the eye having been 18 years blind.

Pellier in 1779 operated on a gentleman aged 84 years, who recovered his sight in 20 days. The operation was accomplished in 17 seconds!

Mr Lawrence states that he operated by extraction on a late member of the profession aged 92, with the most perfect success.*

I lately operated successfully on a lady aged 86. She was not confined to bed after the operation, and no inflammation was produced by it.

This question must be decided not altogether by the amount of years which the patient may have seen, but also partly by the vigour and health he may enjoy; for these do not always depend on age. Although very advanced age does not forbid an operation, it should be a reason for selecting that which is most simple, and least likely to affect the general health by confinement and after treatment.

§ 5. *Which operation is to be preferred in cases of Cataract?*

Our more complete knowledge of this subject has now established the principle, that no surgeon can treat this disease properly who con-

* Lawrence on the Eye, second edition, p. 635.

fines himself to the performance of one operation ; but as the differences in the nature of the disease and circumstances of the patient require different modes of operating, so the surgeon must select that operation which is best suited to the individual case under his care. The data upon which a choice is to be made consist of these,—the nature of the cataract, and the condition of the patient. The following remarks will, therefore, be arranged so as to comprehend these :—

1. *Fluid and soft cataracts* form the cases of most easy and successful operation by solution performed with the needle. They occur generally in young subjects ; and they neither require, nor properly admit of, any other mode of operating.

2. *Firm and solid cataracts* generally occur in persons of middle or more advanced age ; and they form the only class of cases in which any question occurs as to the proper and best mode of operation. They admit of being removed either by extraction from, or by displacement within, the eye ; so this brings us to the question as to the merits of, and objections to, these operations.

Upon this question it is to be remarked, in the first place, and kept in view, that although in all the cases of this class the operation of displacement might be successfully performed, in many of them that of extraction is inadmissible. The number of cases, therefore, in which extraction might be performed is brought within narrow limits. They consist of patients affected with solid cataracts, uncomplicated with any other disease of the eye,—the patient having at the same time a good constitution, a calm mind, not irritable and restless, and his eye well formed, of proper size, and neither too prominent nor too much sunk in the orbit. To these must be added, that the patient should be favourably situated for quietness, care, and attentive nursing.

Another circumstance to be considered and kept in view in deciding upon which operation is best, regards the operator. In a case equally suitable for either extraction or depression, a decision as to the one most desirable will depend very much on who is to be the operator. Does he devote particular attention to these operations, and does he perform them equally well and successfully ? If he does, certainly extraction is the most perfect operation ; but if not, the depression is the safest.

A great proportion of the cases of solid and hard cataract, now under consideration, admit only of operation by displacement.

Although all cases of solid hard cataract may be cured by displacement with the needle, a great many of these cases admit of this mode of operating solely. Hence an operator might dispense with the operation of extraction, but not with that of displacement. The cases in which the cataract must of necessity be removed with the needle, are those in which the patient has an unsound or delicate constitution, has an unusually inflam-

matory diathesis, or is very far advanced in life,—having the eye small, unusually prominent or sunk in the head, or the cataract complicated with other disease of the eye, as partial opacity of the cornea, adhesions of the iris, contraction of the pupil, or disorganized state of the vitreous humour.

In discussing this question, the partisans of these two operations have generally stated the advantages of the one against the disadvantages of the other. But this mode of arriving at a conclusion seems to be quite unfair and erroneous. In the preceding parts I have endeavoured to state particularly both the merits and demerits of each,—from which the reader will be able to form a more correct judgment as to the advantages and objections which may attach to each of them when applied to particular cases.

3. *Capsular cataracts*, whether primary or secondary, admit only of removal with the needle.

§ 6. *Is the season of the year of importance in Operations for Cataract?*

In Europe it has been generally remarked by practical writers on this subject, (especially those of old date,) that spring and autumn are preferable seasons of the year for the performance of operations for cataract. Admitting that this has been founded on observation and experience, the causes which have given occasion to this preference may be more powerful in one country than in another, from the nature of the climate. Unhealthy states of the atmosphere at certain seasons of the year may, in particular places, have been removed or ameliorated by the improved cultivation of the land. Besides, the modes of operating and after treatment having become so much better understood than they were formerly, ~~that~~ there may not now be so much necessity for attention to the circumstance now under consideration. So far as my experience testifies, I cannot say that I have seen cause for attaching much importance to this circumstance; for I have in this country seen and performed many operations for cataract at all seasons, both successfully and unsuccessfully, and I do not recollect to have attributed any of these events to the season of the year. At the same time I have no doubt that in other countries, where the colds of winter are more intense, and the heat of summer is greater than in this, or where the inhabitants at these seasons are subject to endemic diseases, the recovery from such operations may be so much influenced, that it is safe and proper to avoid their performance at those times.

§ 7. *What previous preparation and after treatment are necessary in cases of operation for Cataract?*

These are not of less importance than the proper performance of the operation. Indeed, without great attention both to the

previous preparation of the patient and his after treatment, the most perfect operations for cataract may prove unsuccessful. Much more of the success of these operations depends on them than is commonly imagined. They consist in attention to many minute particulars which individually do not seem to be of much consequence; and hence their importance is often underrated. But when taken together they constitute a form of treatment which has a powerful effect upon the system, and is in most cases indispensable to a favourable result.

1. In order to prepare a patient for undergoing an operation for cataract with success, the functions of the body, including the circulation, digestion, and nervous system, should be tranquillised as much as possible by moderate diet, rest of body and mind, and such medicines as may be required to restore and promote healthy functions. After such a preparation as this, I have performed each of the different operations successfully without their being followed by the slightest pain or inflammation of the eye. But without some preparation of this kind I have seldom seen the recovery from operations prove satisfactory.

2. Neither can too much attention be paid to the after treatment. By any of the operations for cataract the eye is more or less injured, inflammation follows, and if severe or not speedily checked, this soon proves destructive to so delicate an organ as the eye.

It is to be kept in mind that, in such cases, prevention is always better than attempting to cure inflammation after it has taken place. Hence the importance of previous preparation, and such after treatment as may prevent the occurrence of inflammation. It is generally too late to apply remedies, after inflammation has come on, to preserve the eye and restore the sight. After operations with the needle it is seldom that blood-letting is necessary to prevent inflammation. But after extraction, by which more injury is inflicted on the eye, this is in general a proper precaution. In elderly persons an opiate is advisable, as vomiting and other symptoms of collapse are apt to follow, which this may obviate. Rest in a perfectly darkened room, and the constant application of cloths dipped in iced water, low diet, perfect quietness, and attention to the state of the bowels, form the proper and necessary after treatment.

This treatment requires to be continued for two or three days after operations with the needle, and for eight or ten days after extraction.

If inflammation of the eye supervenes, general and local blood-letting, nauseating doses of tartrate of antimony or ipecacuan, with purgative and sudorific medicines, should be administered with vigour, attention, and care.

§ 8. *Conclusion.*

It will be seen from these remarks on the operations for the cure of cataract, which I have now brought to a close, that two things are requisite for the successful practice of them. The one consisting of the proper qualification of the operator, the other, the proper condition and circumstances of the patient. The surgeon requires to devote more than the ordinary casual attention to the subject; the patient requires to be in very favourable circumstances, as to health and care, for having so nice an operation properly and successfully accomplished.

To secure these two indispensable conditions are of great importance to the public. Are they always properly attained? Are our students of medicine sufficiently instructed on this subject? Can the lower orders of society obtain the necessary skill and care for the relief of their affliction, which are commanded by the rich? In answer to these questions I shall not inflict on myself the odious task of detailing the deficiencies and faults of particular institutions and bodies with which I may be acquainted. But I may point out shortly what appears to me necessary for the service and advantage of the public, in reference to this subject.

The Empress Maria Theresa of Austria, in 1770, feeling much concerned about those of her subjects who were blind, caused two large wards to be prepared in the General Hospital of Vienna, for the reception of cases of ophthalmic diseases. In connection with this, the Empress also created a lectureship, to which she appointed the celebrated Barth as teacher of the diseases of the eye, with a suitable endowment, in 1773.*

At this time ophthalmology was very little understood, either in Germany or in France; for, though there were several oculists in the latter country, they confined their attention chiefly to the operative department. Barth was therefore the first who directed his attention, in a particular and systematic manner, to the study of all the affections of the eyes and to the best modes of treating them.

Barth continued to discharge these duties till 1791 when he retired, and made way for the appointment of the illustrious Beer, who, in his turn, has been succeeded by the present celebrated Baron von Rosas.

Thus the benevolent scheme of the Empress of Austria laid the foundation for the establishment of the greatest and most celebrated ophthalmic school in Europe;—a school from which has emanated the first improvements and most valuable information upon these diseases, and which continues to be resorted to by students from all the other European states.

Could this example not be imitated, at least to such an extent

* Medicinische Jahrbücher. Wien, 1819.

as would both form a valuable addition to the medical schools of this country, and prove a blessing to the lower orders? To the consideration of those having the direction of hospitals I would recommend this query.

It could easily be shown that the *ordinary* wards of an hospital are unsuitable for this purpose. The ophthalmic patients cannot bear the light, while the others will not be without it. Besides a number of other minute and important requisites might be enumerated, which are quite indispensable for the comfort and successful treatment of such cases as would there be admitted.

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