much can be done to loosen or break them up entirely by the alternate use of atropia and eserine, thus leaving the eye less liable to recurring inflammatory attacks.

Of the methods and time for removal of traumatic cataract, it is not necessary to speak, as our object has been rather to point out or indicate the treatment of cases prior to the necessity of operative interference.

In old people the use of mydriatics must be watched much more carefully, for in these the development of glaucomatous symptoms is very much more to be feared, while on the other hand, the condition being so much less active in these patients, this source of annoyance becomes proportionately less, depending upon the age of the patient.

Discussion.

Dr. S. C. Ayres, Cincinnati, Ohio:—I have been much interested in the paper, and particularly with that portion which related to partial opacities of the lens. I have seen quite a number of these cases, and they have always excited my surprise and interest. We are taught to believe that injury of the lens capsule is certain to produce opacity of the lens, swelling and the consequent results. I have seen a number of cases in which there were limited opacities of the lens, and in which in all probability, foreign bodies had penetrated to the vitreous, and had left limited opacities in the lens and capsule. It is not easy to explain these cases. It serves to show the healing properties in the capsule, and it shows that very often it will close up when wounded.

Dr. Edward Jackson, Philadelphia:—I was much interested in that portion of the paper which referred to the retention of vision through an injured lens. I recall one case that came to me when 82 years of age. There was a history of an injury in boyhood. There was a scar on the cornea and corresponding portion of the iris and opacity of the corresponding quadrant of the lens in which there had probably been a penetrating wound. He said that vision had not deteriorated since immediately after the injury. I watched the case for eight years longer, and the other lens was becoming more opaque, but the changes in the injured eye were not more rapid.

Another case that I have seen within a year, was one that came with a history of injury and penetrating wound with immediate impairment of vision; then subsequent improvement, followed by deterioration commencing again within two or three weeks. In this case there had been, over a year before, a penetrating wound of the cornea and iris, and I have no doubt of the lens. When the patient first presented, the details of the fundus were so far veiled that only the larger vessels could be seen. Within a month the lens was entirely opaque. This case is quite similar to one mentioned by Dr. Millikin.

The most interesting case of this kind that I have seen is one now under observation. The patient is six years of age, and has double congenital dislocation of the lens. The lower margin of the lens coming back of the pupil, prevents anything like distinct vision. There were slight opacities in the lenses. I undertook to needle one of them. I needled it four times, the last two times very freely; and within two weeks, six weeks after the last needling, there is no general opacity of the lens. Twice I passed the needle entirely through the lens, and after the operation could see its track. That track almost entirely cleared up. Just at the point where the wound was made in the capsule, a little mass of opaque lens substance projected, and in the lower quadrant of the lens there is a marked notch showing there has been some absorption, but the mass of the lens still remains clear.

Dr. G. A. Aschman, Wheeling, W. Va.:—I was much interested in that part of the paper which showed that often there is little trouble after injury to the lens. I recently had under treatment a man 50 years of age, who had lost one eye several years before. He had a ripe cataract in the other eye with a history of injury. After the injury he noticed a decrease of vision in the eye and was treated by a physician for two weeks only, when he returned home without further trouble than a gradual loss of sight. I examined the cornea carefully and found a very slight scar and as he was at an age when we should expect senile cataract, I decided to operate. I made the extraction and found in the lens a very small particle of iron. The operation was done

six months after the injury, and as V. = 20-30 resulted, he was able to perform all work as well as ever.

Dr. Eugene Smith, Detroit:—I can bear out what has been said about punctured wounds of the lens occasionally clearing up without cataract or destruction of the lens. I have in mind two cases. A child ran a needle through the cornea penetrating the lens. Following this there was opacity about the size of the needle extending nearly through the lens. This entirely cleared up as did also the opening in the capsule. The child now has normal vision.

In the second case a piece of wire 1-24 of an inch in diameter was thrown across a room and struck a young lady in the eye. It went through the cornea and penetrated the lens. I expected that there would be a cataract. The opening healed up and in the course of one or two weeks the opacity disappeared. Vision is normal.

Dr. Lippincott, Pittsburg:—I have seen several cases in which injuries to the lens gave rise to very little permanent trouble. One was that of a young lady, who while chipping off the irregularities from the inside of a piece of pottery was struck with a minute piece of steel from the chisel. The foreign body, which was found lying upon the lens in the centre of the pupillary space, was removed with a Gruening's magnet. The ultimate result was normal vision.

In another case a spicule of copper about the thickness of a No. 5 sewing machine needle and three or four mm. long, had entered the anterior chamber and was found sticking in the lens substance near the edge of the pupil. The splinter was removed with a pair of smooth iris forceps through an incision at the corneal margin. A slight and sharply defined opacity of the lens remains, but fortunately it is not central, and the vision is as good as it was before the accident.

Dr. B. L. Millikin, Cleveland, Ohio:—The point in which I have been particularly interested is in regard to the after treatment, and the effect of atropia in paralyzing the accommodation in getting rid of the action of the ciliary muscle and what influence this has upon the after effects of these injuries. That is a point of a good deal of interest and it seems to me that in some of the cases where the amount of clearing up has been great, the atropia has been of great advantage by the complete rest which it has afforded. The point I wish to emphasize is the effect of absence of the accommodation in clearing up the lens matter after these injuries. Some of these cases have had extensive opacities and within a few days one half of the lens has become opaque. Within two or three weeks or less, the opacities have disappeared almost entirely so that the fundus could be made out. The question is whether or not if the mydriatic had been kept up for several weeks or months, it would not have effected a continuance of the clearing up of the lens, and it might not have remained clear.

EYE INJURIES CONSIDERED IN RELATION TO SYMPATHETIC AFFECTIONS.

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

BY T. E. MURRELL, M.D.,
OF LITTLE ROCK, ARK.

It is a difficult matter in many cases of recent injury to an eye to foretell the effect it will have on the fellow eye if it be not removed. There are numerous injuries that do not at first appear very serious, and there are good reasons for believing that not only may a good looking globe be preserved, but practical vision as well, which may finally prove very dangerous; while others that seem to doom the eye to sure destruction, as well as endanger the other eye, sometimes take a different course to our surprise.

We have had practical demonstrations of this in cases where our advice to remove the injured eye has met with refusal, and years afterward the person has been found still carrying it without the slightest trouble, much to his boasting and not much to our credit in his conception. Nevertheless, we know the slumbering dangers in these eye injuries that may awake after long years, and our boasting patient may yet come to grief. Injuries that threaten danger to

the fellow eye, may be divided into two general classes; those in which a foreign body lodges within the globe, and those in which the globe suffers violence from without.

Every one must at times be struck with the remarkable difference in tolerance of eyes to injuries, and it may be considered a fair rule to estimate the danger to the uninjured eye by the speediness and grade of the reaction in the injured eye. Yet we know that in these violent processes in which the entire uveal tract is speedily involved in suppuration there is less danger of sympathetic trouble than in the less severe and more insidious cases. The eye is peculiarly rebellious to the intrusion of a foreign body, and it is rare that such an occurrence does not only entirely destroy the eye thus entered, but finally leads to sympathetic involvement of the other eye. As is well known some portions of the eye are far more intolerant of the presence of foreign matter than others; this is peculiarly true of the ciliary body and the vitreous.

Just why the vitreous should be so ready to revolt at intrusion is hard to explain since it is not endowed with nerves or blood-vessels, but we know that the tiniest particle of matter lodged in it is almost certain, sooner or later, to be followed by severe reaction. Of course the injury done to other important parts, as iris, lens and ciliary body in its route to the vitreous, is to be considered, since reaction may first set up in them, but in many instances they escape and only the sclera and choroid are penetrated, which readily heal, and the reactionary process afterwards ensues in the vitreous. It is commonly believed at the present day that the reaction is the result of microbic infection introduced with the foreign body, or entering along its track from the conjunctival sac. If this be true, on what principle can we explain the want of reaction and final restoration of normal function with perhaps excellent vision when the foreign body, for instance a bit of steel, has been successfully removed with the electromagnet? Certainly all the germs are not brought away with the body; and the wound is greatly enlarged to introduce the magnet, thereby increasing the danger of invasion from without. Then again, observation shows that there is some property in the intruding body itself, perhaps of a chemical nature, that determines very largely the tolerance of the eye to its presence. In former years when percussion caps were used many accidents happened to eyes by fragments of the cap being driven into them on explosion. These injuries were singularly fatal, as my earlier experience verified by the necessity of the removal of many such eyes in gunners in the west. Now a piece of cap on the instant of explosion is at a very high temperature, sufficiently so to destroy any germs that might adhere to it, as I have seen severe burns from such a fragment when lodging in the conjunctiva or skin, and it enters the eye therefore aseptic. The same may be said of fragments of steel which oftentimes enter the eye at white heat and are soon followed by the most intense reaction and panophthalmitis. Is the danger to the fellow eye, then due to the transmission through lymph channels of pyogenous germs? This is a matter still in the hands of the pathologist. In the *Archives of Ophthalmology*, January number for this year, Dr. Poplawski reports the examination of twelve panophthalmitic eyes for microbes and found colonies in all, but they

were bacilli and not micrococci, the orthodox pus producers. Furthermore they were found, if the foreign body was lodged in the vitreous, developed immediately around it, and were not found in its track through iris, lens, or ciliary body. Nor have they been found in the sympathetically affected eye. But whether or not microbes are the agents by and through which sympathetic ophthalmitis is engendered in some cases, there are many in which they are not and cannot be.

Take the cases of sympathetic inflammation following ten, twenty, and even thirty years after the lodgment of a foreign body in an eye, and how can we explain them on the microbic theory? Certainly these ephemeral germs could not lie so long dormant to be suddenly awakened into activity. The other class of injuries which endanger the fellow eye are those in which some anterior portion of the uveal tract is involved. Any injury by which the iris or ciliary body or both, becomes entangled in a cicatrix and is dragged upon always contains the element of danger to the other eye. How soon or how late, or if ever, this may occur is a matter of conjecture. A cut or rupture in the sclero-corneal junction leaving a cicatrix is a well known menace to the opposite eye, and yet I have seen very ugly and extensive injuries in this region which had not been followed by any sympathetic trouble many years afterwards, and yet a small perforating ulcer near the margin of the cornea, into which the iris is dragged, I have known to eventually destroy the opposite eye through sympathetic inflammation. Any entanglement of iris or ciliary body causing traction and more or less constant irritation, is one of the greatest dangers to the integrity of the fellow eye. As has already been said, the most important question to both patient and surgeon in the early stage of a traumatism is as to the possible risk to the fellow eye. How often have we seen a rupture of the globe with prolapse of the vitreous or iris, under careful treatment heal without further trouble? And who will always condemn such an eye in the beginning, especially if no severe reaction is present or imminent?

A case in point will serve to illustrate the responsibilities that devolve upon the surgeon just here.

A colored man came to me just after an accident to his right eye. It had received a blow from a piece of wood causing a transverse rupture in the cornea extending partly into the sclera at the outer side. The iris was entangled in the wound and the pupil was obliterated. Under antisepsis and bandage the wound healed in a few days. At the end of two weeks the eye was clear, there was no tenderness or pain, and he had good light perception in all parts of the field. I decided to make an iridectomy for the purpose of restoring vision, and requested him to call again soon to have it done. Two weeks later he called complaining of pain in the left eye. To my surprise I found a mild plastic iritis. The right eye was now injected, tender to the touch, and had nearly lost light perception. I at once enucleated it, and found a cyclitis starting in the scleral end of the cicatrix. The other eye was carefully treated, and responded at first to atropine, and all looked favorable for a while, but a change for the worse took place after a couple of weeks, and in spite of all treatment it went into an iridocyclitis and the eye was lost. Here was a most rapid and unexpected process. I had in my mind from the first sight of the case the probable danger sometime in the future to the fellow eye, but as there had been no reaction until the wound had thoroughly healed I certainly did not look for so sudden an outbreak of sympathetic ophthalmitis in the other eye. In contrast with this I might mention the case of J. C., a girl aged 11 years, who has a very conspicuous puckered cicatrix extending entirely across the right cornea, and about 6 or

7 millimeters into the sclera on the outer side, the scleral scar being particularly ugly and depressed with entangled ciliary processes in it, and the iris being adherent to the corneal scar in its greater extent. The eye had light perception, and never gave any special annoyance. I found increased tension, however, more marked sometimes than others. Her left eye has had defective vision for several years, since shortly after the accident, viz.: $V = 4-200$, but she had never complained of pain in it, or photophobia or any other symptom except inability to see well. Ophthalmoscopic examination discovered no abnormality in the eye whatever. As the right eye was useless, and the nature of the injury a dangerous one, I advised its removal. Her father refused, and so I requested that he allow me to make an iridectomy. This he granted, and I accordingly removed a section of the iris. There was no more increased tension after this. I could now examine the anterior of the eye with the ophthalmoscope and found aphakia, cyclitic membranes and floating opacities in the vitreous. The injury was caused by a piece of broken bottle, which, being hurled with considerable force, accidentally struck her on the right eye when she was seven years old. I am of opinion that, unless removed, this eye will eventually cause the loss of the other. What could be the cause of the lowered vision in the uninjured eye?

In another case with an eye affected similarly to this through sympathy, I had the pleasure of seeing vision return after removing the offending eye. There are features in the case sufficiently interesting to warrant reporting it.

S. T., aged 18, who entered the Ark. School for the Blind in Sept. 1890, was subjected to an injury of his left eye when four years old by the penetration of a fragment of steel while standing near an anvil on which two men were hammering a bar of iron. The eye first inflamed and then became quiet, but was blind. He attended school, and had but little trouble until about two years afterwards. At this time the injured eye became quite painful at times, and the other eye grew very weak, so much so that for three years before I saw him he was unable to pursue his studies. When I saw him in September, his condition was as follows: O. D. V. = counts fingers 12 feet, slight photophobia. Ophthalmoscopic examination negative. He stated that his vision had been about the same for three years past. O. S. globe tender to touch, and injected. Diagnosis, chronic panophthalmitis. I at once removed the inflamed eye. Soon after all photophobia disappeared from his right eye, but vision was no better. At the end of a week vision had slightly improved. In a month $V. = 16-128$, in two months it was $16-32$, in four months it was $16-25$. The eye had now grown strong and could endure constant work, and he was sent home. I later heard from him saying he had no further trouble in using his eye. In the injured eye was found a small fragment of steel encysted in the vitreous humor near the papilla. The eye was completely disorganized. What was the nature of the sympathetic trouble in this case? The most careful examination failed to reveal any lesion in the fundus of the right, and yet vision was reduced to counting fingers at 12 feet. Another strange feature in the case is the slow but complete return of vision after so long continued reduction of same.

In illustration of the tolerance of the eye to injuries and foreign bodies, I would mention a case I have already reported to this Section where a fragment of glass measuring more than a half inch square lay quiet in the ciliary region of an eye for ten years without any irritation or sympathetic trouble whatever, and the eye was only removed on suspicion of danger to the other eye on account of the extensive cicatricial formations and entanglements of the uveal tract in the sclero-corneal region, without suspecting the presence of the foreign body in the eye. While writing this article, my eye chanced to fall on the title of a paper in the May number of the *Ophthalmic Review*, by E. Treacher Collins, reporting nine eyes removed a very long time after having been entered by a foreign body. The shortest time in which trouble arose after the accident was 14 years, and the longest 28 years, and in three cases, 24, 14, and 28 years, respectively, the eyes were removed on suspicion of the presence of a foreign body without there being any pain or other trouble.

Not one of these cases would have passed through the hands of a modern ophthalmic surgeon shortly after the accident without his urgent advice to remove the eye with the offending body. While this would be sound philosophy, and place the surgeon on the safe side, yet we must recognize the element of uncertainty in every recent eye injury.

Only a few days since, a farmer refused to permit me to remove a very dangerous eye for him on the ground that he had known many one-eyed persons all his life, lost by accident, and had never heard any complaint from them. While I expect my self-wise patient to turn up in sorrow some day, I cannot be positive that he will, and he may for years to come boast of his judgment against mine. With all the uncertainty in one direction there is a certainty in another that outweighs all, and that is: While an injured eye may not affect the other sympathetically, there is in many cases, well established by clinical experience, *very great danger that it will*, and in case the eye is already totally or practically blind, it is a certain safeguard against such an accident to get rid of it, and the surgeon fails of his duty, who would weigh the trifle of looks or sentiment against the all-important question of sight.

THE SURGICAL TREATMENT OF TRACHOMA.

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

BY JOHN E. WEEKS, M.D.,

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In the present stage of our knowledge of the treatment of trachoma, surgical procedures accompanied by proper local medication, afford the most efficient and most expeditious means of effecting a radical cure. Surgical interference is not a thing of recent date. Scarification more or less extensive, has been resorted to, for many years.

In the beginning of the present century, after the return of the French troops under Napoleon, from Egypt, this disease assumed such importance and was so widely spread throughout Europe that the minds of all medical men were active in the attempt to devise means for its cure. At one time scarification was quite widely employed apparently for the purpose of local depletion in cases where the hypertrophy of the conjunctiva was marked. From 1812 to 1813 bleeding was extensively practiced in England and Germany for the cure of this as well as of almost all other diseases. The amount of blood taken, running as high as sixty ounces in some cases. Some surgeons bleed from the veins, others from the arteries, each claiming especial advantages for his method. Local bleeding by the means of leeches was advised, eighty to a hundred leeches being employed in some cases. Moxies and blisters were also employed.

In 1811 Rust (London) advised excision of the affected conjunctiva; this was done by Elbe (Stuttgart) in 1839. In 1854 Pilz (Prag) practiced excision of the individual follicles. In 1859 Barilla, an Italian, devised an instrument consisting of a brush made of fine metal wire, which he used for the purpose of brushing out the trachoma follicles. Samelsohn (*Arch. f. Aug. u. Ohrenheilk.*, Vol. III, 1873) employed a fine thermo-cautery for the destruction of individual granules, effecting a cure by repeated sittings. Reaction was controlled by cold compresses.