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ORIGINAL ARTICLES.

METHOD AND RESULTS OF SIMPLE EXTRACTION OF CATARACTS.

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of the American Medical Association, held at Detroit, June, 1892.

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Gentlemen:—When your President honored me with an invitation to this meeting and to read a paper, I thought that a description of simple extraction and its results, good and bad, might perhaps be more acceptable to the Society than any other subject I could have chosen.

I shall confine my remarks to the method practiced, and the results obtained, by myself during the last six years, *i. e.*, since I adopted simple extraction as the general operation. My views and rules are based on the experience gained by 623 simple extractions, intercurrent with which 60 combined extractions (about 10 per cent.) were made. No cases are omitted except such traumatic and complicated cataracts in which the cataract was the minor evil, for instance partial detachment of the retina complicated with cataract, and the like.

The *method of operating* such as I practice it, though scarcely offering anything absolutely new, differs in many important details and as a whole, both in principle and execution, materially from all others.

THE PREPARATION OF THE PATIENT FOR THE OPERATION.

The patient should be free from any acute disease, for instance bronchitis, exacerbations of albuminuria or diabetes, rheumatism and the like. His conjunctiva must be reasonably free from pathogenic germs. Dacryocysto-blenorrhœa and chronic purulent conjunctivitis absolutely counterindicate the operation. In dacryocysto-blenorrhœa the lachrymal sac should be largely split and rendered aseptic, and if this be impossible, obliterated before the operation is undertaken. Chronic purulent conjunctivitis has to be completely cured with nitrate of silver and other remedies, even if it takes six months or a year, before an operation of extraction is justifiable.

Preliminary ripening operations are, in my opinion, almost always superfluous. I prefer the risk of extracting an unripe cataract to that of any ripening method with which I have become acquainted. The leaving of remnants behind has, in the manner in which I operate, very little to signify. Locked up in the capsule they produce no iritis, and can easily and successfully be dealt with by the secondary division of the capsule.

I avoid operating on *cataracts swollen by imbibition*. They render the section difficult and rarely come out cleanly, whereas the immature cataracts, known under the name of nuclear sclerosis, if the anterior chamber is deep, mostly—not always—come out entire.

The patient is placed on an operating chair, opposite a window, or in cloudy weather, near an Argand burner whose light is concentrated on the patient's eye with a hand magnifier. The instruments are carefully cleansed with corrosive sublimate solution 1:5,000, then held in boiling water for a short time, immediately before being used.

The eye is anæsthetized by three instillations of a 4 per cent. solution of cocaine, fifteen, ten and five minutes before the operation. The lids and surroundings are carefully washed with soap, then with corrosive sublimate, with which also the inner surface of the upper lid is washed by means of a pledget of absorbent cotton. From the first instillation of cocaine until the commencement of the operation the eye is kept closed. The patient is subjected to no preparatory treatment, except a bath and thorough cleansing of his face and head. Each patient is examined when or before he enters the hospital, whether his internal organs are healthy, in particular his nerve centers, lungs, heart, digestive and urinary organs.

The operator stands behind the patient's head, operates on the right eye with his right hand (upper section always), on the left eye with his left hand. The lids are kept apart by a wire speculum. I prefer the Moorfield's speculum, or one which Tiemann lately made for me, both being modifications of the large

Figure 1.

Graefe speculum, preventing the ends of the branches from pressing on the eyeball by its own weight, the long curved parts of the branches hanging down and resting upon the temple.

The eye is steadied by the operator, who implants the teeth of a fixing forceps with his free hand into

Figure 2.

the conjunctival and episcleral tissue immediately below the lower edge of the cornea. When the speculum is applied, and before the eyeball is steadied, a drop or two of a 1:5,000 solution of mercuric bichloride is let fall on the eyeball.

EXECUTION OF THE OPERATION.

The *most important step of the whole operation is the corneal section*. For full-sized cataracts it comprises exactly the upper half of the cornea, for smaller, Morgagnian, and soft cataracts somewhat less. A perfect section passes in its whole extent exactly

through the transparent margin of the cornea, the knife (see Figure 3) remaining in the same plane

which extends the wound and favors the occurrence of prolapse of the iris.

Figure 3.

throughout, particular care being taken that in completing the section the blade of the knife is neither turned forward nor backward. In many cases a small, central conjunctival flap is formed which, if anything, is an advantage.

This section is distinguished by its accurate and firm closure. It does not favor prolapse of the iris as the peripheric section does, nor does it lead to slow healing, secondary infection, and adhesions or incarcerations of the iris, as the more central flap often does. By cutting the lamellæ of the cornea obliquely the contents of the eyeball, by pressing the posterior lip of the wound toward the anterior, at once seal the section, so that the patient can move, open and shut the eye without disturbing the wound.

I open the capsule by passing the delicate sharp lance of the cystotome behind the iris from the nasal

Of the many modifications of the original Liebreich or Mathieu forceps, the essential feature of which consists in the position of the teeth on the surface

Figure 5.

and not on the tip of the branches, I prefer the one Tiemann made for me and which I described two years ago (*Arch. Ophthalmology*, 1890, p. 288). When the instrument is closed, the teeth are hidden and the instrument is smooth all around. In this way the branches are introduced into the eye without scraping at the iris or raising the cornea perceptibly. When the branches separate, the teeth on the lower side project, and when pressed again together grasp so much of the anterior capsule as is desired. The forceps close only at the end, between the teeth, so that the iris is not included. Dr. Eugene Smith has so modified this instrument, that the tooth bearing ends are sunk slightly below the straight prolongation of the branches, thus dipping readily into the pu-

Figure 6.

to the temporal side, thus incising the capsule near its periphery, parallel to the corneal section. This mode of cystotomy leaves the centre of the capsule unbroken and prevents the adhesions resulting from the contact of a torn and bruised pupillary edge of the iris with shreds of capsule and remnants of lens. The expulsion of the cataract and the clearing of the pupillary field can be done through the peripheric opening of the capsule as well as through the central.

I confine the removal of a piece of the anterior capsule

pillary space. The instrument is well devised but a trifle bulky, and is not so readily introduced as the one spoken of before. I have tried it once only.

The *expulsion of the lens* is effected by pressing the lower part of the cornea, with a Daviel's spoon, directly toward the centre of the globe. When the lens presents in the gaping section its exit is aided and

Figure 7.

to the thickened central portions of hypermature cataracts. I again and again have tried to remove the anterior capsule with forceps, a procedure that has become rather popular in Europe and has some warm advocates also in this country, but I have not found it so advantageous as to adopt it for all cases. It may be possible to remove a piece of capsule, not merely to lacerate it, and in this way to obtain a clearer pupil than by the extensive laceration of the capsule, but the result, as far as I have experience, will be simple posterior synechiæ in many cases and plastic iritis with its consequences in some, and the posterior capsule, to which the remnants of the anterior are agglutinated, mostly dots and wrinkles in the course of months and years, with corresponding falling off of sight.

Among the accidents of the extraction of the anterior capsule I may mention that in some cases when the capsule is tough the piece torn out is not limited to the pupillary space but extends to the equator of the lens, in others the whole crystalline body is drawn out. In both events the vitreous chamber is opened, a lesion

followed up by slight strokes with the spoon on the outer surface of the cornea, so as to expel the lens, together with its cortex, as a whole. Should the pupil not readily expand, the rigid sphincter portion is drawn backward with the wire loop which is held in the other hand of the operator to aid in the expulsion of the lens. Should the section prove too small it is enlarged at one end with a pair of strabismus

Figure 8.

scissors, which also serve for cutting the iris in iridectomy, just as the capsule forceps serves in grasping and drawing out the iris for the same purpose. In the majority of cases the cystotomy and expulsion of the lens can be done without keeping the eye steadied with the fixing forceps. In restless people and pro-

lapse of vitreous I remove not only the fixing forceps but also the speculum immediately after the corneal section, and expel the lens by external pressure with the lids. I scarcely ever have to resort to the wire loop or any other traction instrument to get the lens out.

The *clearing of the pupil* is effected almost exclusively by pressing with the edge of the lower lid on the cornea. The remnants are wiped away with a well sterilized highly polished curette; neither the

Figure 9.

edge of the upper lid nor that of the lower is allowed to get in contact with the wound. The so-called milking manœuvre, by which the remnants were formerly pressed into the wound and wiped out of it with the edge of the upper lid is highly reprehensible; this procedure being as nearly a direct inoculation of germs as is possible. Equally reprehensible is it to introduce a curette or spoon into the anterior chamber to scoop remnants out immediately after such instrument has been passed over the cornea to expel the lens. There are germs on the cornea and conjunctiva even after the most careful disinfection. They are taken up by the spoon and carried into the anterior chamber. No instrument that enters the eye should have touched any living tissue, including the fingers of the operator, the skin of the lids or the conjunctiva of the patient.

During the operation I repeatedly let some drops of a 1-10,000 solution of corrosive sublimate fall on the wound and its surroundings, and when the operation is completed I smooth out the conjunctival flap, if there be any, introducing the end of a polished grooved spatula (see Fig. 6), previously moistened with the above sublimate solution into the anterior chamber and passing it through the wound from one end to the other, stroking from within outward, in order to remove particles of lens, redress a curved-in flap, and carefully adjust the edges of the wound.

This is, however, not done before the iris has spontaneously or artificially recovered its natural position. Should the corneal section be too peripheric, the best thing is to make a small iridectomy at once, for peripheric (Graefe's) sections commonly lead to large and harmful prolapses. If the iris does not spontaneously resume its position, frequently it does so when the lower part of the cornea is pressed upon with the edge of the lid. This paradoxical phenomenon may thus be explained. The iris being pinched in the tightly closing wound, pressure on the lower part of the cornea raises the flap and disengages the iris which then, by its natural elasticity and contraction of the sphincter pupillæ, can resume its natural position. If this encheiresis fail, the iris should be pushed back with a spatula into the anterior chamber. When the periphery of the iris remains folded in the sinus of the anterior chamber, it is smoothened out with the olive tipped point of a probe (see Fig. 9) introduced into the iris angle, behind the opaque corneal margin.

Formerly I washed the anterior chamber out with a solution of biniodide of mercury or boracic acid, but gradually this procedure has fallen into desuetude without appreciable influence on the results. I can say the same of instillations or eserine or pilo-

carpine after the operation. When the operation is finished, and the patient can open and shut his eyes without disturbing the flap on the iris, I drop a few drops of 1-10,000 bichloride of mercury solution on the wound and into the conjunctival sac and let him go to bed without any bandage, holding his eyes open or shut at his pleasure. The nurses help to undress, he lies down and closes his eyes. In from 5 to 20 minutes I inspect the eye again, and if everything is all right I bandage it. The dressing consists of a patch of moistened corrosive sublimate gauze, and a pad of moistened absorbent cotton fastened with two strips of isinglass plaster. The non-operated eye is covered the same way for a day or two. In nervous, old, or timid people the good eye is barely covered by a patch of gauze, fastened over the brow by a strip of plaster. The patient is instructed to keep both eyes gently closed and use the good eye only for eating and calls of nature. The first day the greatest possible rest is recommended. From the second day old people may sit up a part of the day. Since September 1891, I have followed this practice of letting the patients go to bed with their eyes unbandaged in 125 cases. In one of them I found the pupil displaced. I stroked the iris back, but there was a prolapse of iris when the eye was opened on the fourth day. In two of them I found an iris prolapse which I cut at once and obtained a smooth healing. Having in this way satisfied myself that in the other cases, the patients had stood the transportation from the chair to the bed and the undressing without a tendency to prolapse, was less in dread of this event, yet it occurred in a few instances, mostly by some accident.

Ordinarily there is pain for 5 or 6 hours after the operation, then the eye is and remains quiet. If after hours or days of freedom from irritation the patient, by an injury, a fit of coughing, or other more or less violent exercise, or without any assignable cause, feels a sudden sharp pain in the eye which gradually dies out in an hour, then in all probability a prolapse of iris has occurred. If I am informed of it within several hours, I open the eye, and in case the supposition prove true, I cut the prolapse, reducing the edges of the iris, if there be no irritation, i.e., the prolapse is simply mechanical. If I notice the prolapse later, on the third or fourth day, I leave it untouched. Some of the small ones disappear, others skin over and produce no irritation, others become larger, constricted at their base or cystoid. I leave all these until the irritation has disappeared, and then cut them off. This operation, when performed after the eye has become white, is nothing more than the amputation of a small staphyloma and is usually followed by a smooth and permanent recovery.

For a time I wanted to test the practicability of dealing with the iris-prolapse, under all conditions, as soon as it came to my notice. The majority of cases did well, but there were three most unfortunate ones, the only failures I have had from iris prolapse whether operated on or left alone. Those three cases were one loss by suppuration, and two losses by irido-cyclitis chronica, both followed by sympathetic ophthalmia, so that both eyes became blind.

The first (extraction, with removal of a portion of anterior capsule), a man of 76 years, had a prolapse on the fourth day, when the eye was opened for the first time. It was excised the whole length of the wound. The next day no reaction, but on the temporal side there was a small angular incarceration, with a small bead of vitreous presenting.

Six days later the incarcerated portion had become bulging and was abscessed. Infiltration of the wound developing into panophthalmitis followed. The patient had chronic conjunctivitis.

The second had a large prolapse cut on the fourth day, as soon as it was noticed. Edges reduced. Clean iridectomy, no irritation the following day. In the next night he struck his eye, causing some incarceration. Slow irido-cyclitis developed, followed in third month by iritis in the other eye. Both eyes were lost. Patient suffered intensely from rheumatism, and his eyes have given him a great deal of pain for a year after the operation.

The third case was a complicated (cholesterinic) cataract in a man of 71. Extraction with a portion of anterior capsule. On fourth day small prolapse noticed in outer corner; abscessed 20 days later. Slow irido-cyclitis. Strings of cholesterine in vitreous adherent to scar. Fifty-four days after extraction the first circumcorneal injection noticed in other eye. In six months closure of both pupils. S=1-00.

These excessively sad cases are depressing in the highest degree. Their disheartening effect is counterbalanced only by the overwhelming number of good results.

The patients are usually discharged at the end of the second week. By this time the irritation has usually disappeared. The pupil almost always is free from adhesions, but sometimes more or less obstructed by remnants of lens. The capsule stretching across it may be smooth, dotted or streaked. The average visual acuteness in the third week is $\frac{3}{80}$. For the next two or three months the vision frequently becomes a little sharper, but then it gradually and steadily declines, so that S. as high as $\frac{2}{80}$ or $\frac{3}{80}$ in the sixth week may be reduced to $\frac{2}{80}$ and even $\frac{1}{80}$, without any subsequent inflammation, but simply by dotting, thickening and wrinkling of the capsule. This course has been the rule, not only in my own operations, but also in those of other operators, so far as their patients have come to my notice.

Excepted from this rule are: 1. Those cases in which the lens has been removed in its capsule. 2. Those in which secondary capsulotomy has been made. 3. A moderate number of those in which a part of the anterior capsule has been removed. 4. A small number of those in which the center of the anterior capsule has been extensively lacerated during the extraction. Having watched these results in hundreds of cases, I have made for the majority of cases the early secondary discission of the capsule an integral

passing the needle in different directions through the anterior chamber without letting aqueous humor escape. The operation can be done only under artificial focal illumination.

The needle is commonly introduced at the temporal side of the cornea 2 or 3 mm. from the margin, then its point transfixes the capsule at the inner margin of the dilated pupil. The capsule is first cut horizontally across. Then the needle is passed in front of the lower segment of the capsule, transfixes it near the lower margin of the pupil and slits it by an upward incision. Then the needle is passed before the upper segment of the capsule, which is transfixed at the upper pupillary margin and cut by a downward incision. This is the typical form of secondary capsulotomy, and gives a large and free pupil. Many modifications of this type are needed, for the manner of splitting must be suited to the peculiarities of the case. Each case is a study for itself. We must select the thinnest places, those that offer the least resistance, for the splitting, under all conditions avoid dragging fibrous bands to and fro. A T-shaped incision answers the purpose frequently, a curved incision, passing around a dense part, is often sufficient, but a linear straight incision commonly closes again. We should not thrust the little knife more deeply into the vitreous than is necessary to make clean and sufficiently extensive cuts. Avoid deep ploughing of the vitreous, for there is a dark side in this operation, the importance of which I have learned of late only. I mean the occurrence of glaucoma after secondary discission of the capsule. In the April number of the *Archives of Ophthalmology* of 1892, p. 293, I published ten cases from my own practice. Sometimes the first day after the discission, sometimes a few days later, acute glaucoma breaks out, the eye grows painful, red, hard, and rapidly loses sight. Myotics relieve the symptoms, but control only mild forms of the disease. The others have all been cured by a prompt iridectomy. In all, the anterior chamber was filled with vitreous, and this seems to be the permanent condition when the opening in the capsule does not close again or some thin hyaline membrane is formed.

In evidence of this I may mention the case of a gentle-

Figure 10.

Figure 11.

step, the final act of the operation. Experience has taught me that the easiest and neatest performance, the smoothest recovery and the best permanent visual results may be expected, 1. If the pupillary area is free from products of inflammation. 2. If the secondary changes in the capsule are not too old. 3. If these changes have not yet begun, *i. e.*, during the first weeks or months after the extraction. For years I have practiced the early secondary discission of the capsule as a rule. The results have been so satisfactory that I continue the operation without any material change.

The secondary discission is made with a knife-needle, the stem of which is so proportioned to the size of the little knife that it stops the opening, admits of

man who had been operated on twenty years ago, by repeated discissions of a congenital cataract by the late Dr. C. R. Agnew. In one eye detachment of the retina had followed, in the other there was a round black pupil, increase of tension, glaucomatous excavation, gradual impairment of sight, contraction of the naso-frontal part of the visual field, and some floating opacities of the vitreous. S. 20-50. In this condition he was sent to me by a colleague who had just received and read the above publication. I made an iridectomy with a lance-shaped knife. Immediately after the corneal section healthy vitreous escaped, through which I introduced Tyrell's blunt hook, drew the iris out and cut it. Finding that only the inner half of the iris had been excised, I at once introduced the hook again, drew the outer half out and cut it close to the sclerotic. Recovery prompt and good.

This has also been the method in other cases, with the difference that our introduction of the hook

brought the iris out to the periphery. To try to grasp the iris in aphakial eyes with a pair of forceps is commonly unsuccessful. The iris recedes at the first pressure.

Messrs. Geo. Tiemann & Co., New York, have put all the instruments I use for primary and secondary cataract in a neat little case, which is very handy.

Figure 12.

STATISTICS.

I have published detailed accounts of the first 300 cases of simple extraction. (See *Arch. of Ophth.*, xvii, p. 91; xviii, p. 1; xix, p. 280.) The results were unusually satisfactory, viz.: good in 94½ per cent.; moderate in 4½ per cent.; failure in 1 per cent. I desire to mention that the unpromising cases were not related to the combined operation, but that the iridectomy was made only for special indications in which a manifest tendency to prolapse (on account of conditions lying in the eye, or created by the operation, too peripheral section, and the like) was the most frequent. Among the intercurrent 37 combined operations, i. e., 11 per cent. of the whole number, there was no failure. Doubts have been expressed as to the reliability of such statistics, which means that the veracity or the sober judgment of the author is put in question. If we give the reader the data to verify our statistics, he may come forward and show our mistakes, or if he thinks our conclusions are too rosy, let him frankly utter his belief that we have been too enthusiastic. In my reports, as well as in those of several institutions, for instance, the New York Eye and Ear Infirmary, the Massachusetts Charitable Eye and Ear Infirmary, the Birmingham and Manchester Ophthalmic Hospitals, the cases are reported in tabular arrangement, with name and address of the patients. If in such publications no case is omitted, for what further evidence do the doubters ask?

We all know the fallacy of statistics unless the numbers are so great as to exclude the important element of chance. In presenting to you the results of the last 346 extractions, you will find that they have been less favorable than the first series of 327. Taking the two series together, we shall arrive nearer to the truth than by considering either alone.

A. UNCOMPLICATED CATARACTS, 301. LAST SERIES, 346 CASES.

Operated according to the simple method as above detailed.—Total, 257 cases: result good 227; moderate 28; failure 2; prolapse of iris 19. Secondary discission made in 163.

Simple extraction with removal of anterior capsule.—Total, 19. Good 13; moderate 5; failure 1. Discission 5; prolapse of iris 3.

Combined extraction.—Total 23. Good 18; moderate 4; failure 1. Discission 16; incarceration of iris 1.

After preliminary iridectomy.—Total 2. Good 2; discission 1.

B. COMPLICATED CATARACTS, 45.

Simple extraction. Total 33. Good 23; moderate 4; failure 6. Included in these figures are two temporarily good eyes, healing and vision good. Detachment of retina in old highly myopic eyes, occurring months after the operation. Discission 6; prolapse of iris 1.

Combined extraction.—Total 10. Good 8; moderate 1; failure 1. Discission 5.

After preliminary iridectomy.—Total 2; moderate 2.

Suppressing the decimals we obtain from the above (241 good, 44 moderate results and 11 failures);

84 per cent. good results; 13 per cent. moderate results, and 3 per cent. of failure.

Out of the 37 extractions with iridectomy, 2 were failures. 37 is too small a number to draw comparisons from. If we add the rate of success in the first 300 cases of simple extraction to these here reported we obtain: 89 per cent. good; 9 per cent. moderate results and 2 per cent. of failure. This outcome is still very satisfactory, showing that in 683 successive cases of cataract (the complicated included) in which the combined operation was performed in only 10 per cent. no more than 2 per cent. of failure had to be recorded.

In conclusion, Mr. President, let me say that in cultivating the operations for cataract *I have endeavored in the first place to operate as safely as possible, and in the second place to obtain the greatest acuteness of vision compatible with the safest method of operation.*

Discussion.

Dr. Julian J. Chisolm, Baltimore:—We are so accustomed, and I think properly, to look to Dr. Knapp for advice, that we always note his suggestions and frequently act upon them. I think that the profession as well as the public who are interested factors in blindness, are to be congratulated on the decided changes, which, according to Dr. Knapp's remarks, he has made in the after treatment of cataract cases. He now allows his patients to get up and walk to their beds with the eyes unbandaged. That seems to be a marked change from his former practice. He also releases the eye not operated upon on the second day which is an immense change from the former eight days of bandaging. He also covers the eye much more lightly. This is also a great advantage. I think that the profession in later years has found that excessive restraint is not an essential part of a successful cataract treatment, and that we may allow our patients a great deal more latitude in movement than formerly. He says that it is essential to keep the patients at rest for twenty-four hours, but that after the first day has passed it is not so important, and that he then allows the use of the second eye for certain purposes. Dr. Knapp notes nineteen prolapses in his last series. Before leaving Baltimore, I had occasion to look over my records for the last year as regards the number of cases of prolapse. In my patients, the eye operated upon is closed by adhesive strap or bandage while on the table and the patient is then allowed to walk to his bed with the good eye, if he has one. This eye is never bandaged. While it may be the patient's pleasure to remain quiet, they have no occasion to go to bed unless they desire to. They sit up from the time of the operation and take their regular meals with a liberty and a liberality which, if not injurious, and my experience has so proved it, is a great luxury to the individual. I have found that I have not more than nine per cent. of prolapses. Dr. Knapp has had about seven per cent. As is well known, I have gone further than Dr. Knapp has yet attained. I do not see the necessity of excluding light from any of my

patients. In over five hundred cases treated in the past five years I have allowed all these privileges of unrestraint to cataract patients and have had no occasion to regret it. The day will come when we shall find less need to restrict patients after cataract operations, and at the same time we shall not diminish the good results that all of us are so anxious to obtain. It was satisfactory to me in urging non-restraint practice, to find that Schweigger, who keeps his patients absolutely quiet, reports hernial troubles in seven per cent. He has, therefore, not gained much by his excessive care of keeping his patients on their back in bed. As to the removal of the hernia afterwards, I have been in the habit of excising those that I found. In the small prolapses, I have discarded excision and leave their disappearance to nature.

As to the dangers of extracting the anterior part of the capsule which I have done quite extensively of late, I find that whilst I secure a central pupil, posterior adhesions are not uncommon and that full dilatation under atropia does not constantly occur. I have however, found no detriment from this condition. The patients see well and continue to see well. I have not found that the adhesions led to any subsequent inflammatory trouble. I am still disposed to believe that if we can succeed in extracting the larger part of the anterior capsule by forceps, we avoid that second operation of cystotomy, which simple as it may seem, necessitates retaining the patients under treatment longer than they desire.

I am particularly gratified to find that Dr. Knapp has recently relinquished a great deal of the restraint which he formerly considered essential in the after treatment of cataract operations.

Dr. L. Webster Fox, Philadelphia:—It may not be inappropriate to bring to the notice of the members of the Association fine specimens of black cataract removed from three patients.

Case 1.—Female, age 50, gave the following history. In 1876 she gave birth to twins and immediately afterwards it was found that her vision grew dim, so that in six weeks the patient was not able to count fingers at arm's length. The cataract was removed May 11, 1890. The ordinary method was followed, with iridectomy, and the eye did well for three months, when a thickening of the capsule took place. The patient, during the period of her blindness, developed a high degree of convergent strabismus. On June 27, an operation was performed on both internal recti muscles and the eyes became straight.

By December the capsule in the left eye became so dense that vision fell to about 10-200. Having had no inflammatory reaction after the first operation, I obtained the consent of the patient to removed the lens of the right eye, which I did December 7. The operation was followed by satisfactory results. The following formula, cyl. +6 ax. 180° $\subset$ cyl. -3, ax. 90 gave 20-70, and with a sph. +3 extra front J. 8, was read. These glasses were worn until June 21, 1891, when another examination was made on account of a loss of the visual acuity. This formula was as follows: Sph. -1. cyl. +6 ax. 5° , two letters of 20-30 and with an extra front of sph. +2 added J. 8 was read. The patient was examined in April of this year and no change was found in her vision. The thickened capsule still the same in the left eye. After the second operation erythropsia developed and continued for six months, when it gradually faded away and the eye has since remained normal to light sense.

Case 2.—Male, 61 years, was examined January 11, 1891, with the following history: The right eye was removed early in life on account of dropsy of the globe, by a physician in Boston. The left was always myopic to a high degree, but the patient was able to follow his occupation, book-binder, until April 13, 1880, when he suddenly lost his sight. He could not give a clear history of the trouble other than the sight grew bad and the cause was attributed to cataract. His family history was irrelevant. On January 25 I removed the cataract by the simple method; the only complication was a slight loss of vitreous which was highly fluid. The movement of the hand could be easily noticed after the operation. The eye did well until the night of the third day, when a sudden discharge of phosphene took place in the eye, which so alarmed the patient that he suddenly sprang from his bed; his nurse had difficulty in quieting him, an opiate was necessary to lessen pain. Early the next morning I found the eye ball very painful, high tension and vision gone. An intra-ocular hæmorrhage had taken place. Antiphlogistic treatment was resorted to, but the eye went from bad to worse and later the eye ball was removed to

alleviate pain. Upon opening it I found complete detachment of the retina and a blood clot.

Case 3.—Female, age 61. Was not able to discern objects at a distance, high myopia, and during the last five years was practically blind. Upon examination I found double cataracts, both deeply pigmented but somewhat brownish in the centre. On June 21, 1891, I removed the lens (iridectomy) and the eye did well. Six weeks later an irido-cyclitis developed and the sight was lost. On November 8, 1890, I performed the simple method on the right eye and the result has been fairly satisfactory since. The patient has an acuity of vision equal to 20-100 with the best glasses. The specimens from the last patient are particularly interesting as they show the nucleus almost black while the cortical substance is translucent or almost white. These specimens have been preserved in a solution of boroglyceride. I shall have a chemist make an examination of these specimens and see whether any light can be thrown as to the causation of this pigmentation.

Dr. George E. Frothingham, Detroit:—This subject is one of great importance and I have been much interested in this paper. The statistics of Dr. Knapp show a very decided improvement over the statistics of former operations, but we all know that Dr. Knapp is a skilful operator, and in the reports of cases of simple extraction by many operators, the successes have been less numerous than in Dr. Knapp's cases. I remember looking over the report of Schweigger; there were 4.4 per cent. reported as absolute loss, and 19 per cent. of secondary cataract not reported as regards the results of the second operation. 76 per cent. only were reported as successful; and in the other reports, I have found that the percentage of successes was not better than in the operation of von Graefe. I have given some attention to this subject and have made a modified linear operation. I first extracted with the Beer knife. Soon afterwards, the downward operation with the narrow knife was published. It was claimed to be as simple as couching, as perfect as the flap and as safe as the modified operation, and the suggestion was made that the operation might be done upwards. I published in 1874, an operation with the narrow knife very similar to, if not identical with, the simple operation. I entered the knife a little back of the clear margin of the cornea aiming to bring the apex within the clear margin of the cornea. I at first met with success, but I regret to say that I afterwards had to abandon it on account of the bad results which I had. I found that without iridectomy, there were the same difficulties in evacuating the lens as in the old flap operation. I found, however, the chief objection to be prolapse of the iris. This occurred in about ten per cent. of the cases and occurred as late as the fifth day, and some of the cases were very troublesome. I do not remember an eye that was absolutely lost.

Unless we can see these cases of prolapse early and replace them, we can do little. The eye which has been subjected to traumatism, bears illy another operation. As Dr. Knapp has declared, between the third and the tenth day we are debarred from operating on account of the increased danger. We must operate early or wait a long time and then inflammatory products have complicated so that I consider this one of the most serious complications with which we have to deal. I notice from Schweigger's report that he has 8.2 per cent. of prolapse and Dr. Knapp in 509 cases reports 42 cases of prolapse. We have therefore between eight and ten per cent. of prolapsed iris in this operation.

The question of sufficient vision is a very important one, and unless it can be shown that it gives a larger percentage of successful results we should be slow in adopting it.

In regard to the extraction of unripe cataracts by this method, my experience was that there was great difficulty in evacuating the lens thoroughly where the lens was immature and the cortex soft. We must have a lens that will slip through the iris, otherwise we cannot remove it except by traction instruments which cause bruising and stretching the iris, and result in complications such as iritis and plugging of the pupil with lens matter and inflammatory products.

My reason for iridectomy is that we can extract the lens through a smaller corneal incision. I believe that that will be generally admitted. It is a principle of general surgery that the larger the incision, the greater the traumatism and the less the likelihood of recovery. An incision of one-half the cornea is more dangerous and less likely to be kept in position than one not so large. Any of us who have made iridectomy with a small triangular knife know how impossible it is to displace the lips of the wound. The larger corneal incision endangers the continued coaptation of the

would long enough for primary union to take place. That is the reason for the iridectomy. I must admit that the traumatism of iridectomy is most grave. It remains to be shown that we increase the traumatism more by iridectomy than by an increased extent of corneal incision. Until that is shown, I think that the smaller corneal incision is based upon proper principles of surgery. It will take a vast time and much experience to establish the fact that an incision involving one-half the cornea is as safe as a smaller one. Four or five hundred or even a thousand cases are not enough to establish it.

Dr. Henry D. Noyes, New York:—I think that I am bound to say something in regard to the attempt to cure cataract by medication or anything else than extraction, for this matter is in the air. It exists in New York and has cropped out here. I may simply say that it is my firm belief after an observation of many years, that these cases of improvement in vision, which it is true do present themselves, are founded upon the fact that there is a healthier condition of the eye and of the patient; and furthermore, that a careful examination of the natural history, development and progress of cataract, will convince any one that there are various stages through which it passes, with corresponding changes in vision. At first cataract may be attended with opacities of the vitreous which may clear up, permit improved sight. What is still more important is, to discriminate the particular variety of cataract with which one has to deal. There are forms which may remain stationary for twenty years. There is a gentleman, a distinguished member of this Association to whom I said in 1884 that he was beginning to have cataract. I also told him that he would never lose his sight or the vision which as a surgeon he must possess. He still remains in the condition he was eight years ago. This assumption that galvanism, external applications, manipulations, massage, instillations of boro-glyceride, etc., can have any effect in improving the vision is founded upon insufficient evidence, and the mistake is extremely probable of supposing an improvement from natural causes to be the result of treatment.

In regard to operations for cataract, I do not propose to take up unnecessary time, but I have been learning from year to year and I have come to the conclusion that simple extraction is *a priori* the extraction that ought to be done. The question I think stands in this position, that those who do iridectomy ought to give a reason to justify it, because they mutilate the eye. I am free to admit that the visual result may be as good with as without iridectomy, but I am in a position to assert that the man who does iridectomy must give a satisfactory reason for the iridectomy.

In the second place, I am perfectly convinced that the essential thing in the extraction of cataract is not so much the precise position of the incision, although I believe that the limbus is the proper place, but it must be an ample incision involving close upon one-half of the cornea, I want one-tenth less than one-half. The diameter of the lens then makes no stretching of the corneal tissues. It is on this that the subsequent removal of soft matter depends and rapid healing of the wound may be predicated. I have grown a great deal more bold with the iris than formerly. I am not afraid to push it back with a sterilized spatula with great care, and remove soft matter. I recognize the value of manipulation of the lower lid. A little trick which is of value is to allow the aqueous humor to collect and then open the eye and allow the aqueous humor to remove the debris. I have discarded all attempts at irrigation of the anterior chamber, neither do I introduce a syringe; I occasionally employ external irrigation, injecting fluid against the wound. Cleansing of the anterior chamber is of the highest importance. The removal of the blood and softened lens substance which remains in the lips of the wound is best accomplished by a pledget of cotton moistened with a 1-5000 bi-chloride solution. With this the eye ball is swept off and the cotton can be passed over the edges of the wound and it brings substances out of the anterior chamber both by its direct action and by its capillary attraction.

The opening in the capsule, I am not in the habit of making as Dr. Knapp does. I make it through the centre of the pupil and large, but I recognize the value of the cystome which he has demonstrated.

As to the dressing of the eye. I do not confine my patients with the rigor which formerly prevailed. I think that I have learned another thing and that is that the tendency to prolapse is largely produced by the pressure of the bandage. I think that favors prolapse. The attempt to tightly shut up the eye excites irritation and resistance on the part

of the patient. As a dressing I apply a bandage more commonly of loose material with a small amount of cotton. This is often moistened with a solution of the bichloride to prevent the secretions from concreting and causing adhesions of the lids. This adhesion of the lids is one of the causes of irritation and causes the patient to make spontaneous efforts for his own relief. The prolapse of the iris is not so difficult of explanation. It depends upon three factors chiefly: First any rudeness in the operation itself giving rise to undue reaction, making the eye sensitive and preventing prompt adhesion of the wound. Second, and chiefly, the prolapse is produced by the efforts of the patient himself in his vigorous but unconscious efforts to keep the eye still. This may be brought about by the traction of the recti or the pressure of the orbicularis muscle. Thirdly, the prolapse may come from the accidental contact of the eye with the finger of the patient as he moves in bed. I think that the causes of prolapse may almost entirely be classed under the head of traumatism either from within or without. The reason that I still adhere to the bandage is because I consider the protection of the eye for the first two nights as an important safe-guard against accident. In the case of women where the bandage is troublesome on account of the hair, I sometimes use strips of india-rubber plaster with cotton beneath, but I am satisfied that undue pressure with the bandage is one of the favoring causes of prolapse. Furthermore, as to eserine or anything dropped into the eye, I have abandoned that. I am more apt to use atropia at the end of twenty-four hours, always at the end of forty-eight hours.

As to the capsule:—If there be any need for secondary capsulotomy, it is deferred until the second or third month, but I am perfectly ready to agree with Dr. Knapp in saying that capsulotomy is not always the simple operation which its ease of performance would indicate. I have seen it set up a most serious plastic irido-cyclitis, and early in my career I was made excessively cautious in doing this because of some sad experiences with irido-cyclitis and subsequent atrophy of the globe. Capsulotomy as described by Knapp is very beautifully conceived and admirably done at his hands, but there is another thing to be mentioned. We have inherited a fear of piercing the eye ball through the ciliary region but I think that in some respects we have grown too cautious about it. Within the last few years in occasional instances, where I had a thick capsule to deal with which one needle thrust through the cornea would not satisfactorily open, or which two needles passed through the cornea would not open, I have overcome the difficulty by passing a long double edged needle through the sclera and reached the pupillary area from behind, and although there is a little hæmorrhage, I have been surprised to find the reaction so insignificant. With the long lever thus afforded you can make a satisfactory opening which it is often impossible to do by any mode of procedure through the cornea. I have even passed one needle through the cornea and another long needle with double cutting edge through the sclera, in some difficult cases and attained success.

Dr. Eugene Smith, of Detroit:—Dr. Knapp has spoken of my forceps. I have brought with me several pairs that they might be seen. It is the forceps of Knapp with the exception of the dropping of the teeth. Finding it necessary to have the teeth project downward and backward to grasp the capsule, I had them made in that way. As that causes a little awkwardness in the introduction of the forceps, I have come to the conclusion that these teeth may be placed in a perfect plane. I have had an experience with thirty or forty cases and have yet to fail in extracting a piece of the capsule or in not so thoroughly rupturing the capsule as to prevent so far, every necessity for subsequent decision; I am fond of removing the anterior capsule.

My dressing is essentially the same as Dr. Knapp's. It appears to me that those who advocate iridectomy hold that in order to get the lens out, you have to tilt it on its axis into the anterior chamber. Those of us who practice simple incision know that in the majority of cases this is not so, the iris slides up into the incision, the pupillary space corresponds with the incision in the cornea, the lens slides through and the iris drops back into the anterior chamber.

In regard to Schweigger's statistics I would say that they are different in his hospital and private practice. His percentage of successes is larger in private practice. Those who have visited his hospital know what some of his cases are.

I agree with Dr. Noyes in regard to what he has so well said in reference to our fear of the iris. I do not hesitate to return the iris forcibly, within reason, with a spatula and to

repeat this two or three times if there is a tendency to prolapse. I do not hesitate to drop a solution of eserine, one grain to the ounce on the prolapsed iris. I have yet to see any untoward result follow these procedures. Of course I prefer not to do it. I have frequently followed the suggestion of Dr. Knapp, although I have not used the probe. I have taken the point of the spatula and rolled the periphery of the iris from beneath the limbus, and at the same time I try to remove any little fragments of cortical substance from the wound.

As far as the results from extraction of the capsule are concerned, I think that they compare favorably with those of other operations. If there is any little remnant present, I do not wash it out. I do not find a slight degree of simple iritis of any importance except occasioning a slightly prolonged retention of the patient. I escape it in a large proportion of the cases. As far as adhesions of the capsule are concerned, I have no doubt that in this operation we get them more frequently than we know anything about but the ordinary degrees of contraction and dilatation of the pupil under the natural influences of light is so small that in a large proportion of cases there is no teasing of the iris. If there be moderate adhesion, I do not think that it is as important as the danger of subsequent decision in many cases. That we may have to incise the posterior capsule, is well known.

Dr. X. C. Scott:—In regard to one of the cases reported as benefited under medicinal treatment, I would say that I saw the case a year ago. One eye was almost obscured by cataract and the other eye was very defective. The patient also informed me that there had been a gradual increase of the defective vision from the time it began to fail.

Dr. J. E. Minney, Topeka, Kan.:—I think that the simple operation requires more manual dexterity than where iridectomy is done. I have had one case in which prolapse occurred on the third or fourth day, and as Dr. Knapp has suggested, I allowed it to remain. The man's vision is excellent, but I am in constant dread of trouble.

I would take exception to one remark of Dr. Noyes in regard to iridectomy. When a man is called to a patient and does not prescribe any drug, he is expected to give a reason for not doing so. I do not think that the burden of proof rests upon those who do iridectomy, but upon those who do not do it.

Dr. B. Alexander Randall, Philadelphia:—If one must give a reason for continuing to do iridectomy, many of us will have to give as one reason, lack of that skill which comes from a large number of operations. Therefore I continue to do iridectomy.

In regard to the medicinal treatment of cataract, I have had some experience with my friend Dr. Risley, and have also myself followed a series of cases, not very large but distinct, where the swelling of the lens and the deterioration of vision was evident, and where I had myself seen the spicules encroach further upon the pupillary space. Yet I have seen such advancing conditions take on a retrograde change, the vitreous clear, the vision improve, and the lens, if not becoming more clear, certainly growing no more opaque nor swollen and productive of a fictitious myopia; and for a term of years this improvement has remained under treatment of a medicinal character.

Dr. Samuel D. Risley:—I think that the criticism of Dr. Erwin's paper grows out of the fact that he has not reported his cases fully. He has left the impression that the cataracts were cured, which I doubt very much if he intended to do. Some time ago I published a long series of carefully studied cases of incipients, some of which I had followed for ten or twelve years, and last year read a second paper on the same subject before the Section. Dr. Noyes' remarks accord with my own experience. These cases must be placed in two classes. I have watched the opaque masses in the periphery for a long time and there has been no increase. We are all familiar with this large group. The claim which I made in my paper of last year was that the typical cataract was, in a large number of cases, not justly regarded as a senile change, but was the result of impaired nutrition of the eye, and that if the change were due to this cause, by improving the health of the eye by wisely directed treatment, we might retard the onward progress of the opacity of the lens. This experience has demonstrated the possibility of doing in a certain number of cases. Quite a large percentage of the cases reported went on to maturity, but many were retarded and still enjoy useful vision. There is one other point in favor of the treatment of incipient cataract, and that is, even if the onward progress is not arrested by the treatment, the eyeball is healthier and better able to withstand

the trials of operation. I therefore feel that there is a field for study in this direction, and one which we should not altogether ignore. I wish to reiterate, however, that while I have again and again seen the anterior chamber grow deeper as the swelling of the lens subsided in incipient cataract, I have never witnessed the slightest diminution in any spicule of opacity in the lens under any method of treatment.

Dr. A. J. Erwin, Mansfield, O.:—You have doubtless observed that I do not suggest medication as a substitute for surgical interference in mature cataract. My distinct proposition is this, that where the existing vision is equal to the average vision that we get after extraction, it is better, all things considered, to save the lens with the vision as long as possible, for the reason that you not only save the patient the anxiety and distress of the operation, but also the risks that necessarily attend operations. Furthermore, there are many cases that could not be safely operated if ripe, and many others advance so slowly that the patient would be kept in comparative blindness for many years before an operation could be made. True, by medication the hundreds are not made by one fell swoop, as it were, like we do in extraction. Such treatment as I suggest takes time and work, but in our profession that should not be an objection. But the great obstacle to medication in cataract is the all-pervading surgery fad, and then it is so brilliant and so courageous to be a surgeon that one likes to forget all other therapeutic measures. I doubt, therefore, whether our more eminent oculists have either the time or inclination to give incipient cataract that long continued, attentive treatment as suggested in my paper, necessary to stop the advance of the disease. In answer to the criticism of an illustrious compeer from New York, whose book we read and whom we delight to follow, it is only necessary to say that he has, in his remarks, adopted the illogical method of thrusting an opinion upon this Society as a climax, after acknowledging that he had no experience in the medication of cataract. It is entirely gratuitous for any man to say that this or that therapeutic measure is worthless, unless he has carefully and persistently tried it. In the science of medicine the time is past when any man's opinion has either weight or value unless based upon observed facts. Hypothesis is nothing, opinion is nothing; facts alone count now.

I am glad my friend from Cleveland had the opportunity of examining Mr. Swineford, one of the cases in my report, five months later than my last examination. He has just informed me that the vision of his right eye was still good, but that he was nearly blind of the left, though not ripe, well, 2-200, as in my report, is probably about what he found. I do not pretend to say that these cases are permanently cured, or rather permanently checked, nor do I know that this treatment will permanently arrest the advance of cataract in any case; but I do believe that nearly all cases of incipient cataract can be arrested for at least a few years, and in many cases to the end of the lifetime of the individual, by these measures.

Dr. H. Knapp, of New York:—In regard to discarding the bandage and restraint, I think that Dr. Chisolm will agree with me that rest is one of the prime factors in obtaining primary union, so that it is merely a matter of compromise between the old roller bandage and other appliances for securing greater rest for the eye. If we could have secured greater rest with the roller bandage I should have kept it, but it was necessity that led me to the abandonment of this cumbersome dressing. In Heidelberg, I had little trouble in keeping the roller bandage on my patients. It seems that nationality has something to do with it. Put a roller bandage on the eyes of a restless patient in a New York summer, the next morning you will find it over the ears. This is worse than no bandage. In summer I use the simple bandage of which I have spoken. This gives me occasion to mention an appliance which has been used in Vienna for many years and advocated also in this country as a protection of the eye from traumatism. It consists in a mask of metal wire placed over the eye. The objection is that the wire moves with the roller and the stiff corner of the mask gets into the corner of the eye, doing more mischief than good.

So it is with the roller bandage—good in principle, unreliable in execution.

Another thing of which I want to speak is why I and many others, have abandoned iridectomy as a rule. Iridectomy is certainly advisable in a number of cases, preventing accidents that are worse than the enlargement of the pupil. I must say that I might have done more iridectomies than I have done—ten per cent. Dr. Chisolm says in advocacy of

his isinglass plaster that he has no greater number of cases of prolapse, but in his last report there are thirty-three per cent. of iridectomies. The iris which is cut away, cannot prolapse. The number of intercurrent iridectomies in the simple operation must come into consideration.

Dr. J. J. Chisolm, Baltimore:—The report to which Dr. Knapp refers is a hospital report in which are included cases done by my assistants and they do iridectomies. The hospital report does not refer to my individual cases.

Dr. H. Knapp, of New York:—The danger in the simple operation comes from the prolapse of the iris, as it does in the combined operation and the danger from prolapse in the combined operation (the angular incarcerations) according to my experience is greater than the prolapse in the simple operation. Since I abandoned iridectomy, I have seen much less iritis, irido-cyclitis and other complications than before. Simple extraction is, I think, the safest operation and that is its principal claim. When I examine eyes on which extraction with iridectomy has been done by myself or others, I find incarceration of the iris in the corners not so rarely and incarceration of the capsule in the majority of cases. This leads to many reactive processes including sympathetic ophthalmia.

I never cut a prolapse, whether spontaneous or traumatic, unless I get it fresh. If there is blenorrhœa or another infective process, it is criminal to cut a prolapse, as this opens a door for the entrance of germs into the interior. These are only the immediate results of cutting the iris, but the later ones are just as deleterious. In the series of one thousand combined operations which I have reported, there were two or three cases of late suppuration following incarcerated iris. In some cases the incarceration was so small that it could not be seen. As a result of exposure there was purulent iritis and ophthalmitis in eyes that had been quiet for years. Such cases are well known. The danger from immediate prolapse of the iris is greater when the iris is cut than when it is left untouched. Some years ago while engaged in experiments with infective germs, I injected pyogenic cocci into the anterior chamber of rabbits. On examination of these eyes I found the cornea was full of germs, but the iris almost free from them. The iris protects the deeper parts. This fact may serve as a rule for guidance, that we should make an iridectomy only when the eye is still aseptic. Otherwise it is better to postpone the operation until all inflammatory irritation past.

The occurrence of prolapse is chiefly due to two things. The one is *traumatism*. In fifty per cent. of the cases there is a direct history of hurt or blood in the anterior chamber to indicate that the part had been injured. The second cause is a *peripheral section*. The introduction of excision of the iris was not the result of scientific thinking. Iridectomy was made because its originators could not help it. A large peripheral incision without iridectomy is impossible. This is not so when the section is placed in the limbus. As we cannot always be accurate, let us rather encroach upon the cornea than on the sclerotic. On the whole the subject is certainly one that still requires careful study and prolonged experience.

DOUBLE CONGENITAL DISLOCATION OF THE LENS.

Read in the Section of Ophthalmology, at the Forty-third Annual Meeting of the American Medical Association, held at Detroit, Mich., June, 1892.

BY GEORGE FRIEBIS, M.D.,
OF PHILADELPHIA.

On Jan. 3, of this year, the Rev. Dr. B. of Philadelphia, brought his son Walter, now 7 years of age, to me desiring that something be done to improve his sight; stating that for some time past both he and the teacher had noticed that the boy had great difficulty in clearly defining objects, which were easily distinguished by other pupils of his class, at a reasonable distance from him, nor could he well define small letters at the usual reading distance. The examination revealed the rare condition known as congenital dislocation of the lenses; and in this instance the dislocation was symmetrical. I have the honor to show you an excellent drawing, made by Dr. J. Madison Taylor, of Philadelphia, illustrating the conditions. The lens in each eye was tilted upward, slightly backward and inward. The iris was responsive to light stimulation and only on close scrutiny could a slight tremulousness of the same, in the inferior, outer quadrant

be detected. The fundus viewed by both the direct and indirect methods showed the curious phenomenon of aphakia with myopic refraction in both eyes. The lower periphery of the upward dislocated lens appeared as an irregularly marked black line. The fibres of the zone of Zinn, described by some observers upon the subject, as clearly discernible in the aphakial interspace, were absent in this case. Owing to the child's unsteadiness it was impossible to measure with accuracy the degree of refraction either of the lens or aphakial portion of the eye. I confess to have been slightly puzzled by the appearance of the lens, viewed by oblique illumination, deeming it at first glance, because of the strong grayish reflex of the lens, though entirely transparent by other methods of examination, a form of congenital cataract. The vitreous body and fundus were normal; the tension likewise. The test for vision in the R. E. = 15-70, L. E. 15-50 imperfectly; a manifest refraction at this time, which was rather hurriedly performed, gave a negative result. Upon a subsequent occasion, the pupils being dilated by atropine, I thoroughly tested his vision with different combinations, sphericals, cylinders and spherocylinders + and - which would be too wearisome to enumerate; I found the following formula gave the best results. R. E. S. -1 = cyl. -1 ax. 180 = 15-70 clearly, but in a moment he would again lose certain letters in the line. L. E. S. -1 = 15-50 perfectly but as in the R. E. he could not hold the line satisfactorily. A few weeks later on, I again tested his refraction without mydriatic or glasses. At this time vision for distance in the R. E. = 15-70, L. E. 15-50 imperfectly, these tests proving conclusively that the child was also amblyopic; a usual concomitant of congenital dislocation. Vision for reading was not improved by glasses in the slightest degree. In fact vision for small letters at about 8 inches was slightly better without glasses and he defined letters Snellen 1 at 8 to 10 inches fairly well, but had to search for them, this showing an amplitude of about 2 inches in each eye and that accommodation was not entirely abolished. Glasses were not prescribed. The field was tested and found to be normal; the color sense was unimpaired. Diplopia usually present and demonstrable in many cases of this character could not on account of the youth of the patient and some mental obtuseness be established.

In passing I would state, that Dr. Chas. S. Turnbull also saw this little patient with me but by no method of examination could we detect any other structural changes than those already mentioned. Both parents are healthy and have a family of nine children, all of whom have excellent vision. As some observers hold that congenital dislocation is largely due to heredity and that consanguinity often plays an important part in its causation, I closely questioned the father, a very intelligent man, as to his family history. I could not obtain a satisfactory answer confirmatory of his theory, but he stated that he had no definite knowledge of any hereditary tendencies in his wife's family. The late Dr. Wm. S. Little of Philadelphia, reported at the 19th meeting of the A. O. Society two cases of congenital dislocations of the lens, one was non-symmetrical and the other symmetrical. The latter case occurring in the practice of Dr. Turnbull, by whose courtesy I am enabled to show you an additional cut representing a double inward dislocation. Although this cut was shown at the meeting of the American Ophthalmological Society in 1883, yet I deemed it of sufficient interest, by way of contrast with my own case, to bring it to the attention of this meeting. Both patients were likewise markedly amblyopic and in each instance refraction of the existing ametropia gave a useful degree of vision. In Dr. Turnbull's case the lenses were so far dislocated as to make the eyes almost aphakial, but by the use of cataract glasses useful vision was obtained. Dr. Turnbull's patient gave no history of malformations in any of the members of his family or near relatives, but had himself a highly vaulted roof of mouth. Dr. Little's patient said that he had a cousin similarly affected and that