Adams, Dorothy Rose.—Investigations on the Crystalline Lens.

Miss Dorothy Adams, whose paper on the Literature of the Crystalline lens appears in this number, communicated a paper to the Glassworkers’ Cataract Committee of the Royal Society which was read on April 2, 1925, and will appear in the Proceedings of the Royal Society. The following are her conclusions:

"The lens resembles other tissues in possessing an autoxidation system made of two sulphur-containing components: (a) water-soluble glutathione; (b) a thermostable protein residue. These are maintained in chemical equilibrium by an oxidation reduction change of SH-SS type. A system of this kind may be of economic importance to respiration of avascular tissue, such as the lens, since it could be maintained by a minimum fresh supply of energy (oxygen).

Experiments were made on fresh ox lenses. Oxygen uptake was measured directly and indirectly. It was found that:

1. Fresh lens has a definite oxygen uptake, evidently used for maintenance of its autoxidation system, since any alteration in concentration of glutathione in the lens causes corresponding change in oxygen uptake, e.g., the oxygen uptake is considerably decreased by drying the lens, and is altogether absent after dialysis. In each case it is restored at once by addition of a few milligrammes of glutathione. Also glutathione and linseed oil together have the same remarkable catalytic effect on oxygen uptake of fresh lens as they have on muscle.

2. The average glutathione content of ox lens is higher than that of other more vascular tissues.

3. The thermostable protein residue prepared from the lens has no oxygen uptake; but with a few milligrammes of glutathione gives an oxygen-uptake curve exactly similar to that of fresh lens. It also shows the same catalytic effect in presence of oil and glutathione together.

4. Only one of the three proteins of the lens, viz., β-kryallin, is able to function as a thermostable residue.

5. Exposure of fresh ox lens to ultra-violet light or to heat rays causes measurable decrease in its glutathione content. Effect of ultra-violet light is more marked than that of heat."
II.—OPTICS AND REFRACTION

(1) Landolt, E. (Paris).—How to assist certain amblyopes. (Comment venir en aide à certains amblyopes.) Arch. d’Ophthal., July, 1923.

(1) The amblyopes to whom Landolt refers are those whose defect of sight is due to opacities of the dioptric media and whose chief trouble is their inability to read even by the aid of a loupe. The author finds that such individuals can be greatly helped by increased illumination so arranged that light is concentrated on the paper or book. He has had an apparatus constructed by Meyrowitz in Paris which consists of a high power electric lamp enclosed in an opaque metal tube, in the lower wall of which is an aperture placed opposite the lamp. The tube is fixed horizontally to an upright stem and can be rotated and moved vertically at will. The light from the lamp is concentrated on the book beneath the tube while surrounding objects are in darkness. This light can be tinted if desired by coloured glass inserted in the aperture. Landolt’s communication was read and the apparatus shown to the Société française d’Ophtalmologie at its meeting in June 1923.

J. B. Lawford.


(2) Every oculist who takes an interest in checking the glasses for which he has issued a prescription knows how it is possible for errors of all sorts to creep in, and how fortunate it is that a wrongly prescribed or executed spectacle prescription is less likely to do positive harm than when medicines are in question. Penel presents the results of an investigation of his prescriptions, and also refers to the work of one of his colleagues—name unmentioned—who states that there are 78 reasons why spectacles “do not cure us.” He gives as a summary of these reasons the following:—Initial error in the examination, defective trial lenses, asymmetrical faces and wrong positions of the head when the patient is examined; too numerous transcriptions of the prescription in intermediate hands, absence of agreement about the notation of axes, errors of manufacture even with multiple control. Finally, there is the patient himself, or, by inference, the patient herself, for this is what the author has to say about the patient:—“It is necessary merely to take a walk upon the promenade in order to observe how wearers of glasses are more concerned with the set of their hats than with that of their glasses.” Surely this cannot
apply to the male sex! But of the general truth of what Penel says there can be no doubt. And if mistakes readily occur with high-class work how much more likely are they in the case of contract work. The reviewer has had a large experience of this in connection with spectacles for school children, for, since the commencement of his connection with the Lanarkshire Education Authority ten years ago he has insisted on checking, so far as possible, every pair of spectacles ordered for the children by him. He has found that whether the spectacles are contracted for by a high-class firm or whether they are put through the hands of small local opticians who are often jewellers, the result is essentially the same, none of the contractors can be trusted to execute the prescription with the same exactitude as that with which a chemist executes a prescription for medicine. The prescriber also makes a blunder now and again, it goes without saying, but these are as nothing to those which occur in the course of execution of the prescriptions. In the case of contract work, it is perhaps hardly fair to expect too much from the optician since the prices are so cut that experienced assistants cannot well be afforded, but the facts remain, and their chief indication is that in contract work it is more than ever essential that the prescriber of the glasses should be in a position to verify the correctness of the lenses, and, very specially, of the frames.

Ernest Thomson.


(3) Hepburn contributes to the Lancet's series of special articles one of the best short accounts of treatment of myopia in young children which the reviewer remembers to have read. He gives the necessary facts with the minimum of side-stepping towards controversial subjects and presents a clean-cut statement which should be most useful to the practitioner. There appears to be a printer's omission where the letter J. presumably ought to read J. 1. The author says in his last paragraph: "in cases of definite progression, such as one or two dioptres in six months, the question of discontinuing all reading and school work has to be decided," etc. The reviewer considers that "one or two dioptres in six months" is too liberal an allowance of increase. He would call half a dioptre in six months or, at any rate, one dioptre in twelve months definite progression which would lead him to consider, in a young child, removal from school for a period.

Ernest Thomson.

(4) In spite of its title, the article by Strebel really deals with the whole subject of accommodation and the rival theories of its production; very little space with an insufficient description is given to the actual model illustrated. The article contains much interesting theory on a very difficult subject, but is not suitable for abstraction and should be read in the original. Two points only need here be noted, namely, that the author upholds the theory of von Helmholtz as against that of Tscherning, and makes the following statement:—

"Miotics act not merely by increasing the circulation, drawing the iris farther from the irido-corneal angle, diminishing the depth of the anterior chamber, etc., but they have a special action in that by causing spasm of accommodation they bring about a mechanical pumping action on the canal of Schlemm. In fact the meridional portion of the muscle of accommodation passes to the canal of Schlemm and has its fixed point there. It is in this way that miotics bring about an assured improvement in the intraocular circulation which is impeded in glaucoma."

Ernest Thomson.


(5) It is common knowledge that in high myopia the image of the fundus on direct examination is, in the somewhat redundant expression of Schousboe, "woolly, indistinct, badly focused" though probably most of us will not admit that it is, in the author's word "useless." But it is probably not common knowledge that the fact has been noted by Tscherning without receiving an explanation. Nor does the author offer an explanation. The procedure described of examination by the indirect method merely consists in placing plus lenses up to 5 D behind the ophthalmoscope mirror, adjusting the observer's distance to suit, and thus obtaining a magnified image.

Ernest Thomson.


(6) From Dor's article one gathers that in France there is a considerable leakage of money paid as pensions for slight diminutions of visual acuity, which pensions are not wholly justifiable as they are based on the supposition that the soldier originally had a
visual acuity of 1, such visual acuity and the fractions thereof being based on a test at 5 metres only. As Dor points out, certain astigmatics and other ametropes cannot be brought up with any glass to more than 1/2 at 5 metres, and yet at 25 centimetres can do any kind of work without difficulty. The object of Dor’s communication is, he says, to draw attention to the fact that the notation of visual acuity by ordinary fractions has a scientific appearance which is fallacious, and that it would be better to adopt a dioptric notation intelligible only to the oculist. When a non-professional person hears it said that he has a visual acuity of 1/2, he thinks that he has lost half of his sight and claims a pension, often in good faith, for fear of losing the other half. Dor’s conclusion is that the military authority should be asked to consider the central visual acuity as the expression of only 2/3 of the useful function of an eye and not as the expression of its whole value. If this were done, compensation for loss of central vision (expressed by \( V = 1/20 \)), which is at present counted as 45 per cent., would be counted as 30 per cent., and there would be a correspondingly lower compensation for slighter losses of visual acuity.

Ernest Thomson


(7) Exton, after investigating the effect of prolonged microscope work, comes to the conclusion that suppression of the image in the “off” eye is invariably accompanied by effort and strain. There is a close association between high magnifications and eye strain, and a relationship between intensity of light and loss of acuity. Posture is also a factor in the production of strain, the fixed position of the head and neck, and of the ocular musculature required by binocular microscopes causing discomfort for which the visual relief afforded by them does not compensate. The Euscope has, therefore, been invented to overcome these defects. It consists essentially of a camera having on its floor near the smaller end, an aperture to receive the eye-piece of the microscope. In this is placed a reflecting prism by which the light from the microscope is deflected down the camera forming an image on the screen at its far end. This image is viewed from the smaller end through a pair of sphere prisms or a strip of reading glass of proper focus.

Experiments with different materials have shown that a zinc oxide screen is the best. For routine work a 150 mm. square screen, 200 mm. from the reflecting surface of the prism, is satisfactory. Seen through the strip of reading glass the visual field has the apparent size of a full page magazine illustration—the image appearing crisp with three dimensional effect.
The observer is in an easy, natural sitting position, sees the stereo-like images with binocular single vision and by looking at a reflection on a screen instead of directly at the light source he avoids "irritation of the rods and cones with consequent fag of the visual purple." During the four years in which Eusscopes have been used in the Prudential laboratory, not a single complaint of fatigue or strain has been heard.

Photography is of course very easy with this instrument, for instance, blood counts may be made photographically on bromide paper with 16 or 8 mm. objectives, which give a field large enough to include all the 400 squares of the haemocytometer slide. With this instrument it is possible to study magnifications up to 35,000 whereas the limit with the microscope alone is 2,700.

F. A. Williamson-Noble.


(8) In this interesting short article Wirgman deals with the adjustment of lenses for target shooting. He does not deal with the shot gun nor with the sporting rifle, because, with regard to the former, as is well known, the alignment of the gun is very little dependent on aim, and, with regard to the latter, shots are not always taken in a prone position; and it is in this position that the eye is specially rotated away from the centre of the frame. As this matter of centration is one of great importance to ophthalmic surgeons when dealing with cases of this kind, it seems well to transcribe the author's words:—"In prescribing glasses the point to which I wish to draw attention is that an ordinarily centred lens is not advisable, because in the position assumed when firing the eye looks through the upper and inner quadrant of the lens . . . . In the prone position the body is carried well away to the left, so that the head is inclined to the left also in the act of looking at the mark. The face is inclined at a more or less acute angle to the ground, and the right eye is slightly further from the target than the left (in a right handed man). This necessitates the line of vision passing, as has been pointed out, through some point situated in the upper and inner quadrant of the right lens, and, if no alteration of centre is mentioned in the prescription, a prismatic and curved image is produced. To counteract this, it is necessary (a) to raise the frame; (b) to centre the glass so that the line of aim and the optical centre coincide; (c) to bring the face of the glass parallel in the vertical plane with the target. Theoretically the shooting glass should be angled to correspond in the horizontal plane also, but in practice this is hardly needed. It will be found that an angle of 10 to 15 degrees back from the vertical is required.
to fulfil (c). An angling joint can be used for this." There are other interesting points in this article which should be consulted in the original. The foregoing quotation deals with the most important point, the correction of the aiming eye.

ERNEST THOMSON.

III.—GLAUCOMA

(1) Blatt, Nicolas (Roumania).—Hemeralopia as a prognostic symptom in glaucoma. (Hemeralopie als prognostisches Symptom bei Glaucom.) Wien. klin. Wochenschr., p. 403, 1921.

(1) Blatt has observed that the degree of the hemeralopic trouble in glaucoma depends on the malignity of the individual case. When a high degree of hemeralopia can be shown to be present, in a case of glaucoma, by the common methods of examination, experience proves that blindness rapidly ensues, and is not to be avoided by either operative or palliative methods of treatment. Whence the importance of hemeralopia as a prognostic factor.

V. ST. JOHN.


(2) Hamburger first draws attention to the value of the undiluted suprarenin injection in glaucoma. He demonstrates the pressure curves of two cases of simple glaucoma. One a woman of fifty years and the other a man of eighty years. He treated both by the suprarenin injections. Prior to this, pupil, field of vision, and pressure, 40–50 mm., had remained unchanged in spite of eserin. After the employment of the suprarenin the eserin became effective. He states that by this supplementary use of eserin the effect of the suprarenin can be prolonged for several weeks or months. Twenty injections were made in the case of the woman and seventeen in the case of the man.

With regard to acute glaucoma he refers to the case of Heimann (Med. Klinik, 1924, No. 21). A cure was established here after injections of suprarenin, 0.2, and 0.4 c.c. respectively given at an hour’s interval. With regard to this treatment Hamburger puts most value in its employment in chronic glaucoma. Instead of injecting, simple instillation into the conjunctival sac can be
employed (boracic or the tartrate combination of the Hochster Chemical Works, or the hypernephrin of the firm Sicco, Berlin). An ointment can be employed also, but the most effective is the injection method. The danger in employing this method is negligible, and acute glaucoma is not a contrary indication. One must keep to the maxim: suprarenin only when miotics fail to act. All the ten cases and those which were reported from Lucerne and Dresden—one being a one-eyed person—were relieved by the method. Hamburger gives as a rule eserin two hours after the injection to ward off an attack. The other objection, that of collapse, has been greatly exaggerated. One must not of course inject suprarenin directly into the blood stream. Hamburger has now at his disposal several preparations which do not alter the blood pressure, or only alter it locally. A big step has thus been made. The question of how often operation may be evaded has not yet been determined.

The Principle. The primary effect is due to blood being pressed out from the uvea which is a cavernous tissue. This effect is as transient as every suprarenin effect. The secondary effect is a long and much more important one, and is due to the fact that metabolism is stimulated in a very high degree in the region which was strangulated by the suprarenin, or according to Bier “was hungered, thirsty and choking.”

Historical. The first experiments were made twenty years ago on animals by Wessely. In 1911 Zirm-Olmutz wrote an excellent thesis on the subject, but only the practical conclusions were arrived at. Köllner (1918) made the first experiments on man with success, but in 1920 stated that suprarenin had far less effect than eserin and has published nothing further. He failed, therefore, to recognize the therapeutic value of suprarenin. His doses were only 1/20–1/40 of those used by the writer. Hamburger claims priority for himself. He worked out the method eighteen months ago and is still working at it. He has carried this out in spite of the warning by Wessely on the danger of necrosis and the risks of the mydriatic treatment of glaucoma.

S. SPENCE MEIGHAN.

(3) **Salus, R.**—Subconjunctival injection of adrenalin. (Subconjunctivale Adrenalin Injektion.) Abs. Zentralb. f. d. gesamte Ophthal., July 29, 1924.

(3) **Salus** describes the effect of subconjunctival injection of adrenalin according to the technique of Hamburger in a case of acute glaucoma, and reports also his results in twelve cases, among which were eight cases of glaucoma of varying types. In the main he confirms the results claimed by Hamburger. The
reduction of pressure varied in the different cases, and sometimes this difference was a great one. The author, however, does not show the optimism of Hamburger for the treatment, who claims that as a result of his procedure, operation in chronic glaucoma has been greatly limited. Clinically the procedure may be of advantage for definite purposes, such as the lowering of tension before operation, or it can be employed in these rare cases where miotics aggravate the condition. In the phase of increase of tension which follows cycloidalysis, it will be especially valuable on account of the property which the treatment possesses of loosening synechiae. Another advantage of the procedure is the facility with which ophthalmoscopic examination can be made as a result. This is due to the lowering of tension combined with mydriasis. In one case it was discovered that the cause of the glaucoma was a thrombosis of the veins, a fact which would not have been elicited but for the method. Twenty injections were given in cases without any disturbance, either local or general.

Elschnig and Kubič consider the employment of large doses of adrenalin dangerous from experience in their clinic (Zentralb. 12, 231).

S. Spence Meighan.


(4) Gradle, after summarizing the recorded experiences of others with adrenalin in glaucoma, gives his own results. Between 1912 and 1917 he gave it subconjunctivally to six cases of glaucoma secondary to iritis with immediate and permanent reduction of the hypertension in four and no effect in the other two. In acute congestive glaucoma, and with tension over 70 mm. Hg. a colleague injected adrenalin subconjunctivally. An enormous mydriasis resulted and a marked reduction of tension so that in twenty-four hours, all congestive signs had disappeared. Gradle, therefore, advises its use in this disease, combining it with a powerful miotic and repeating it two or three times in twenty-four hours if the first injection is not successful. In two cases of chronic congestive glaucoma there was no benefit, and in three cases of non-congestive glaucoma, a slight reduction of tension was obtained in two and none in the third. It is, therefore, not advocated in these forms of the disease, especially as Hamburger has reported a case where an acute attack was precipitated. In hypertension recurring after operation, adrenalin may be of great benefit.

It is used as follows: The eye is anaesthetized with two per cent. butyn. Three to six minims of 1 to 1,000 adrenalin, obtained from
a sterile 1 c.c. ampoule, are injected under the conjunctiva at any convenient place—usually half-way between the lower limbus and fornix. A moderate amount of dull ache follows for about fifteen minutes, but massage is not used because the local and not the systemic effect of the drug is required. A suggested *modus operandi* is that the adrenalin brings about a diminution in the blood supply of the choroid and ciliary body, through its action on the sympathetic fibres controlling the vessels supplying them. The intraocular contents are thus diminished and the iris is no longer pressed forward so as to block the angle of the anterior chamber.

F. A. Williamson-Noble.


(5) Liebermann reports good results from this procedure. He thinks that the principal value lies in the fact that operation can be carried out under favourable conditions. Complications after operation are hereby lessened. He cannot go so far as Hamburger who claims that under the adrenalin treatment operation in glaucoma has been limited to the utmost.

S. Spence Meighan.

(6) Grosz, von (Budapest). — Indications for cyclodialysis. (*Indikation zur Cyclodialyse.*)


(6) E. von Grosz speaks of the adoption of cyclodialysis, an operation which has step by step taken the place of trephining in cases of chronic glaucoma. Iridectomy has maintained its place unshaken in acute congestive glaucoma, both in the prodromal and in the acute stages. While in 1919, in the Budapest University Eye Clinic No. 1, 119 iridectomies, 74 trephinings, and 3 cyclodialyses were performed; in 1923, 111 iridectomies, 17 trephinings, and 58 cyclodialyses were performed. In the first six months of 1924 50 cyclodialyses were done. Anterior sclerotomy was performed in juvenile glaucoma, that of Lagrange in simple glaucoma. Cyclodialysis has the advantage that it is less dangerous than the other glaucoma operations. In 3 per cent. only was there a loss of visual acuity. It has been done with success even in cases of the haemorrhagic type. It can be repeated and can exceptionally be combined with an iridectomy. Remarkable results were
obtained where the operation was performed for secondary glaucoma in cases of dislocation of the lens. Tension was reduced in all eleven cases. In five cases the visual acuity was improved.

The effect produced by the operation has not been finally established. The detached uvea falls chiefly backwards, and in some cases a one-sided atrophy of the ciliary body was the outstanding feature. During the last ten years at the University Eye Clinic No. 1, 1,960 cases of glaucoma have been operated on. These operations were as follow: 1,101 iridectomies, 565 trephinings, 146 cyclodialyses, 23 Lagrange operations, and 126 sclerotomies.

The influence on tension, due to disturbance of the internal secretion, on the ground of the work of Hertel and v. Szily, and especially from the important communication of v. Imre will be thoroughly investigated. The co-operation of a specialist in the person of Professor Csepay will be included. The results will be communicated later.

S. SPENCE MEIGHAN.


(7) Axenfeld in 1920 demonstrated the symptomatology of the combination of simple glaucoma and high myopia. This combination is by no means rare and is often overlooked. He then recommended the operation of cyclodialysis for those cases which had not been arrested by non-operative measures. To-day, however, after further observations, he finds that the method is not always successful, although there is nothing to be said against it in many cases. There are cases, however, in this category where trephining is the only hope. In myopes this operation is easy to perform on account of the anatomical arrangement of the parts.

In one case the speaker found a serious acute glaucoma to supervene after a cyclodialysis, which was uncomplicated at the time of its performance. Eserin cut short the attack and a trephine operation completed the treatment. An acute glaucoma after cyclodialysis is, however, very rare. He does not consider, therefore, that the operation is totally discredited on this account, but draws attention to the fact that such an incident may happen.

S. SPENCE MEIGHAN.
GLAUCOMA


(8) In his paper Salzer points to the fact that Bjerrum's method has somewhat been given up. He himself only employs it with regard to the 20° - 25° of the field. He uses as a screen, a cardboard square, 1 metre 20 centimetres in diameter. He does not employ small test objects. Either the test objects of Uhthoff, or an illuminated ground glass, 1 cm. in diameter is used. The latter can be made smaller by placing screens before it. In the same manner colours can be introduced. The illumination is regulated by means of a rheostat. The results obtained are transferred by means of a tangent rule, which reduces the readings by 10. Salzer describes the intermediate scotomata which are found in: (1) Diseases of the accessory sinuses; (2) papillary congestion; (3) optic neuritis; (4) papillary and retinal haemorrhages; (5) myopia and choroiditis; (6) glaucoma; (7) arteriosclerosis.

He has observed that in a number of cases the scotomata remain unaltered over a period of years, and in others he has observed that they may spontaneously disappear. They can no longer be taken as a guide for operation in increase of tension, nor can they indicate when the accessory sinuses should be explored. The author considers the increase in tension in glaucoma to be a complication in itself. He does not operate, therefore, unless this increase be present. He recognizes, however, that the presence of the scotomata and true glaucomatous cupping are related.

S. SPENCE MEIGHAN.

(9) Constantin, Dr.—Pilocarpin, eserin and adrenalin in glaucoma. (Pilocarpine, esérine, adrénaline dans le glaucome.) Abs. Zentralb. f. d. gesamte Ophthal., August 26, 1924.

(9) Constantin points out that pilocarpin stimulates not only the oculomotor sympathetic fibres, but also the inhibitory fibres of the cervical sympathetic. These latter dilate the vessels of the uvea, increase the secretion of the ciliary body, and bring about a hypertension. These injurious effects are balanced by the stimulation of the oculomotor sympathetic. These fibres cause a contraction of the pupil when stimulated and thus free the angle of the anterior chamber and spread out the absorbing surface of the iris. Eserin is of less dangerous nature as its only action is to stimulate the oculomotor sympathetic fibres and thus cause a contraction of the pupil.
The following case is described: In an eye affected by cataract and suspected glaucoma, preliminary iridectomy and extraction were performed. A normal after-course was pursued. Then attacks of inflammatory glaucoma supervened. Miotics were employed unsuccessfully. Paracentesis caused bleeding into the anterior chamber. Eventually sclerotomy was carried out, and this without success so far as results were concerned. Instillations of adrenalin were directly successful. Lowering of tension, disappearance of corneal haze, and increase in the visual acuity were the results. At one end of the healing sclerotomy wound, on the following day, a fistula developed. This was attributed to the delay caused in healing by the anaemia of the tissues. Adrenalin which is almost without effect in glaucoma becomes a valuable means of assistance after sclerotomy in favouring the formation of fistulae.

S. SPENCE MEIGHAN.

BOOK NOTICES


Their Lordships of the Admiralty appointed in 1921 a Committee to investigate the Electric Lighting of H.M. Ships and Establishments, with a view to recommending principles upon which lighting schemes should be based in future. The Committee consisted of Mr. Ernest T. Williams, Mr. F. Purser Fletcher, Commander Barry, and Surgeon Commander Hall. No ophthalmologist was appointed, but the Committee had the opportunity of hearing the views of Mr. R. J. E. Hanson.

This first report deals with general principles, and the Committee propose to issue separate reports dealing with specific problems at a later date. In a recent paper in the “Revue des Deux Mondes,” Marshal Lyautey, to whose work the excellent hygienic state of modern Morocco is largely due, is credited with the statement that there is no separate military and civil hygiene (il n’y a pas une hygiène et une santé militaire, et une hygiène et une santé civile). The same may well be said of naval and civil illumination, as is well illustrated by the report under notice. There is a brief note on medical considerations to indicate the way in which defective illumination may affect the eye and the health of the worker. There is a happy misprint in the note on miners’