

thread. As the patient finds difficulty in selecting only a few lines, which are almost equally black, the author, to reduce the number of lines to a minimum, constructs the chart so as to rotate. Lines above and below are marked on the rotating chart, and on the background at $7\frac{1}{2}$ degree intervals. If five lines, for example, are picked out, a rotation of the entire board $7\frac{1}{2}$ degrees to the right, or $7\frac{1}{2}$ degrees to the left, as the case may be, will enable the patient to reduce the number of black lines, in many instances, to two and three, and the exact axis of the astigmatism is more readily selected.

In a second chart Dr. Peter combines the "V-Chart" of Dr. Maddox, which consists of two lines of the same black velvet ribbon fastened to cardboard at right angles. To the end of one of these lines is attached a V, constructed of cardboard and ribbon, and placed upon a cardboard $3\frac{1}{2}$ inches in diameter. If the patient, for example, has selected on the first chart the lines 75, 90, 105, and 120 as the black lines, the second chart is put in place, with the V approximately within this area, from 75° to 120° . The patient very readily recognizes a difference in the shade of the two sides of the V, if the V has not been placed in the proper axis. The darker side is in the direction of the correct axis. The V is, therefore, rotated from one side to the other until both sides are equally black, when the axis is read off.

These charts were not presented to take the place of the usual examination with a cycloplegic which must necessarily be employed in practice. They were presented only as an aid to reduce the time of work and the many vexations which arise in difficult refractions.

Results of Cataract Operations Performed by Colonel Smith at Wills Hospital.

DR. WILLIAM ZENTMAYER read a paper published, (See v. 5, p. 97.), the table of results having been prepared by Dr. C. S. O'Brien, House Surgeon.

The discussion which followed the reading of Dr. Zentmayer's paper was participated in by Drs. de Schweinitz,

Radcliffe, Schwenk, and Chance. The conclusion reached by each of these surgeons was that the operation for extraction of cataract by the Smith-Indian method, based upon the results in the group of cases operated upon by Col. Smith at Wills Hospital, was not to be recommended. It was recognized, however, that the trained assistants who constitute a most important adjunct of the Amritsar clinic, would have been a valuable aid in securing better operative results.

Color Vision.

DR. BURTON CHANCE read a paper on this subject published in full on p. 274.
CHARLES R. HEED, M.D., Clerk.

ROYAL SOCIETY OF MEDICINE, LONDON.

(Section on Ophthalmology.)

JANUARY 13th, 1922.

DR. JAMES TAYLOR, President.

THE PRESIDENT felicitated Sir John Herbert Parsons on the honor of Knighthood, which the King had recently conferred on him, and in the name of the Section expressed the hope that Sir John would live long to enjoy it.

SIR JOHN PARSONS, in returning thanks, said the honor was a recognition of his having served on a number of Government Committees, on which, however, he served only as an ophthalmologist, therefore it was an honor to ophthalmology, and he was the fortunate peg on which it was hung.

Congenital Deformity of Conjunctiva.

MR. DOYNE showed a case with a congenital deformity of the conjunctiva, associated with deformities of tongue and thumb in the same patient.
Filamentary Keratitis.

MR. REA showed a case of filamentary keratitis, which lasted three years and had been very resistant to treatment. When bullae were removed, the patient came with a fresh crop in three weeks. Tension was normal, and there was no suggestion of glaucoma. The woman had suffered from arthritis for many years.

Hyaloid Vessels.

MR. HUMPHREY NEAME showed a case with branching remnants of per-

sistent hyaloid vessels. He thought it likely that these processes arose from one common trunk. Vision in the right eye, with correction was 6/36, in the left 6/9. There was also a thickening of the walls of some of the arteries in the right fundus; the strands had no connection with the lens capsule.

MISS MANN exhibited slides and drawings of embryonic eyes showing the earliest formation of a definite hyaloid artery. Until just before five weeks, she said, the globe was filled with mesoderm, in the meshes of which there were blood vessels, but definite branching arteries could not be traced much earlier than five weeks. There were usually five branches of the vessel, and they broke up again into blood spaces, which quite surrounded the lens. A 3-months embryo showed a differentiation of retina, with optic nerve. From the center of it came a definite hyaloid artery with thick walls. That broke up into five branches. She next showed an equatorial section .6 mm. in front of the disc; it showed a division into three main branches. In the next section, .1 mm. in front of the last, there was again a division into five. That went on to the sixth month, after which it began to disappear again.

MR. M. S. MAYOU referred to injected specimens of hyaloid artery in the embryo which he made some years ago. At the 4th month it could be seen that hyaloid did not break up at the back of the lens, as so many textbooks depicted, but far back in the vitreous. The posterior vascular capsule was formed by a cone of vessels up to the back of the lens. In some cases one branch was found persisting and anastomosing with the ciliary body. Sometimes there were masses of fibrous tissues at the back of the lens, which were supposed to be remnants of the hyaloid artery.

MR. LESLIE PATON suggested that Mr. Neame's case might be one of proliferating retinitis.

MR. NEAME replied that Mr. Paton's suggestion was a likely one; but the five branches seemed to come so locally from the back that this seemed to negative that idea.

Necrosis of Maxilla.

MR. M. S. MAYOU exhibited a baby with acute necrosis in the upper jaw. This was his third case of the kind, all under one year old. One had successive portions of the jaw removed until none remained; it was a spreading necrosis. It was an acute process in all the cases, and he believed the mouth could be excluded as a channel of infection in the present case; moreover, the disease occurred before teething, and before sinuses were present in the bone.

MR. LESLIE PATON mentioned a case of his own of the same character, a healthy breast fed child nearly four months old. When he first saw the child there was a large swelling under the left eye, and the eye was protruded forward and outward to the extent of an inch. He evacuated about an ounce of pus from behind the eye. Bare bone was evident to the probe, but there had not been time for necrosis to take place. The condition seemed to belong to the same category as acute osteomyelitis in infants.

MR. STACK enquired whether syphilis and tubercle could be excluded.

MR. PATON replied that those diseases could be excluded in his own case; the only organism found in it was staphylococcus.

MR. MAYOU, in his reply, said both parents in one of the cases proved negative to Wassermann; in another the doctor was so sure there was no suspicion of syphilis that the test was not applied. The cases were, he thought, too acute for tubercle to be the cause; one had a temperature of 103°, and a pulse of 130.

Operating Lamp.

MR. LANG showed an operating lamp; it could be attached to the ordinary bracket and carry a 1/2-watt lamp, with the necessary resistance. It enabled fluorescein staining, such as in corneal ulcer, to be well seen.

Trephine Operation for Glaucoma.

MR. MALCOLM L. HEPBURN read a paper entitled "Experience Gained from 140 Trephine Operations for Glaucoma."

He regarded glaucoma as such a serious condition, especially the chron-

ic type, with its variety of symptoms and signs, that the question of operative interference merited all possible discussion. Recently contributions had appeared favoring iris inclusion and silk inclusion operations, somewhat to the detriment of the iris free operations. The reporting of late infections had deferred some surgeons from confidently recommending trephining, and had led some to give it up. In perforating wounds of the eye, and after cataract extractions, surgeons tried to avoid permanent inclusion of iris in the wound, because of the danger alleged to be associated with such inclusion, and he could not see the justification of it in operations for glaucoma, unless other methods had failed. The danger of leaving an opening in the eye separated from the external air by only a thin layer of conjunctiva was admitted, but it applied to all filtering scars, and the only question was as to which was the least dangerous.

In the 140 trephine operations he had performed in the last nine years, 27 were in private patients; and if the combined hospital experience of his colleagues could be studied, he thought there would be overwhelming evidence in favor of the trephine operation. At Moorfields, at least, late infection was very rare, and he believed its occurrence in a general way had been much exaggerated. He had not been without complications in his cases.

With regard to the technic he followed, the importance of an efficient conjunctival flap was very great in striving to avoid late infection; he made the flap as thick as possible, and he did his best to prevent tearing or button-holing of the conjunctiva, stripping the conjunctiva off the globe in its whole thickness down to the sclera from the beginning, and continued cutting with the scissors, the points of which were kept directed towards the globe. Toothed forceps he used only for the initial fixation; those subsequently employed were very fine toothless ones. On reaching the limbus he used the secondary cataract knife, keeping it directed towards the globe and pressing slightly. He never found that he got too far forward, as he always found himself further back at the end of the

operation than he expected to be. Before commencing rotatory movements, he drew the flap upward and backward so that it was parallel to the trephine, so avoiding button-holing. While rotating the trephine, he directed the handle forward so as to cut thru the anterior part of the scleral disc before the posterior to ensure the formation of a hinge posteriorly when the section was complete; then the disc could be removed later without fear of injuring the conjunctival flap. Having once got the trephine to bite, he did not remove it until the section was finished, so that the full force of the aqueous discharge would push the knuckle of iris well out of the wound. The guide to the penetration of the sclera was the coming up of the pupil toward the hole. When the iris presented, it must be dealt with at once; the disc could be left to take care of itself. He grasped the iris with very fine straight forceps, at the same time pulling downward and forward, so as to detach it from its root. Lastly, he cut off the disc, which could be done easily without endangering the conjunctiva. Usually he inserted one or two stitches in the conjunctival flap; perhaps there should be more.

Proceeding to the consideration of complications, Mr. Hepburn said that if a hole was seen in the flap, a new point of application of the trephine must be selected. Three or four times loss of the disc had happened to him; it might be drawn into the anterior chamber, it might be left in the trephine, or it might be washed away when the aqueous was discharged. Sometimes the iris was so dilated at the time of operation, that the force of the aqueous discharge caused a total prolapse to the pupillary border; in this case all the prolapsed part must be cut off and a complete iridectomy performed. On occasion a complete iridectomy occurred from a too free division. If a complete iridectomy was intentionally done, the iris must be pulled well out of the wound. Apart from cases of buphthalmos—in which the accident was not uncommon—he had had vitreous loss only three or four times. Whether it influenced the subsequent draining capacity depended somewhat

on whether the vitreous was solid or liquid. In two of his cases there was good drainage and no affection of vision afterward; in one case the vision had remained at 6/6.

With regard to delay in the reformation of the anterior chamber, this had occurred in about six of his series of cases. He now allowed these patients to be out of bed at the usual time after the operation, when he usually found that the anterior chamber formed immediately. When this formation was delayed unduly, he was anxious lest there might be adhesion of the iris to the trephine hole; for this reason he always used atropin as a routine treatment. In two or three of his cases the lens had come forward, but only in one case was he able to assure himself that there were no opacities previously. He was not aware of detachment of choroid having happened often in his cases, but it might occur without being recognized. He had not encountered serious complications from this cause, tho it might account for failure in the reformation of the anterior chamber.

What cases were to be included in the term "late infection?" As the permanent opening in the eyeball was the weak point in the operation, the entry of organisms thru this channel must be established to justify the use of the phrase; he thought inflammatory reaction must be associated with rupture of the conjunctival flap. Inflammations occurring many years after operation, when there was a thick and firmly attached flap, could not be included as late infections. And he did not see why every type of inflammation occurring in an eye after trephining should be directly ascribed to the operation.

A general review of his cases showed that by far the best results ensued in cases which he secured early, and especially if he had been able to do the operation at a time when the tension of the eye was normal. In acute glaucoma he trephined only if he had been able to reduce the tension before operating. If he could not reduce it, his practice now was to perform iridectomy. He had seen two eyes in the same patient in which one had been trephined in an early stage, but in

which operation on the other eye had to be postponed, and the unoperated eye steadily went downhill with the same symptoms; but, after operation these symptoms were cut short and controlled. That his private cases had been more successful than the hospital ones he attributed to the fact that private patients were more observant and anxious about initial symptoms, and early sought advice. His 13 failures in the 140 had been in cases whose tension at the time of operation was raised, where there was a long history of the trouble, and in which the field had been contracted in a general way, almost to the fixation point. As failures he reckoned those cases in which sight was restricted to finger counting, with much contraction of the visual field, and where no improvement followed the operation. Many cases appeared to have worse vision immediately after the operation but it improved later. He seldom had good results in acute or in secondary glaucoma; both these kinds showed too much congestion round the limbus, and this encouraged healing of the trephine hole. Moreover, in acute glaucoma the conjunctiva was often very friable. He had had two cases of cyclitis; both recovered. He had had no case of sympathetic trouble following trephining.

As a result of his experience, he had formed the opinion that the operation of trephining, performed with every consideration for the conjunctival flap, was the ideal one for chronic glaucoma, especially for the type generally met with in young adults.

MR. R. R. CRUISE said all surgeons naturally preferred the type of operation which, in their hands had been successful. He had now ceased to do trephining for glaucoma, tho at one stage in his practice he trephined all his cases of that nature. He abandoned the operation because of one or two disasters, and since he had changed his operation those had not happened. In two there was an escape of vitreous; he did not know why; not, he thought, thru any fault in technic. At the operation on one of them a colleague was present and praised the operation, foretelling a good result. He called in colleagues in consultation.

The eye remained quiet, but vitreous continued to come out. He cautiously sealed up the hole, and the tension rose to plus 3 or 4, and the lens was drawn up. It was the patient's only eye, and he went blind. In two cases there was infection afterward, causing conjunctivitis; these patients were left with vitreous opacities. He had also had, when doing trephining, a good deal of subconjunctival thickening around the trephine hole margins. For ten years he had been doing a modified flap sclerotomy, doing rather more than Herbert did, i. e., completing the two sides of the flap well forward into the cornea, and beyond the rim of resistance felt when cutting thru. It was very important not to suture the conjunctiva. One of the features of trephining which made him more dubious about it was the transparent pedicle which remained, enabling one to look into the depths of the eye.

MR. M. S. MAYOU agreed as to the transparent bubble which was left after trephining, and it was a spot very difficult to cover and protect. A further objection was, that the cornea had to be split in order to get the trephine on properly. During the last three months the speaker had been carrying out the new operation of Holt, who claimed it did not leave a transparent bubble, and that was true in the cases in which Mr. Mayou had so far done it. He described Professor Harden's method of ascertaining detachment of the choroid. The examination, done as early as the second or third day, was carried out by means of the contact illuminator. This was put on the globe 5 or 6 mm. behind the sclera, and if there was a detachment of choroid, the whole area of sclera right to the cornea would be illuminated; but if the choroid was in its place, there would be illuminated only an area around the point of contact.

MR. LANG thought the danger arising from the hole in the flap had been much exaggerated. The amount of drainage was directly proportional to the diameter of the trephine hole. The operation he did for glaucoma was a modified Lagrange, turning back a piece of conjunctival flap and taking away a part of the cornea.

MR. HEPBURN, in the course of his re-

ply, considered that Mr. Cruise had had bad luck in his cases, which caused him to adopt a different procedure. He, the speaker, did not find transparent blebs were common, and when they did occur they got thicker with the passage of time. He had never found that splitting of the cornea made any difference. The Lagrange operation was, in his opinion, merely a glorified trephine operation. Tho patients who had a hole in the conjunctiva might survive trouble or escape it, it was not wise to design a procedure on that assumption.

Epibulbar Sarcoma; Penetration of Globe.

MR. HUMPHREY NEAME read a paper on this subject, illustrated by a number of microphotographs, projected by the epidiascope. In May, 1919, the patient noticed a swelling under the upper lid of the left eye. There was a history of syphilis, of recent ulceration of the palate and deformity of the nasal bones, and the Wassermann reaction was positive. For some time the swelling was regarded as a gummatous infiltration, but as it did not react to antisyphilitic treatment, and the eye was practically blind, Sir John Herbert Parsons, under whose care the patient was, decided to enucleate the eye. Pathologic examination revealed an extensive epibulbar growth, with extension within the globe. The growth surrounded the cornea and, as a thin sheet, spread around the eye to the posterior pole. The iris, ciliary body and choroid were completely infiltrated with the same type of growth. It was a round celled sarcoma, with slightly alveolar formation. Within three months of the enucleation, there was a recurrence within the orbit, and Sir John Parsons carried out exenteration of the orbit. There was a mass of round celled recurrent growth not definitely delimited from the orbital tissues. The stump of the optic nerve, in transverse section at the posterior limit, was free from growth cells. An extension of extrabulbar sarcoma within the globe was an extremely rare condition. Less rarely, sarcoma started in the choroid, and extended out thru the coats of the eye, usually by the perivascular lymphatics of the various perforating vessels. Mr.

Neame thought there was more evidence that this growth was of extrabulbar origin than that it was at first intrabulbar. The reasons he adduced were:

(1) The earliest symptoms were referred to the epibulbar region above the cornea. (2) The vision in the eye, within two months of the commencement of symptoms, was 6/6 with the appropriate glass; no visual failure in it was noted until 7 months after the onset. An extensive choroidal growth usually effected the vision. (3) The growth was much more massive at the point first noticed than elsewhere. (4) The gross appearance of the choroidal growth resembled a secondary or metastatic growth more than a primary growth there. (5) The alternative, flat sarcoma of choroid, was usually densely pigmented, whereas this was a non-pigmented growth. (6) Flat sarcoma was almost always relatively avascular, whereas thruout the present growth there were many delicate capillaries. (7) Flat sarcoma often invaded the deeper layers of the sclerotic, but this growth had only slightly done so, but had definitely invaded the superficial layers of this structure in various parts. He concluded with some extracts from literature bearing on the subject.

SIR JOHN PARSONS referred to the close mimicry of this condition, in its earlier stages, of gummatous infiltration of the conjunctiva and sclera, especially when, as in this case, the reaction to Wassermann was positive. Only slowly, after a long course of antisyphilitic treatment had been given, was it realized to be a new growth. Concerning epibulbar growths in general, on reading cases of the kind he could not quite convince himself that there had not been some small lesion in the eye, which had subsequently extended outward. Even in Mr. Neame's case there was that possibility, tho the author of the paper had adduced much evidence favoring the opposite possibility.

MR. MAYOU threw out the suggestion that a flat sarcoma might have existed in the anterior part of the globe and then perforated, good vision

nevertheless persisting. In flat sarcoma the retina remained attached for a long time. One of his patients had detachment in the anterior part of the globe, and vision was still 6/13 when the eye was removed. The growth had infiltrated the canals along the vortex of veins and lymphatics. The patient died two years later of recurrence. He suggested that this case should be submitted to a Pathologic Committee, to place it on a sure basis. This was agreed to.

MR. E. TREACHER COLLINS pointed out that there could be no doubt as to the direction of spread in the case of epithelioma, as that type of growth never started in the eye; however, much doubt might be thrown on the manner of spread of epibulbar sarcoma. He referred to a paper he read some years ago before the Ophthalmological Society on epibulbar epithelioma. He showed then illustrations of epithelioma spreading along the vessels at the limbus into the canal of Schlemm, and he had read of other cases which behaved similarly. A further point favoring Mr. Neame's view was the way the growth spread on the outer surface of the sclerotic. If a piece for diagnosis had been removed in this case earlier, removal of the eyeball might have been obviated, and the case rendered more hopeful. He referred to a case of his own in which he cut off the top of the growth and sent the patient to be further treated at the Radium Institute, and after two or three applications of that salt, the growth entirely disappeared and he knew of no recurrence of it.

MR. J. H. FISHER agreed that a piece should have been removed earlier, and referred to a case of his own of similar nature in which subsequent application of the actual cautery prevented any recurrence.

MR. LESLIE PATON also alluded to an interesting case, in which the application of radium for 24 hours after the operation kept the man free for a long time, and a swelling of the soft palate, probably of the same nature, which developed was similarly treated with radium and also disappeared.

H. DICKINSON.