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REPORT UPON A SERIES

15.

OF

FORTY-SEVEN CATARACT OPERATIONS.

BY

JOHN B. STORY, M.B., DUBL. ; F.R.C.S.I. ;

SURGEON TO ST MARK'S OPHTHALMIC HOSPITAL ;

EXAMINER IN OPHTHALMIC SURGERY IN THE UNIVERSITY OF DUBLIN,

ETC., ETC.

Reprinted from the Dublin Journal of Medical Science—August, 1880.

DUBLIN :

PRINTED FOR THE AUTHOR

BY JOHN FALCONER, 53, UPPER SACKVILLE-STREET.

1880.

REPORT FROM A MEMBER

PHYSICAL DATA OF THE

JOHN B. STONE, JR. (1881-1941)

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REPORT FOR THE YEAR

1907-1908

R

JOHN B. STONE, M.D., President

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REPORT UPON A SERIES
OF
FORTY-SEVEN CATARACT OPERATIONS.*

IN bringing forward this subject I have been influenced by the belief that it is hardly possible to overestimate the value of accurate statistics of the results of operations and methods of treatment; and that, while the literature of British and Irish ophthalmic surgery is in many respects worthy of comparison with that of any other country in the world, it has been singularly deficient in such statistical reports. So far as the subject-matter of this report is concerned, there is hardly any mention of such a thing as the average chance of success in an operation for cataract in the English ophthalmological treatises, and a surgeon who wishes for information on the subject is driven to consult Continental literature. As a proof of this deficiency, I may remark that in the last number of Nagel's *Jahresbericht* there is a table of the results of cataract operations in 50 ophthalmic hospitals—29 German and 21 in Europe and America—and not a single British institution is included in this list. In the hope that this reproach will soon be taken away from our ophthalmological literature, I have taken this report as the subject of my thesis.

The only portion of the report that can be of any value, from a statistical point of view, is the first portion of it—relating to uncomplicated senile cataract; and I have only included the other cases in order that, by publishing all those, without exception, in which I have operated on the lens, it might be

* A thesis for the Degree of Master in Surgery in the University of Dublin.

thoroughly understood what I mean by an uncomplicated case. This report includes all the operations I have performed on the lens up to September 24th, 1879.

The operations divide themselves naturally into the following groups:—

- I. Extraction of uncomplicated senile (so-called) cataracts.
- II. Extraction of complicated cataracts.
- III. Solution and suction operations for soft cataracts.
- IV. Operations for traumatic cataracts.

It is needless to dwell on the advantages of this classification. What an operator wishes to ascertain from the record of his cases is whether by his methods he has reached as high a percentage of successes as has been attained by others in similar cases, and for this purpose it is almost impossible to make use of any cases except those of uncomplicated senile cataract, as, once complications are admitted into the statistics, all comparative value depends upon the character of the complications, and the statistics are worthless for the comparison of methods. For a similar reason traumatic cases form a group by themselves, and the great difference in the method of treating soft cataracts justifies their appearance in a separate table.

The method of operating in all cases, where the reverse is not distinctly stated, was as follows:—Anæsthetics were never given; the patient lay on a couch facing the window, and the surgeon, standing or sitting behind the patient's head held the knife (von Græfe's), right-handed for the right eye, and left-handed for the left eye. The difficulty of using von Græfe's knife with the left hand seems to have been greatly overrated by some surgeons. A stop speculum was always used; the plan of holding the lids open by means of assistant's fingers, which has been adopted in some foreign cliniques, does not seem to have anything to recommend it—not even novelty. The assistant's fingers were used instead to restrain the action of the extra palpebral portion of the orbicularis. The globe being fixed by a toothed forceps, the incision was made upwards. An iridectomy was never omitted. Until an operator has satisfied himself that his results with iridectomy are as good as it is possible to produce by that method, it is wiser not to experiment in operating without iridectomy. In performing the iridectomy the fixation forceps, when necessary, was given over to the assistant to hold, this plan being manifestly better than allowing

the assistant to use the scissors, as is sometimes done, and often recommended. Wecker's or Dowell's scissors were used in nearly all the cases to cut the iris. The capsule was opened by Weber's method, when not otherwise stated, and the speculum was removed either immediately before or immediately after the cystotomy. It was never kept in during the delivery of the lens. Before dividing the capsule all clots and blood were removed from the anterior chamber, and the edges of the iris reposed. The nucleus was delivered by pressure of a large curved curette on the cornea, through the under-lid. In no case was the cornea itself touched by a curette. If this manœuvre failed, Bowman's spoon or Taylor's vectis was used to extract the cataract. The *débris* was removed by gentle rubbing with the lower lid, unless where it is stated that a curette or spoon was inserted for the purpose. The pupil being cleared, and the wound edges cleaned, the eye was closed, a piece of fine cambric and cotton wool carefully applied over the lids, and firmly tied down by Liebreich's bandage. In some of the later cases simple absorbent cotton wool was used directly over the lids, without the interposition of any cambric. It is to be understood that neither atropine nor eserine nor any other medicaments were used, unless the fact of their use is mentioned. As a rule the bandage was not changed for twenty-four hours, and the eye rarely examined or opened for forty-eight hours after the operation.

The treatment of complications is given when necessary.

In classifying results success is said to be perfect when the eye, with a suitable convex glass had a power of $V = \frac{6}{60}$ Snellen. Any power of V . below $\frac{6}{60}$ is counted as an imperfect success, but though imperfect the result may be considered fair if the patient can accurately count fingers at one metre's distance in front of the eye ($V = \frac{1}{60}$ approximately). If the perception of light is good and the patient can count fingers at all, the operation, though a failure, cannot be classed as a complete one, for these cases generally admit of improvement by secondary operations, and at all events the patient has some power of guiding himself about by his eye-sight when he can count fingers at all. These cases are included among the partial successes as very poor results, some of them being again susceptible of improvement by secondary operation.

The cases where no secondary operation is likely to do good, and where vision was only equal to perception of light and darkness, are classed as absolute failures.

I. UNCOMPLICATED CATARACTS.

Of these there were 25 cases, in all of which the cataract was mature or nearly so, the reaction of the pupil to light good, the projection perfect, the tension of the globe normal or nearly so, and no evidence of intraocular disease. The numbers in brackets refer to the registry of St. Mark's Hospital, or the page of my notebook, and the abbreviations used are:—R. = right eye; L. = left eye; r. p. = reaction of pupil to light; P. = projection; T. = tension of globe estimated by fingers; M. = male; F. = female; the numbers after the sex refer to the age of the patient; V. = power of vision; pl. = bare perception of light and darkness; Jg. = Jaeger's test type.

CASE I.—(165, July, 1877). M. 60, single; a large flabby-looking individual. The urine was examined and found healthy. R. and L. senile cataract. R. Modified linear operation of v. Græfe. The incision was much too small in consequence of the fixation forceps tearing through the conjunctiva, and the subsequent difficulty in fixing the eye. The delivery was difficult; some perfectly fluid vitreous was lost before the nucleus was extracted, the spoon was used three times, and owing to a further escape of vitreous some cortex was left in. Two days later chemosis, and gradual implication of all the ocular coats in a panophthalmitis which ran its course without much pain, produced effusion of blood into the anterior chamber, and resulted in a collapsed globe. V. = 0. The unfortunate result in this case is to be attributed partly to the diseased state of the eye, the vitreous humour being perfectly fluid, but chiefly to the small size of the incision, which rendered the extraction so difficult that there was no chance of keeping the posterior capsule intact. In such cases it would be well to enlarge the wound at all hazards, and if the condition of the vitreous could be suspected beforehand it would be advisable to make the lower section.

CASE II.—(519, March, 1878). F. 58, married. Palpebral fissure small; probably had granular conjunctivitis at one time of her life. R. Mod. lin. v. Græfe; the forceps tore through the conjunctiva, and counter-puncture was placed rather too far into the sclerotic, but a good conjunctival flap was made; the nucleus was large, and the cortex was not completely removed; healing normal, except some conjunctivitis. Result, V. = fingers at 6 metres; does not know her letters.

CASE III.—(524, March, 1878). M. 46, married. Hard but barely mature cataract. L. Jaeger's Hohlschnitt upwards; the knife was not perfectly sharp, and the incision consequently difficult to complete.

Owing to position of wound in the operation the iridectomy was unsatisfactory, and the delivery of the lens very difficult, its edge catching against the upper portion of the cornea and lying in a sort of *cul-de-sac*. For the same reason it was not possible to remove all the cortex, and some little vitreous escaped. The edges of the iris healed into the corneal cicatrix, and the capsule had afterwards to be divided with a needle. Result, $+ \frac{1}{3\frac{1}{2}} V. = \frac{6}{18}$.

CASE IV.—(49, May, 1878; 53, February, 1879). F. 67, widow. L. Mod. lin. v. Græfe upwards; operation normal; nucleus large; a piece of capsule snipped off with scissors after the extraction; healing normal. Result, $+ 14 D V. = \frac{6}{18}$; $+ 15 D$ reads Snellen 1.75 at 7"; $+ 18 D$ Wecker 0.25 at 25 cm.

CASE V.—(56, May, 1878). F. 39, married. After the operation, was discovered to be six months pregnant. R. Cataract not perfectly ripe; mod. lin. v. Græfe upwards; operation normal, except that a long time had to be spent in removing the cortex; healing slow, with subacute iridochorioiditis. The evening of the day of operation the patient had a long hysterical fit of crying, which was the starting-point of the iridochorioiditis. Result, $V. =$ fingers at 1.25 m.

CASE VI.—(67, June, 1878). F., unmarried. Whether R. or L. not recorded; mod. lin. v. Græfe upwards; incision rather small, and spoon used in delivery, which was not at all easy; the nucleus was large, and no vitreous was lost; healing normal. Result, $+ \frac{1}{6} V. =$ fingers at 7 metres.

CASE VII.—(72, June, 1878). F. 50. L. Mod. lin. v. Græfe upwards; operation normal, except that the spoon was used; healing normal. Result, $+ \frac{1}{3} V. = \frac{3}{9}??$

CASE VIII.—(83, June, 1878). M. 70, married. R. Mod. lin. v. Græfe; operation normal, except that the fixation forceps tore through the conjunctiva, and that some fluid vitreous escaped after delivery of lens; healing slow, with subacute iridochorioiditis. Result fair. Patient, who was a small farmer, wrote fifteen months afterwards to say he could "ramble" about his farm with the operated eye, the second one being "blind entirely."

CASE IX.—(98, June, 1878). F. 60. L. Two years "bad"; ripe senile cataract. R. Has synechia posterior and senile cataract. L.

Mod. lin. v. Græfe; incision small; delivery difficult, the spoon being used four times, and the nucleus being large. Result (15 months later), + V. = fingers at 3 m. T. n. Considerable opacity in pupillary area from capsule, pigment, and lymph.

CASE X.—(151, July, 1878). M. 60. R. Mod. lin. v. Græfe; incision corneal only and small; cortex very sticky; no vitreous lost. Result, $+ \frac{1''}{3} V. = \frac{6}{18}$.

CASE XI.—(152, July, 1878). M. 40. R. Three years "coming on"; mod. lin. v. Græfe; incision hardly large enough; counter-puncture rather far in the sclerotic; a good deal of hæmorrhage. Result (10 months later), $+ \frac{1''}{3\frac{1}{2}} V. = \frac{6}{18}$; T. - ?

CASE XII.—(154, July, 1878). F. 66; a broken-down woman. R. Unripe cataract. V. = fingers at 0.5 m. L. Ripe cataract; mod. lin. v. Græfe; incision small; spoon used; nucleus large; some cortex left in; no vitreous lost; healing slow; some iritis. A secondary needle operation was performed, leaving result V. = fingers inaccurately. Another needle operation will be of use.

CASE XIII.—(291, August, 1878). M. 60, coachman. Patient looks much older than he is. R. Mod. lin. v. Græfe; very considerable hæmorrhage; no vitreous was lost, although it showed in the wound after the delivery of lens; healing very slow. On the seventh day there was still a clot in the anterior chamber, and the wound was not closed. A month later an attack of iridocyclitis with T. + 1; iridectomy was performed without permanent benefit; the false membrane was torn across with two hooks (Noyes). Fifteen months after operation V. = fingers at 2.5 m.; a false membrane in pupil, and the iris discoloured and dragged into cicatrix of incision.

CASE XIV.—(61, May, 1879). M. 40 (same patient as Case XI.). L. 3-mm. flap upwards with eserine; the incision not very large, and a small conjunctival flap; operation normal; healing normal. Result, $+ \frac{1''}{3\frac{1}{2}} V. = \frac{6}{18}$.

CASE XV.—(107, June, 1879.) F. 65. L. Mature senile cataract; T. n. R. Mature senile cataract; T. n. L. 3-mm. flap upwards, with eserine; incision small—the flap in reality not being more than 2 mm.

in height; vectis was used; some iritis occurred in process of healing.

Result, $+\frac{1''}{3\frac{1}{2}} V.=\frac{3}{36}$.

CASE XVI.—(107, June, 1879.) F. 65 (same as Case XV.). R. Mature senile cataract. 3-mm. flap upwards, with eserine, under Lister's carbolic spray; operation normal; some iritis in healing. Result, $+\frac{1''}{4} V.=\frac{6}{24}$; T.—1. Synechia posterior.

CASE XVII.—(111, June, 1879.) M. 57. Deeply sunken eyes, with very prominent eyebrows. R. Mature senile cataract; T.—1. 3-mm. flap, without eserine and without Lister's spray; a small conjunctival flap, and considerable hæmorrhage. The capsule was subsequently divided with a needle. Result, $+\frac{1''}{4} V.=\frac{6}{18}$.

CASE XVIII.—(111, June, 1879.) M. 57 (same as Case XVII.). L. Senile cataract, not perfectly ripe; T.—? 3-mm. flap, with eserine and Lister's spray. Result, $+\frac{1''}{4} V.=\frac{6}{12}$.

CASE XIX.—(115, July, 1879.) M. 64 (same as Case X.). L. Mature senile cataract; T. n. 3-mm. flap, with eserine; large conjunctival flap, but trifling hæmorrhage. Result, $+\frac{1''}{3} V.=\frac{6}{60}$.

CASE XX.—(128, July, 1879.) M. 47 (same patient as Case III.). R. Senile cataract; T.—? 3-mm. flap, with eserine; a little cortex was left in; wound healed in forty-eight hours, but there was some iritis. Result, $+\frac{1''}{4} V.=\frac{6}{18}$.

CASE XXI.—(147, July, 1879.) M. 70. R. Mature senile cataract, the capsule of which has a calcareous look; T. n. 3-mm. flap, with eserine and Lister spray. The nucleus large; some cortex left in; slight iritis. Result, $+\frac{1''}{3\frac{1}{2}} V.=\frac{6}{36}$.

CASE XXII.—(165, August, 1879.) F. 35 (?). R. Mature cataract, rather overripe, with cholesterine crystals in lens; T. n. 3-mm. flap, with eserine and Lister's spray; peripheral section of capsule, after Knapp. Result, $+\frac{1''}{9} V.=\frac{6}{18}$.

CASE XXIII.—(165, August, 1879.) F. 35 (?) (same patient as Case XXII.). L. Mature cataract; no signs of cholesterine; T. n. 3-mm. flap, without eserine and without spray; peripheral section of capsule; wound did not heal for nine days; no inflammatory reaction. Result, $+\frac{1}{9}''$ V. = fingers at 1.5 m.

CASE XXIV.—(219, September, 1879.) F. 50; a nervous, weak-looking old woman. R. Mature senile cataract; T.+? 3-mm. flap; incision much too small—not so much as a 2-mm. flap in reality; peripheral section of capsule; delivery very difficult; cornea maltreated; no spoon, however, was used, or vitreous lost. Result, whole upper third of cornea sloughed, leaving a depressed cicatrix; globe phthisical (?); V. = pl.

CASE XXV.—(229, September, 1879.) M. 40; sight failing two years. R. Mature cataract of a milky colour; cortex probably fluid; T. n. 3-mm. flap; peripheral section of capsule, after which milky cortex came away; nucleus large, smooth, and slippery; cortex fluid; delivery easy. Sulphate of atropia ointment (grs. 4 to oz. vaseline) was kept continually on the eyelids from the third to the eighth day, when the pupil was fully dilated. The iris healed into corners of wound, and the pupil was drawn slightly upwards. Fundus normal; slight irregular astigmatism from capsule; T.—?. $+\frac{1}{3\frac{1}{2}}''$ V. = $\frac{6}{18}$. Patient cannot read, and knows very little English.

Of these 25 cases the result was:—

V. > 0.50 < 1.00 in 1 case (No. 18).

V. > 0.33 < 0.50 in 9 cases (Nos. 3, 4, 7, 10, 11, 14, 17, 20, 22).

V. > 0.10 < 0.33 in 6 cases (Nos. 2, 6, 16, 19, 21, 25).

Complete successes = 16 cases = 64 per cent.

V. useful, but < 0.10 in 7 cases, 5 of these being good results (Nos. 5, 8, 9, 15, 23), and 2 of them poor (Nos. 12 and 13).

Partial successes: Good results, 5 = 20 per cent.

Poor results, 2 = 8 per cent.

Failures: 2 (No. 1, V. = 0; No. 24, V. = pl.) = 8 per cent.

In comparing the different methods of operating, there were 12 cases of v. Græfe's modified linear extraction, 12 cases of the 3-mm. peripheral flap extraction, and 1 case of Jaeger's Hohlschnitt.

Mod. lin. v. Græfe (Nos. 1, 2, and 4 to 13), of which:—

Complete success in 6 (Nos. 2, 4, 6, 7, 10, 11).

Good success in 3 (Nos. 5, 8, 9).

Poor result in 2 (Nos. 12, 13).

Complete failure in 1 (No. 1).

Jaeger's Hohlschnitt—1 case (No. 3), a complete success.

3-mm. flap—12 cases (Nos. 14 to 25):—

Complete success in 9 cases (Nos. 14, 16, 17, 18, 19, 20, 21, 22, 25).

Good success in 2 cases (Nos. 15, 23).

Complete failure in 1 case (No. 24).

Though the result of Jaeger's Hohlschnitt was satisfactory in the one case, in which that method of operating was adopted, I did not attempt any further operations by that method, as it does not seem to offer any practical advantages over the other methods, while there are several very serious drawbacks connected with it—viz., the impossibility of observing accurately the whereabouts of the point of the knife when it has once pierced the cornea, the difficulty in removing a large enough portion of iris to avoid synechia anterior, and the awkwardness of getting the lens out of the *cul-de-sac*, formed by the upper margin of the cornea.

In comparing results, it is manifest that the 3-mm. peripheral flap has been far more successful in my hands than the modified linear extraction. For this there are many reasons.

It is much easier to measure exactly beforehand the size of the incision, and still more easy to alter and exactly carry out your intentions after the point of the knife has entered the anterior chamber. The wound is recorded as small in one-half the mod. lin. cases, and only one-sixth the peripheral flap. The result of this is seen in the greater frequency with which the spoon was used in mod. lin. than in peripheral flap extractions— $\frac{5}{12}$ mod. lin.; $\frac{1}{12}$ peripheral flap.

The position of the wound renders the escape of vitreous less likely. Vitreous was lost in two-twelfths, or 16.6 per cent., of mod. lin. extractions, but not once in the 12 peripheral flap extractions.

The peripheral flap takes the cicatrix away from the dangerous region of the ciliary body.

To these reasons must be added that, as I have only lately taken to the periph. flap operation, the experience gained in performing

v. Græfe's operation has been of use in improving the technique of the former.

In eight flap operations, Nos. 14, 15, 16, 18, 19, 20, 21, 22, the sulphate of eserine was used at the time of the operation, to draw the cut edges of the iris away from the corners of the incision in the outer tunic of the globe, as recommended by Dr. Wecker. I am not able from this experience to form a conclusion as to the advantages and disadvantages of its use, but this much may be observed, that iritis occurred in four out of the eight cases in which eserine was used, while it is only mentioned as being present in six out of the seventeen cases in which eserine was not used. Against this, however, may be put the fact, that all the cases where eserine was used resulted in perfect successes, except one, which was very fair. $V. = \frac{3}{36}$.

In four of the cases, Nos. 16, 18, 21, 22 (peripheral flap), the operation was performed under Lister's carbolic spray, but no attempt was made to disinfect the conjunctival sac by any other applications of carbolic acid or anything else. Some operators have recommended the instillation of a $2\frac{1}{2}$ per cent. solution of carbolic acid into the conjunctival sac previous to operating, but I think anyone who tries its effect on his own conjunctiva will be very slow in irritating his patient's eyes with so powerful an agent. The carbolic spray has not, in my experience, produced any ill results whatsoever, and it cannot but be a good thing to even partially asepticise the unhealthy Dublin atmosphere before exposing the inner portion of so delicate an organ as the eye to its influence.

Of the four operations all were completely successful.

In four operations, Nos. 22, 23, 24, 25, Knapp's peripheral section of the capsule was adopted, instead of Weber's rectangular flap. One of these (No. 24) was lost, owing to causes quite unconnected with the cystotomy, one (No. 23) gave only an imperfect success, and two (Nos. 22, 25) were complete successes. It is impossible to come to any conclusion upon this evidence; the pros and cons in reference to this modification appear about equally balanced. It is likely that there is less danger of iritis after extraction by Knapp's plan, but there is certainly greater probability of a secondary operation being necessary, and secondary operations are not always trifling. No secondary operation has as yet been necessary in these four cases.

The fact of there being a definite conjunctival flap formed is recorded in four cases (Nos. 2, 14, 17, 19), one Græfian, and three flaps. All were complete successes. Of course it is probable that many more cases than these had well-formed conjunctival flaps, but the fact is mentioned in these cases only.

The vitreous was lost in three cases = 12 per cent., a very high percentage for uncomplicated cataracts (Nos. 1, 3, 8). One was Jaeger's operation, and the other two were Græfian. The vitreous was not once lost in the peripheral flap operation. Of these three cases one was lost, one was an imperfect, and one was a complete success.

The spoon was used in six cases (Nos. 1, 6, 7, 9, 12, 15), being five Græfian, and one flap. Of these cases one was a failure, three were imperfect successes, and two perfect successes. This, however, exemplifies not so much the danger of using a spoon, but the necessity for forming a large incision to let out the cataract easily without injury to the tissues, for the spoon was never used when the cataract came out easily without it.

Secondary operations were necessary or advisable in four cases, one of Jaeger's, one of the peripheral flaps, and two of Græfe's.

Some cortex was left in the eye in six cases (Nos. 1, 2, 3, 12, 20, 21), three Græfian, two peripheral flap, and one Jaeger's. One of these was lost, one was a partial, and four complete successes.

In three of the cases there was considerable hæmorrhage (Nos. 11, 13, 17), two of which were complete successes, and one partial.

The wound was small in eight cases (Nos. 1, 6, 9, 10, 11, 12, 15, 24) = 50 per cent. of the Græfian extractions, and only 16·6 per cent. of flaps.

Only three of these cases were completely successful, three partially successful, and two completely lost, exhibiting forcibly the supreme importance of an easy exit for the lens. There were 64 per cent. complete successes upon the whole of the series, while only 37·5 per cent. were completely successful where the incision was small.

The iris or cornea was subjected to much pressure in one case (No. 24), and the eye was lost directly in consequence of the injury to the cornea. It is probable that these tissues were subjected to considerable maltreatment in other cases, but the fact is not recorded.

The fixation forceps tore through the conjunctiva in three cases (Nos. 1, 2, 8)—one completely successful, one partially successful, one lost.

The Untoward Results.—Panophthalmitis in one case (No. 1), due to diseased condition of eye, coupled with imperfect performance of the operation, the vitreous being lost, and portions of cortical matter being left in.

Iridocyclitis or iridochorioiditis in three cases (Nos. 5, 8, 13), due in one case (No. 5) to the unripeness of the cataract, coupled with an hysterical fit of crying on the evening of operation; in the second (No. 8) to the loss of vitreous, which was perfectly fluid; and in the third (No. 13) to the prolapse of vitreous, and the great hæmorrhage that occurred at the operation.

Simple iritis in five cases (Nos. 12, 15, 16, 20, 21), probably caused by the spoon in one case (No. 15); by cortex left in in two cases (Nos. 20, 21); by use of spoon in addition to incomplete extraction of cortex in one case (No. 12); and in one case (No. 16) no cause can be assigned, unless it be asserted that the use of eserine was the cause.

The iris is recorded as healed into the wound in two cases; it probably took place in a greater number, but was not noticed. One of these was Jaeger's Hohlschnitt, and the other was a peripheral flap.

A secondary operation was advisable in four cases—one Jaeger's, two Græfe's, one peripheral flap. It was not necessary in any of Knapp's.

II. EXTRACTION OF COMPLICATED CATARACTS.

CASE XXVI.—(88, June, 1878.) M. 66. L. V. = pl.; P. uncertain, and only in inner segment of field; T. n.; annular synechia posterior; hydrops of posterior chamber; probably detached retina. Operation, modified linear v. Græfe; vitreous was fluid, and came out; spoon used; some cortex left in; healing not recorded. Result, "A very slight improvement," which for present purposes may be counted a complete failure, as nothing is stated about the chances of a secondary operation.

CASE XXVII.—(292, December, 1879.) M. 74. L. Partial synechia posterior; senile cataract; V. = fingers at 1 m. R. Collapsed since infancy; V. = 0; mod. lin. v. Græfe; wound too small, and iridectomy too small also; delivery with spoon, and very difficult; some vitreous lost; healing not recorded. Result not tested, but patient was able to write letters again, which he had not been able to do for years. A fair case of incomplete success.

The two cases require no comment; both were unfavourable cases to operate on, but the second was much less so than the first,

and the result was consequently more satisfactory, and would probably have been much more so had the primary incision been larger.

CASE XXVIII.—*Complicated Cataract treated by Discission.*—(280, January, 1879.) M. 30. L. Cataracta arida siliquata; r. p. good; T. n.; V. = pl.; probable chorioiditis. Operation, an attempt to divide toughened capsule with a needle, followed by an attack of cyclitis, with a regularly eczematous inflammation of the skin of the lids and face. Result, V. = fingers at 2 m. reads Jg. 20.

III. OPERATIONS ON THE SOFT CATARACT OF EARLY LIFE.

CASE XXIX.—(324, Sept., 1877.) M. 9. R. Needle operation twice.

CASE XXX.—Same patient as Case XXIX. L. Needle operation thrice. Result in both, great improvement. The boy was to return in a month or two for glasses, but never has appeared since.

CASE XXXI.—(32, May, 1879.) M. 23; sailor. Unilateral cataract, for which no cause whatsoever could be assigned. Two needle operations. Result, + 13 D. V. = $\frac{5}{6}$ + 18 D. reads Jg. 1 at 8".

CASE XXXII.—(192, August, 1878.) F. 3. R. Two needle operations. Result, good.

CASE XXXIII.—Same as Case XXXII. L. Three needle operations. Result, good.

CASE XXXIV.—(105, June, 1879.) F. 2; sister of last patient. This child's father, paternal uncle, and paternal grandfather had all congenital cataracts; nothing ascertainable from history of family as to cause; child never had convulsions. R. Pupil acted badly to light, atropine, and duboisine. Needle operation, followed by a violent attack of cyclitis, with high tension, necessitating the removal of the swollen lens through a linear incision, two days after the operation; after this the globe slowly collapsed.

CASE XXXV.—Same patient as No. XXXIV. L., like R., acted badly to light and mydriatics. Needle operation at same time, and to a greater extent than in R. Result, lens was absorbing slowly, but very satisfactorily, when the patient's mother removed her from hospital. This child had a severe attack of spasms and delirium from one instillation of a solution of duboisine (grs. 4 to oz.) into the two eyes after the operation.

Duboisin

Of these seven operations the result may be put down as satisfactory in four cases (Nos. 29, 30, 32, 33), and likely to turn out satisfactorily in a fifth case (No. 35). A perfect success may be recorded for one case (No. 31), and one (No. 34) was a complete failure.

It was impossible in this series of cases to give a more exact record of the results, owing to the youth and general lack of intelligence of the patients, but the facts, as noted, are not very encouraging—a total loss of 14·28 per cent. is far too high a figure.

I am quite at a loss to account for the severity of the inflammatory attack in No. 34. The operation was done at the same time, and under the same conditions, in this eye as in the other eye (No. 35), except that the lens substance was not broken up by the needle nearly so much in the eye that went to the bad as in the other one. Whether a preliminary iridectomy would have warded off the attack, or whether it would have been better not to perform the linear extraction, I am not able to determine.

IV. TRAUMATIC CATARACTS.

CASE XXXVI.—(480, February, 1878.) M. 15. L. Blow from a thorn bush fourteen days previous to operation. Dilated, immovable pupil; chemosis, T. + 2. Operation, linear extraction, with eserine; healing. About a fortnight after operation the tension became so high that I relieved it by a sclerotomy. Result, T. + ? V. = fingers at 1 m.

CASE XXXVII.—(134, April, 1879.) M. 9. L. Blow from a thorn bush two months previously. Operation, keratonyxis twice, with ten days' interval; fourteen days later attempted linear extraction, with eserine, followed by two more needle operations in the ensuing month. Result, V. = $\frac{6}{9}$.

CASE XXXVIII.—(284, January, 1879.) M. 18. R. Injury from thorn three months ago. T. + ? V. = fingers at 0·5 m. Operation, keratonyxis, followed by linear extraction a fortnight later, the tension being T. + 1. Vitreous bulged through the linear wound. Result, $+\frac{1''}{3\frac{1}{2}}$ V. = $\frac{6}{12}$.

CASE XXXIX.—(287, February, 1879.) M. 35. L. Blow of a stone one month previously. V. = pl. T. - 2. Globe tender on pressure; synechia posterior totalis (?); iris discoloured; leucoma corneæ; globe angular. Operation, mod. lin. v. Græfe, in hopes of finding the piece of stone in the cataractorous lens. Result, phthisis bulbi.

XL.—(69, April, 1879.) F. 20. R. States she received a blow from a cow's tail some months previously. The history seems rather doubtful, but she is very positive in attributing the blindness to the blow of the tail. There are two specks of lymph on the anterior lens capsule, and the reaction of the pupil to atropine is not good. L. Has a slight nebula on the cornea. Operation—R. Keratonyxis; two days later, removal of swollen lens through linear wound with suction curette. Result, panophthalmitis and subsequent enucleation. I cannot account for the unfortunate result in this case. The patient was a fine, strong, stout country-girl.

CASE XLI.—(93, June, 1875.) M. 55. L. Traumatic cataract; leucoma corneæ et synechia anterior. Operation, 3-mm. peripheral flaps upwards; wound small; spoon used three times for cortex, but nucleus removed without spoon; some vitreous escaped, and some cortex had to be left behind. Result fair.

CASE XLII.—(117, July, 1879.) M. 39. L. Blow of a rope, sixteen years ago, followed by violent pain. V. = fingers at 3 m. Dislocated opaque lens; iridodonesis. Not at all a favourable case for operation, but patient so determined upon it that I consented to do it. Operation, 3-mm. peripheral flap; vitreous escaped before iridectomy; lens delivered by vectis. Five days later violent pain and chemosis, which yielded to the artificial leech and hypodermic injections of morphia. Result, $+\frac{1}{18}$ V. = fingers at 3 m.

CASE XLIII.—(130, July, 1879.) F. 28. L. Perforating wound of cornea and lens from prod of a scissors, twenty-four hours before admission to hospital. The case was treated for ten days with iced compresses, and atropine. Operation, extraction through suction, under Lister's spray, duboisine being used as mydriatic. Result, $+\frac{1}{3\frac{1}{2}}$ V. = $\frac{6}{60}$.

CASE XLIV.—(169, August, 1879.) M. 38. L. Blow from a piece of wood six days previous to admission to hospital. Cataract, synechia posterior; T. —? V. = pl. Treated by iced compresses and mydriatics for six weeks. Operation, removal through suction curette, and division of capsule with needle, eleven days later. Result, $+11 D.$ V. = $\frac{5}{7.5} ???$

CASE XLV.—(174, August, 1879) M. 28. R. Two years ago got a blow from a stone, and for two months afterwards suffered violent pain. The stone evidently wounded the cornea, iris, and lens, and has resulted

in a thick capsular opacity, the lens being absorbed. There is also synechia anterior. T. n. ; V. = fingers at 0·5 m. Operation, division of capsule with needle, which failed, owing to the tough nature of the membrane. Patient left hospital in the same state as he entered.

CASE XLVI.—(180, August, 1879.) M. 149. L. Wound from a piece of steel, two days previously, which is not now in either the lens or vitreous. Chemosis, pain, and some lymph in anterior chamber. Operation was undertaken in the hope of finding the foreign body in the lens, and averting panophthalmitis. 3-mm. flap, iridectomy, and removal of soft lens and some lymph with suction curette. Result, failure to find piece of steel; panophthalmitis, phthisis bulbi, and eventual enucleation.

CASE XLVII.—(Notes lost. July, 1879.) M. Traumatic cataract, with partial synechia posterior. Removal of lens through linear wound, combined with iridectomy. Result unknown; patient was doing well when he left the institution, and he never returned.

The methods used were in the 12 cases modified linear of v. Graefe, 1 (No. 39); 3-mm. flap, 3 (Nos. 41, 42, 46); linear extraction with iridectomy, 1 (No. 47); linear extraction with eserine, 3 (Nos. 36, 37, 38). In No. 37 the needle was used twice previous to the linear extraction; linear extraction with suction curette, 3 (Nos. 40, 43, 44); simple needle operation, 1 (No. 45).

The results of the different methods adopted cannot be fairly compared, as the cases differed so extremely in the severity of the injuries.

In the 12 cases the result stands—Success, complete, 4 (Nos. 37, 38, 43, 44); partial, 3 (Nos. 36, 41, 42); curable by secondary operation, 1 (No. 45); unknown, 1 (No. 47); failures, 3 (Nos. 39, 46, 40).

This gives complete success, 33·33 per cent.; partial success, 25·00 per cent.—total successes, 58·33 per cent.; curable or unknown, 16·66 per cent.; losses, 25·00 per cent.

It must be recollected that two of the three cases which terminated unsuccessfully were almost perfectly hopeless from the start, No. 39 being one in which the globe was practically phthisical, and where the operation was only undertaken as a substitute for enucleation in the hope of removing a foreign body, and No. 46 being already in a condition of plastic, if not suppurative, inflammation when the operation was attempted.

To sum up the results of all the cases taken together there were—

Complete success,	-	-	-	21 cases.
Partial success,	-	-	-	16 „
Improvable or unknown,	-	-	-	3 „
Complete failure,	-	-	-	7 „
			-	
Total,	-	-	-	47

To compare these results with those obtained elsewhere by skilled operators, I have annexed the following tables:—Table No. I. gives all my own operative results, complete success being assumed when the power of vision was $\frac{1}{20}$, which corresponds approximately to the power of counting fingers at three yards distance, and total loss when $V = 0$, or merely the power of distinguishing light and darkness. Most of the other operators have adopted this standard, though not all of them by any means. It is much to be regretted that there is no agreement among oculists on this subject. The standard here assumed certainly is much too low, but this cannot be helped, as it is that adopted by the majority of the surgeons whose statistics are given.

The other tables give the results of in all 11,012 operations. Column *a* gives the name of the operator, and the reference to Nagel's *Jahresbericht*; column *b* the number of operations; *c* the number of complete successes; *d* the number of partial successes; *e* the number of failures; and *f* the percentage of failures.

TABLE I.

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>
<i>Uncomplicated Cataracts:</i>					
Modified linear of v. Græfe -	12	7	4	1	8·3
Jaeger's Hohlschnitt -	1	1	—	—	—
3 mm. peripheral flap -	12	10	1	1	8·3
Total -	25	18	5	2	8·0
<i>Complicated Cataracts</i>					
Traumatic Cataracts -	3	—	2	1	—
Soft Cataracts -	12	5	4	3	—
Total -	7	1	5	1	—
Total -	47	24	16	7	14·88

TABLE II.—Results of Operations on Uncomplicated Cataracts by the Modified Linear Method of v. Græfe.

<i>a</i>		<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	
1. Secondi,	N. 1871	-	94	84	4	6	—
2. Horner, ^a	N. 1872	-	371	329	22	20	5·4
3. Rothmund, ^b	N. 1873	-	99	78	18	3	—
4. Pagenstecher,	N. 1873	-	55	50	3	2	—
5. Bäuerlein	-	-	29	22	5	2	—
6. Woinow	-	-	34	23	8	3	—
7. Cohn	-	-	14	10	3	1	—
8. N. 1874 ^c —Results of 22 surgeons			838	704	67	67	8·0
9. Maconachie,	N. 1874	-	48	45	3	—	—
10. Knapp,	N. 1875	-	46	42	2	2	—
11. N. 1875 ^d —Results of 25 surgeons			889	791	36	62	7·0
12. Derby, &c.,	N. 1875	-	53	45	—	8	—
13. N. 1876—Results of 50 surgeons			1,711	1,376	219	117	7·0
14. Knapp,	N. 1876	-	36	30	2	4	—
15. Story	-	-	12	7	4	1	—
			4,329	3,636	396	298	6·88

Complete success, 83·98 per cent. ; partial, 9·14 per cent. ; losses, 6·88 per cent.^e

TABLE III.—Results of the Modified Linear Extraction in Complicated and Uncomplicated Cases.

<i>a</i>		<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	
1. De Wecker,	N. 1870	-	109	104	?	5	—
2. Martin (Hyades),	N. 1870	-	55	50	3	2	—
3. Secondi,	N. 1871	-	120	103	7	10	—
4. Derby,	N. 1871	-	60	44	13	3	—
5. Snellen (Westhoff),	N. 1871	-	209	190	14	5	—
6. Keller,	N. 1871	-	20	18	2	—	—
7. Wilson, Henry	-	-	100	80	15	5	—
8. N. 1872—Results of 11 surgeons			667	618	24	25	—
9. Joy Jeffries, &c.,	N. 1872	-	46	35	9	2	—
10. Calderini,	N. 1873	-	10	9	—	1	—
11. Barde,	N. 1873	-	43	32	8	3	—
12. Little,	N. 1873	-	200	178	6	16	—
13. Jacob,	N. 1873	-	7	4	2	1	—
14. Just,	N. 1874	-	75	66	6	3	—
15. Knapp,	N. 1875	-	25	16	3	6	—
16. Jeffries,	N. 1875	-	16	16	—	—	—
17. Adler,	N. 1876	-	58	57	—	1	—
18. Pagenstecher,	N. 1876	-	76	67	6	3	—
19. Arlt. (Gr. & Sœmisch)	-	-	1,075	900	114	61	5·67
			2,971	2,587	232	152	5·11
Uncomplicated cases of Table II.			4,329	3,636	396	298	—
			7,300	6,223	628	450	6·16

^a Horner's results are given in percentage—88·8, 5·8, 5·4.^b Rothmund exacts $V.=0\cdot1$ for complete success.^c Nagel gives the result in percentage. He counts $V. > \frac{1}{20}$ complete success. 84·0, 8·0, 8·0.^d Nagel gives only percentages—89·0, 4·0, 7·0.^e The error in the figures is copied from Nagel's table in the Jahresbericht for 1876.

TABLE IV.—*Results of Extractions by various Methods on both Complicated and Uncomplicated Cataracts.*

	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>
1. Macnamara, ^a	N. 71	124	97	12	15	—
2. N. 1871—Results of 9 surgeons		538	470	37	31	—
3. Steffan, ^b	N. 1872	23	21	1	1	—
4. Driver, ^b	N. 1872	50	44	3	3	—
5. N. 1872—Results of 7 surgeons		589	546	9	34	—
6. Steffan, ^c	N. 1873	22	21	1	—	—
7. Jacob, ^c	N. 1873	8	4	2	2	—
8. „ ^d	„	56	43	6	7	—
9. Hansen, ^e	N. 1873	46	41	4	1	—
10. Steffan, ^f	N. 1874	23	22	1	—	—
11. Agnew, ^g	N. 1874	33	27	2	4	—
12. H. Derby, ^h	N. 1874	64	44	18	2	—
13. Jaeger (Klein), ⁱ	N. 1874	102	78	9	15	—
14. Maier, ^j	N. 1875	83	67	10	6	—
15. Cohn, ^k	N. 1875	18	15	3	—	—
16. Wecker, ^l	N. 1875	100	97	—	3	—
17. Chiralt, ^m	N. 1875	85	73	7	5	—
18. Degauneau, ⁿ	N. 1875	114	88	17	9	—
19. Schiess-geninsens, ^o	N. 1876	65	53	6	6	—
20. Cervera, ^p	N. 1876	156	113	—	43	—
21. Rothmund, ^q	N. 1876	2	2	—	—	—
22. Carreras, ^r	N. 1876	18	12	3	3	—
23. Schirmer, ^s	N. 1876	11	9	1	1	—
24. Maier, ^t	N. 1876	3	3	—	—	—
25. Braun, ^u	N. 1876	1	1	—	—	—
26. Rothmund, ^v	N. 1876	1	—	—	1	—
27. Reymond, ^w	N. 1876	3	2	1	—	—
28. „ ^x	„	42	23	8	11	—
29. N. 1876 ^y —Results of 7 surgeons		36	25	2	9	—
30. N. 1876 ^z —Results of 3 surgeons		57	45	9	3	—
31. N. 1876 ^{aa} —Results of 3 surgeons		5	2	1	2	—
32. Wecker, ^{ab}	N. 1876	101	95	—	6	—
33. N. 1876 ^{ac} —Results of 3 surgeons		34	30	1	3	—
34. Higgins, ^{ad}	N. 1876	50	37	10	3	—
35. Arlt. (Gr. & Sœmisch) ^{ae}		954	753	126	75	—
36. „ „ „ ^{af}		95	73	16	6	—
		3,712	3,076	326	310	8·35
Cases in Tables II. and III.		7,300	6,223	628	450	—
		11,012	9,299	954	760	6·90

Altogether in 11,012 extractions complete success has been obtained in 84·44 per cent. of the cases, partial success in 8·66 per cent., and 6·9 per cent. have been completely lost.

^a By Macnamara's method.

^b By Weber's method.

^c By spoon operation.

^d By flap operation.

^e By Liebreich's method.

^f By peripheral flap.

^g By Jaeger's method.

^h Chiefly by flap operation.

ⁱ By Lebrun's method.

^j By Liebreich's method.

^k By Pagenstecher's method.

^l By Wecker's method.

^m By Wecker's method. Eight cases are omitted, being still under treatment.

ⁿ By Jaeger's method.

^o By flap operation.

^p By Weber's method.

The conclusions to be drawn from these statistics are—firstly, that the number of failures taken on the whole is much less than one would have expected. In 4,329 uncomplicated cases, the failures were 6·88 per cent., while in 11,012 cases of all kinds the failures were only 6·9 per cent.; secondly, as it is highly improbable that too high a figure has been given for the failures in any of the tables, we may conclude that an operator must expect to lose 7 out of every 100 of his cases.

It might at first sight seem that we should also conclude that 7 per cent. even of the uncomplicated cases will result in failure. I myself have hitherto lost 8 per cent. of such cases; but I believe that at least five-sixths of the failures in these cases are due to preventable causes. If I had to repeat the operations in my cases which have turned out badly, I believe, with my present experience, the results would be successful, and I cannot but think that many other operators would feel the same thing about their unsuccessful cases.

The more carefully we study all the various conditions which influence the success of our operations, the more exactly we map out the primary incision so as to give the freest possible exit to the lens, without exercising undue pressure on the ocular tissues on the one hand, or leaving too large a wound to undergo the process of repair on the other hand; and the more closely we attend to the perfect cleanliness of all the instruments and bandages, if we do not actually adopt some form of antisepticism, the sooner shall we reduce the present 7 per cent. of losses to nil.

I am aware that some operators, notably Horner of Zurich, and Wecker of Paris, have already reached a far higher percentage of success than what the tables given above exhibit, and this gives us additional grounds for hoping that what they have accomplished can also be attained by others, if the latter can bring to the work equal skill and equal care.



