some estimate of the probable time and expense necessary to complete the research and indicate the extent of the financial assistance required. The right of publication of papers based on this research must be given to the BRITISH JOURNAL OF OPHTHALMOLOGY. Applications to be addressed to: The Editor, British Journal of Ophthalmology, Ltd., 24, Thayer Street, Manchester Square, W.1.

ABSTRACTS

I.—DISEASE OF LENS


Weill and Nordmann enumerate some of the theories put forward in the past to account for the formation of senile cataract (the commonest form): (1) senility affecting especially or unusually early the lens, a condition to which everyone would be subject if he lived long enough, in other words, a physiological change of old age; (2) a result of arterio-sclerosis, which is present in some degree in the majority of patients with senile cataract; (3) auto-intoxication. As some cataracts develop in persons affected with an abnormality of endocrine secretion, it is suggested that possibly senile cataract may be the result of a similar cause. An examination is made of various forms of cataract of constitutional origin.

1. Diabetic Cataract.—According to von Graefe 25 per cent. of diabetics have cataract. Fouconneau-Dufresne only found 0.6 per cent. of cataracts in 162 diabetics. This wide difference is due to different methods of classifying cataracts in diabetics. Various writers have reported striking examples of true diabetic cataract in which the opacities of the lens developed to maturity in a few days. The cataract which appears in cases of diabetes with wasting is universally recognized as a complication of the diabetes. This type of diabetes is comparable with that produced experimentally by extirpation of the pancreas. It is recognized as due to an endocrine deficiency. Various theories as to the mode of production of diabetic cataract are reviewed. Although the actual local cause of diabetic cataract is not yet known, it is generally accepted that such a cataract does occur and is connected with hyperglycaemia of pancreatic origin.

2. Cataract with Tetany.—Numerous cases of the development of cataract soon after the manifestation of epileptic, hysterical, or
tetanic convulsions have been reported. The patients are usually relatively young adults. Spasm of the ciliary muscle and interference with the nutrition of the lens, or lesions of the ciliary epithelium with alteration in the chemical composition of the aqueous, have been proffered as causes of the cataract. Reference is made to some interesting combinations of events—the coincidence of tetany and epilepsy, of tetany and scleroderma, and of tetany and myxoedema. Tetany resulting from extirpation of the thyroid gland is sometimes complicated by cataract. A cataract reported by Treu occurred in a patient the subject of all the symptoms of tetany without any convulsions. This is claimed to overthrow the theory of ciliary spasm as the cause of the cataract. A case of chronic parathyroid insufficiency following thyroidectomy suffered from tetany with trophic changes and developed bilateral cataract forty-three months later which underwent operation (Sainton and Péron). Cataract therefore is a symptom of tetany along with the other trophic lesions of the hair and nails.

3. Zonular Cataract.—As to the cause of this type of cataract fierce discussions have raged between the school which insists on rickets and that which claims tetany as the cause. In each of these conditions it should be noted that a deficiency of blood-calcium has been recorded. It has been shown recently that a disturbance of calcium metabolism can produce zonular cataract (v. Szily and Eckstein).

4. Myotonia Atrophicans (myotonie dystrophique).—In this affection usually the tongue, hands, and fingers undergo contraction lasting up to thirty seconds. The patients are very wasted and display atrophy of the sterno-mastoid, the small hand muscles, and occasionally of the peroneals. There is sometimes a distinctive facies with drooping of the angles of the mouth, and the presence of paresis of the orbicularis oris and palpebrarum. The most constant feature is some abnormality of endocrine glands—testicular atrophy, deficient development of hair, ovarian atrophy, menstrual disturbance, frequent abortions, and sometimes thyroid hyperplasia or under-development. The disease is also familial. Considerable numbers of cases have been reported of cataract as one of the signs present. Series of thirty-five cases (Fleischer) and twenty-two cases (Naegeli) of myotonia atrophicans had cataract. Vogt is stated to doubt the occurrence of this disease without cataract, as habitually the lens had been examined without the microscope and slit-lamp. It is ascribed to numerous causes, namely disease of the central nervous system—brain or spinal cord—a neurosis, a pure myopathy, auto-intoxication, the result of endocrine defect, or an affection of the portion of the nervous system controlling endocrine secretion. Weill and Nordmann
conclude that whatever the basal cause of the endocrine defect which is so commonly a marked feature, the cataract should be classed with those which occur in diabetes and tetany.

5. Mongolian Idiocy.—Cataract is a frequent occurrence in this condition. It has been found in twenty-two out of thirty-four cases between the ages of eight and seventeen years and in no case under eight (van der Scheer). The cataract is composed of dots or flocculent opacities in all layers of the lens. By some writers defective function of the thyroid gland, by others the sexual glands, and thirdly a hypophyseal deficiency have been adduced as causes.

6. Abnormality of Thyroid Function.—Many opposing views are quoted as to the connection between cataract and thyroid abnormality. Numerous statistics are cited supporting the opposing sides. Some cases of particular interest are: (1) a case of marked infantilism in whom at the age of twenty years cataract in each eye developed side by side with scleroderma; three similar cases of association with scleroderma and cataract have been reported; (2) a cataract observed in a young cretin. Although it has been shown that large numbers of cases of goitre found in certain regions are free from cataract, it is claimed that the special cases quoted demonstrate the possibility of a connection between thyroid deficiency and cataract formation.

7. Cataract in Neuro-dermatoses.—A small number of cases is referred to, quoted from the literature, in which obscure skin conditions were associated with cataract. Certain of these skin conditions (névrodermite) have been stated to be due to lesions of endocrine glands. It is suggested tentatively that these cataracts may be comparable with those associated with tetany. Cataracts from yet another source are possibly of similar origin—namely, those which develop in ergot poisoning. In this disease, convulsions occur and also atrophy of the hands and the nails, all of which are symptoms present in tetany.

8. Senile Cataract.—The form and method of development of senile cataract are similar to those of diabetic and tetanic origin. It is pointed out that the cataract called senile occurs in people who have suffered a considerable change of endocrine activity. It is a manifestation of the climacteric. This may be stated for men as well as for women. It would be expected, if this be correct, to find the appearance of senile cataract at a greater age in men than in women. This is shown to be the case (Schmitt). Among three thousand men and two thousand five hundred women up to the age of sixty years, many more cataracts were found in the women (Gallus). Of the women, eighty per cent. had passed the menopause. It was claimed that the administration of ovarian
extract resulted in marked improvement objectively and subjectively in six cases so treated, and in one the vision improved from 3/60 to 5/18, and in another from 5/15 to 5/5. On the other hand, Ascher found no greater proportion of cataracts in women who had undergone ovariectomy than in normal women. Ovariectomy was recently shown to result in a reduction of calcium and phosphorus salts in the blood (Dalsace). The parathyroids have also been accused (Fisher and Triebenstein). 88.2 percent of senile cataract cases were found by careful neurological examination to show signs of latent tetany. In twelve old people without cataract, only one was found to have this condition. This parathyroid deficiency was thought to develop with the involution of the sexual glands.

Weill and Nordmann believe that, as in the case of constitutional cataracts in younger persons, so in old people, cataract is possibly caused by a disturbance of endocrine secretion of some form or another.

HUMPHREY NEAME.


(2) Madame Gourfein-Welt and Piotrowski here give an account of the continuance of the investigation reported by the former writer in Rev. gén. d'Ophthal. for 1925 (Abs. Brit. Jl. of Ophthal., Vol. X, p. 233). The article is statistical and unsuitable for abstraction. Here is a portion of the summary: "We believe that to a certain extent we are able to confirm the results obtained in a former work and to say that a difference exists between the serum of the cataractous and that of the non-cataractous. . . . And, without wishing to draw conclusions from such a small number of cases (26 cataractous and 19 non-cataractous patients are included in the tables in this number of the journal. Reviewer) we think we can say that there is a difference between the serum of the cataractous and that of the non-cataractous and that this difference consists especially in the fact that the serum of the cataractous is optically much the more stable."

ERNEST THOMSON.


(3) This study by Woods and Burky was undertaken as the necessary forerunner of a proposed study of the possible rôle lens protein may play in lenticular disease. From 1905 to 1914 Römer
Disease of Lens

Römer did a considerable amount of work with reference to (1) the effect of lens protein on the blood of various animals; (2) the action of lipoid and various poisons on the lens; (3) the permeability of the lens capsule to toxins; (4) a serological study of patients with cataract; and (5) the effect produced by specific organo-therapy with lens protein. Römer was convinced that the formation of cataract was due to a reaction taking place between the blood serum of the patient and the protein of the lens, though he was unable to prove this by experimental research.

Guyer and Smith, although primarily interested in the immunological reactions of lens proteins, took advantage of the fact that in embryonic life the lens is surrounded by the tunica vasculosa and is therefore more subject to influences from blood serum than would occur later in life. These observers immunized fowls to rabbit lens protein producing anti-rabbit lens serum. This serum was then injected back into pregnant rabbits at intervals of two or three days over a period of two weeks. There was a high mortality among these rabbits and the embryos; but among the 61 young surviving, nine showed ocular defects centred chiefly in the crystalline lens; imperfect development or liquefaction of the lens; partial or complete cataract; or other ocular lesions which, in the opinion of these authors, were due primarily to the imperfect development of the lens.

It is to be noted that some who have read the original paper by Guyer and Smith (among these the reviewer), have not been entirely satisfied that the strain of rabbits on which their experiments were made, constantly exhibited entirely normal eyes and lenses, as determined through many generations by an expert ophthalmologist.

By chemical means the aqueous extract of animal lenses can be separated into alpha antigens and beta antigens, and methods have been elaborated for the preparation of these substances in a condition of purity. Study of these serologically pure fractional antigens shows that they are organ specific and not species specific.

A. F. MacCallan.


(4) The cataract which follows accidental injury to the parathyroid glands in the course of operative removal of the thyroid is a well-known clinical entity. Kast has made its morphology as seen through the slit-lamp a subject of special study, and, contrary to the opinion of some, he considers that a differential diagnosis can be made distinguishing this from other forms of
lenticular disturbance. The two distinguishing features he stresses are:

(1) There is a thin layer of discrete opaque spots situated immediately under the anterior and posterior capsules. These are occasionally vacuolated, the vacuoles being flattened in a dorso-ventral direction. They tend to be segregated in the polar regions, especially in the posterior pole, and hence the visual disturbance, even in the early stages of cataract formation, is considerable. They frequently show up the arrangement of the fibres of the lens, and the pattern of the sutures.

(2) The lens is constricted sagitally. The diameter is of normal proportions (8 mm. to 9 mm.), but the thickness is definitely sub-normal, being on the average only 3 mm.

Although subcapsular, the cataract is not strictly cortical, for the layer of opacity is extremely thin. Nuclear sclerosis may frequently follow at a later stage, but usually the remainder of the lens substance remains clear. The prognosis on extraction is good (fourteen cases) since only very slight cortical remains are left.

W. S. Duke-Elder.


(5) Cases of true bone formation in the lens are relatively rare. Betsch reports seven fresh cases. In four of the cases the eye was enucleated for phthisis bulbi developing some considerable time after a trauma (blow, perforating wound, etc.); in one case phthisis developed thirty years after a nodular iritis for which an iridectomy had been performed, in one case after the development of a metastatic abscess in the vitreous, and in the remaining case in an eye which, seventeen years previously, had a tuberculous keratitis followed by a corneal ulcer which had perforated and had left a staphyloma. The microscopical appearances of these are given in detail. In each there was considerable bone formation in the lens, with the formation of regular and typical Haversian systems, while the iris and ciliary region showed marked atrophic degeneration.

W. S. Duke-Elder.

(6) Pesme, Paul (Bordeaux).—The extraction of the transparent lens in high myopia. (L'extraction du cristalin transparent dans la myopie forte.) La Clin. Ophtal., June, 1927.

(6) Pesme, in agreement with his teacher Lagrange, considers that the abandonment by so many surgeons of the Fukala-Vacher operation is not well merited. He relates in detail a number of
cases operated on by Lagrange and others, and afterwards explains the desiderata for and the decided limitations of this operation. Coming as it does from such a well-known school one needs no excuse for a partial transcription of this part of Pesme's article.

"The operation which best satisfies the patient is that which gives useful vision at any distance without the necessity for glasses. This ideal is reached in patients who can see at a distance with one eye and can use the other eye for near vision. Our own observations and those of others confirm the fact that abolition of the transparent lens in myopic eyes results in a loss of refractive power equal to 20 dioptres. Consequently the operation in a myope of 20 dioptres should result in emmetropia. If one goes beyond 19 or 20 dioptres there will be a residual myopia after the operation and if one operates on a lower myopia there will be hypermetropia. In each of these cases glasses will be required. The patient should be under 25 years of age, or one may say that the conditions for operation are two, namely, 20 years of age and 20 dioptres of myopia. It is, of course, to be understood that the patient is in good general health and that there are no macular lesions, progressive chorio-retinitis or marked softening of the vitreous." One is inclined to ask what percentage of high myopes fulfil all these conditions. That it is small is realized by the writer himself when he says of the operation "le cadre de son application est très limité."

Ernest Thomson.


(7) Demets refers to a case in which Moreau operated on a born-blind individual, aged 8 years. The cataract operation was technically perfect, but eleven years afterwards the vision remained rudimentary. Demets seems to wish to-counteract the disheartenment which might tend to follow the publication of such a case and relates several in which the results were excellent. Among these is a remarkable family. "I knew a medical family in which cataract developed in five successive generations; in the three last the cataract was complete at birth and was operated on tout de suite—I was myself concerned in the two last. The results were excellent and have remained so ever since." Demets suggests the following factors bearing upon the success of operation in these cases:

(1) Has the child been able to see since birth or not?
(2) What is the child's age when one is asked to operate?
(3) Is the cataract accompanied by other deep lesions which are sure to make the operation valueless?
(4) Is the general condition good or are there signs of cerebral or spinal degeneration?

Ernest Thomson.


(8) Wessely's experience has led him to the conclusion that no other instrument can cut through the secondary cataract so lightly as a lancet. The special lancet he has devised and uses has a blade 10 mm. long, whose base is 4 mm. broad; the blade makes an angle of $130^\circ$ with the stem and the edges of the blade are ground as sharp as possible. The advantages claimed for this instrument are: Unlike the needles and knife-needles usually employed, it enables one to place the incision anywhere around the limbus to suit the case in hand. The anchored strand or membrane gets divided with the least traction on its mooring. Where the membrane or strand is too tough for the lancet, the same incision permits of a specially made de Wecker's scissors being introduced into the eye to divide it—the most important advantage of the lancet over other instruments. While the incision is small enough not to favour vitreous prolapse, it is big enough to allow escape of aqueous and thus wash out any infection that may have been carried in by the instrument from the conjunctiva. He has had to resort to de Wecker's scissors in about one case in ten. In practically every case a single operation suffices to give an optically satisfactory gap.

The author's modification of de Wecker's scissors consists in the blades being particularly fine, 8 mm. long and hardly 1 mm. broad, one of the blades sharp-pointed.

He insists that darkening the operating room, oblique illumination with a hammer-lamp, and wearing a moderately magnifying loupe, should never be omitted as they are important factors that tend to assure a good result of the operation.

D. V. Gir.

(9) Tennent, J. N. (Glasgow).—Cataract extraction with peripheral iridectomy. Lancet, December 3, 1927.

(9) Tennent has been impressed by the work of Meller whom he visited at Vienna. He had the opportunity of seeing this well-known surgeon's cataract work and quotes his results as given by Barkan of San Francisco. Tennent discusses the advantages and disadvantages of the three methods commonly employed, namely, simple extraction, with ordinary iridectomy, and with peripheral iridectomy. Employing peripheral iridectomy, Meller had only two cases of iris prolapse out of 180 operations, whereas this
complication occurred twice out of 46 cases of the combined operation. The principal portion of Tennent's communication deals with two cases in particular, in one of which the site of operation was studied with the slit-lamp and in the other with the microscope, the patient in the latter case having died of pneumonia some weeks after a successful cataract operation. Both these cases had had peripheral iridectomy. In the first case there was a small black mass of pigment under the conjunctiva on the outer surface of the wound above one edge of the gap in the iris. Underneath this on the posterior surface of the cornea there was a dark flattened area of proliferating epithelium. This was not so densely black as the outer nodule, it was more rarified and flattened and showed dark radiating lines like those on the wing of a fly. Had a microscope section been available, the author feels sure that pigment would also have been seen extending through the wound. The visual acuity was 6/6 and J1. with correction, there was no anterior synechia and the patient had no complaint. The other eye was successfully operated on and presented no complication whatever. Tennent suggests that the eye with the pigment in the wound is more likely to suffer from late infection than the other. In the second case the microscope showed that, while a portion of the stroma of the iris had been removed, the corresponding portion of the pigment epithelium had been left behind. "This pigment layer has torn through at one point; it might easily tear at another point and then it would lie free in the anterior chamber, and readily pass into the corneal wound; this would give rise to the condition seen clinically in Case 1." Examination of a section passing near to the hole in the iris showed that the line of separation had been between the two layers of pigment epithelium. The author concludes that if the operation with peripheral iridectomy is decided on it is very necessary to be sure that the whole of the iris thickness is removed, and that, if the case presents features suggestive of an increased risk of infection, total rather than peripheral iridectomy should be performed. And there are other types of cases in which peripheral iridectomy is not advisable. In highly pigmented irides it is thought that this is associated with increased toughness of iris tissue and that the iris is less susceptible to atropine. And, of course, in any case where there is increased risk of prolapse of vitreous, as for instance, in high myopia, peripheral iridectomy which is usually performed after the extraction of the lens, is out of place. Apart from such exceptional cases Tennent thinks that the operation with peripheral iridectomy will largely replace simple and combined extraction.

Ernest Thomson.
With reference to the foregoing article by Tennent, Greeves writes to the editor of the Lancet to say that he has had many years experience of the operation for cataract with peripheral iridectomy, and that, in his opinion, it is the one which gives the best results. That the operation finds favour with the Moorfields staff is indicated by the fact that it was performed at Moorfields 846 times between the years 1919 and 1925. Greeves has never known of loss of vitreous after removal of the lens in consequence of the performance of a peripheral iridectomy. He gives three indications for the performance of complete iridectomy, namely, the presence of posterior synechiae, a rigid pupil, failure of the iris to remain in position after having been replaced. In his experience a small mass of uveal pigment in the wound has never given any trouble provided that the iris itself has remained entirely free.

Ernest Thomson.

In this paper which contains six illustrations in the text, and to which is appended a list of thirty-one references, Pesme reports five examples under his own observation, clinically and pathologically, at considerable length.

The employment of the slit-lamp and corneal microscope has drawn the attention of observers to the co-existence of remnants, more or less abundant, of the pupillary membrane and diverse opacities of the crystalline lens. This concomitance of two varieties of congenital anomaly has furnished an explanation of the origin of certain forms of cataract by a malformation or faulty development of the pupillary membrane.

Beck, in 1838, appears to have been the first to describe this association of pupillo-lental anomalies: in 1886 van Duyse described several cases of persistent pupillary membrane, in some of which he noted the co-existence of lentical opacities. From that time onwards numerous reports have appeared, in many of which attention was called to the relations which might exist, from the point of view of pathogenesis, between malformations of the pupillary membrane and forms of anterior polar cataract. Vogt (1921) in a long paper described cases showing many varieties of congenital cataract accompanied by more or less
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abundant vestiges of pupillary membrane. In some of his cases, as in those of other observers, opacities on the anterior capsule have been associated with opacities in the lens substance, sometimes near the anterior pole, sometimes near the nuclear area.

A study of the earlier observations and of his own cases, leads the author to suggest the following groups, according to the variety of lens opacity:

(a) Anterior polar cataract (central punctiform).
(b) Pyramidal cataract.
(c) Capsular punctiform coronal cataract (called by Pesme "cataracte en taches de bougies" and by Vogt "Kapselstarflecken").

Each of these varieties may or may not be associated with opacities deeper in the lens. Each may also be combined with more or less abundant remnants of pupillary membrane which may exhibit considerable variation.

Among the congenital cataracts associated with pupillary membrane malformations, anterior polar and pyramidal forms are well known. But the anterior capsular cataract in the form of scattered spots, described by Seggel, Thomson, Terrien, Vogt and the author were not known with precision before the advent of the slit-lamp.

In the second part of his paper Pesme gives a résumé of the views of earlier writers on pathogenesis and expounds his own. He also devotes two pages to the "origin and nature of congenital pigmentation of the anterior lens capsule." The final paragraphs of "conclusions" contain a brief representation of his views: At the present time there are sufficient observations concerning congenital opacities of the anterior pole of the lens, associated with malformations of the pupillary membrane, to justify the conclusion that in a considerable proportion of cases, congenital anterior capsular cataract originates in a faulty development of the pupillary membrane. This view of the aetiology differs widely from the earlier view so generally accepted of perforating or non-perforating keratitis. Among the clinical forms whose origin is as stated, that described as anterior capsular cataract of coronal type finds a place.

The cause of these congenital cataracts is an inflammatory process, most frequently heredito-syphilitic in origin, which attacks the pupillary blood-vessels of the pupillary membrane; by this path it reaches the lens; if it attacks the envelope only it gives rise to capsular cataract; but it may also affect the subjacent lens fibres; if the attack is brief it leads to the formation of an opacity near the surface, but if of long duration a fusiform or perinuclear opacity may result,
The congenital pigmentary deposits on the anterior lens capsule are usually discrete; they are more abundant when associated with congenital opacities; they are derived from the retinal pigment epithelium which extends along the pupillary membrane to form the *pars iridica retinae*. Fragmentation of the retinal pigment occurs followed by its dissemination either in a free state or by the agency of migratory cells which follow the pupillary blood-vessels. In the normal state the pigment debris disappears almost totally, but following inflammatory conditions it persists in larger quantity as shown in cases of anterior polar cataract.

J. B. Lawford.

II.—MISCELLANEOUS


(1) Mayou (in continuation of a paper read before the Society in 1925) advanced the theory that in siderosis the iron is present in the eye in colloidal form; in confirmation of which R. H. Ward examined two specimens of human eyes and the eyes of three rabbits, the subjects of siderosis, and found the iron in colloidal form in every instance. With the exception of sclerosis of the blood-vessels of the retina, due probably to contact with the iron in the lymphatic sheaths, the endothelium is little affected, and the epithelial cells are those which retain the iron, show most changes, and suffer most. The changes due to siderosis are as follow:

*Conjunctiva and cornea.*—Epithelium stained when the iron is protruding in the conjunctival sac. Connective tissue only stained in the wound in close proximity to the iron.

*Anterior chamber.*—When a piece of iron is placed in the anterior chamber comparatively little staining of the tissues and destruction of epithelium takes place. The endothelium on Descemet’s membrane is not affected, except in extreme cases.

*Iris.*—The deposit of iron on the anterior surface is only locally around the foreign body when the iron is in the anterior chamber, but the superficial layers of the iris may be impregnated when the iron has made its way forward from the vitreous. The sphincter and dilatator muscles contain considerable amounts of iron, whereas the ciliary muscle is not affected. The pigment epithelium on the posterior surface of the iris is little affected.

*Lens.*—For the colloidal iron to enter the lens, its capsule must be damaged. Diffusion then takes place around and between the fibres of the lens. After a time death of the epithelial cells takes
MISCELLANEOUS

place, and they, together with a certain amount of débris from the breaking up of lens substance, become agglutinated and form collections beneath the lens capsule, which are so characteristic of the condition. In cases where these brown spots have been seen in what appear to be clear lenses, it is probable that the posterior capsule has been ruptured as a result of the concussion.

*Ciliary body.*—The epithelium of the ciliary body and ora serrata contains a considerable amount of iron, especially the cells lying at the bottom of the crypts. The iron is contained principally in the innermost layer of the epithelium, and between it and the outer layer. After a time the outer layer seems to be destroyed and the pigment epithelium is attacked and bleached, the cells discharging their pigment. The destruction of cells may lead to a more albuminous fluid passing into the anterior chamber, accounting for the frequent termination of untreated cases in glaucoma.

*Retina.*—In the early stages a good deal of the iron collects upon the internal limiting membrane and the inner layers of the retina. Some collects upon the external limiting membrane, but the rods and cones are practically free. After a time oedema occurs, and finally complete atrophy with disappearance of the rods and cones takes place. The retinal pigment cells are early affected, which no doubt accounts for the night-blindness in the early stages.

*Optic nerve.*—The brown discoloration of the disc is due to colloidal iron lying on its surface, carried there by means of the canal of Cloquet.

*Choroid, ciliary body, and sclera* are not affected unless the iron is directly embedded in them, as they are protected from the diffusion of colloidal iron by the membrane of Bruch.

G. G. PENMAN.


(2) Duke-Elder divides the treatment into "general phototherapy" and "local phototherapy," the first of which has been dealt with by Goulden (see below). Before radiating an eye the minimal erythema dose for the skin is first determined, and that necessary to produce a reaction on the eye is estimated as slightly less than this. Working with a quartz director at half a metre the average person gets a mild reaction after an exposure lasting two and a half minutes; above this intensity a marked photphalmia leading to tissue destruction may result. In radiating the eye, when an irritating effect is desired, rays shorter than 3,000 A.U. are used, controlled so that they do not fall on the
lens; when a mild biotic effect or analgesic action is wanted rays from 3,000 to 4,500 A.U. are used.

Diseases of the Lids.—Chronic blepharitis responds very well to the unfiltered radiation. Conjunctival Diseases.—The most satisfactory results are obtained by giving intensive doses of five minutes up to twenty or thirty minutes. These cause a sharp reaction, followed by desquamation. "During the exposure the cornea is protected either by holding down the everted lid over it, or by a cardboard support, which at the same time keeps the everted lid in position, and allows of its radiation through a hole cut to conform to its shape."

Good results have been obtained in cases of chronic catarrh and of trachoma, especially the acuter forms.

Corneal Ulcers heal well with a considerable amount of local opacity, but this becomes highly vascularized and largely disappears. Little result is obtained with interstitial keratitis or corneal opacities. A useful bibliography containing 34 references accompanies this paper.

G. G. PENMAN.


(3) Goulden draws attention to several groups of cases in which a certain amount of experience with ultra-violet rays has been gained. In tuberculosis of the iris and ciliary body a means of cure seems to have been found by this means, and three very brilliant cases are quoted. Phlyctenular conjunctivitis and recurrent corneal ulcers in children respond extraordinarily well to the treatment, which is combined with routine ear, nose, and throat examination, with removal of tonsils and adenoids if necessary. Other conditions, such as episcleritis, sclerosing keratitis, and chronic irido-cyclitis, have not shown marked improvement. The striking results have all been obtained in children and adolescents.

The apparatus used is: (a) the naked carbon arc and (b) the mercury vapour lamp. Dosage.—"At the London Hospital, where treatment has been used for the last three years, an initial exposure of half an hour to the arc lamp and two minutes to a 6-inch mercury vapour lamp" at three feet has never had unpleasant results. Erythema of the skin may occur, followed in a few days by desquamation. Brunettes give a more severe reaction and deeper pigmentation. "The dosage is increased at weekly intervals by half hours up to a maximum of four hours daily with the arc lamp and by one minute weekly up to a maximum of twenty minutes daily with the mercury vapour lamp. Each side of the body is exposed at the sitting. When there is a break in
the treatment, an interval of four days does not need any alteration in the time of exposure." An interval of a month necessitates starting again at the beginning. A fortnight's break requires a halving of the maximum that has been reached.

G. G. Penman.


(4) Bentzen reports nineteen case of various eye conditions which were treated by general light baths. The technique employed was that practised at the Finsen Light Institute, the carbon arc being used throughout. Treatments were given every second day, the initial exposure being a quarter to half an hour increasing to a maximum of two and a half hours.

Irido-cyclitis: ten cases. Of these six cases were considered tuberculous. In four the result was good; the disease quietened down leaving the eye in good condition with useful vision; one, after thirty-six light baths, showed no improvement at all; one appeared to recover, had a relapse, and then was lost trace of owing to removal into another district. Four cases were of doubtful aetiology: of these two cleared up with light treatment after other methods had failed, and two showed no improvement. While recognizing that his statistics are small, Bentzen concludes that light therapy has a markedly beneficial action in tuberculous cases, while in others, its results are more unreliable and incalculable.

Phlyctenular keratoconjunctivitis: four cases. In two of these the eyes recovered; two were untraced. There was no effect on the tuberculous adenitis which accompanied the conjunctivitis.

Tuberculous scleritis: one case. Result negative, after five weeks' treatment.

Sclerosing keratitis: one case. Good result, the eye quietening, with cessation of the relapses and the return of useful vision.

Gono-rheumatic iritis: one case. An apparently "inveterate" case; eye almost free from injection after three treatments; patient lost sight of.

Recurrent vitreous haemorrhages: one case; no effect.

Chronic kerato-blepharoconjunctivitis. One case of thirty years' standing; an "excellent effect."

W. S. Duke-Elder.

(5) Funaishi, Sh. — On the subjunctive eye (the third eye). (From the Department of Ophthalmology, Manchuria Medical College, Mukden.) *Arch. of Ophthal.*, July, 1927.

(5) Funaishi has elaborated a series of ingenious tests which show that the imaginary cyclopic eye, first postulated by Hering...
and Helmholtz is situated, not midway between the two eyes, but at the articulation of the occipital bone with the vertebral column. His tests also show that the centre of uniocular vision is located here. The more important of these tests are as follow:

(1) Close the left eye, hold a pencil horizontally in front of the face about 30 cm. away and move it as if its end were directed towards the closed eye. On opening the left eye the pencil will be found to point towards the bridge of the nose.

(2) Look at an object some distance in front with one eye, say the right, and hold a pencil close to it so as to cover the object with its end. Now open the left eye and it will feel as though the pencil has moved to the right and upwards from the object.

(3) Look across a table at a row of paraffin balls on the other side of it at the height of the eyes, close one eye and mark with pencil on paper the table several points along the direction from the closed eye to each paraffin ball. The extension of these lines will pass through a small area situated about 10 cm. behind the vertical plane of the eyes in media. If the row of balls is placed vertically, the converging area is found about 10 cm. behind the eyes and 4.5 cm. beneath them, i.e., in the head articulation.

(4) If a closed eye, or a seeing eye through a tube, is pointed with a finger from the side, the finger will direct slightly behind and below the opening of the ear.

(5) If a pencil be held horizontally with both hands behind the head at the height of both eyes, it practically stands just at the height of the head articulation. The author’s conclusions are:

I. We have two organic eyes but transpose them optically and subjectively at the head articulation (articulation of occipital bone with vertebral column) where the centre of visual direction lies.

II. We find no difference between the eyes thus transposed in actual vision. Hence we have only one subjective eye which may be called "the subjective cyclopic eye or the third eye."

F. A. Williamson-Noble.


(6) van der Hoeve points out that the first essential is to prove that a foreign body which has penetrated the eye is magnetic. The history of the use of only steel utensils points towards this
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in the presence of a penetrating wound. In addition other observations may give much information.

(1) The wound.—A wound which penetrates the coats of the eyeball may have been caused by a contusion in which a point of the foreign body punctured the globe and the object then fell back from the eye. Usually a wound produced by a body which penetrates the eye is quite distinctive from one caused by a contusion. In the case of very small penetrating wounds the binocular loupe or the corneal microscope and slit-lamp enable a certain opinion to be formed as to perforation. In cases of sclerotic wounds there is less certainty.

(2) The presence of a wound of the iris or of the lens capsule, or a cloudiness of the lens renders the diagnosis of the entry of a foreign body still more certain.

(3) The presence of air in the eyeball, especially in the vitreous is also of value.

(4) Direct observation of a foreign body by means of a loupe or corneal microscope for the anterior parts of the eye, and by an ophthalmoscope for the posterior part, gives certain evidence in some cases. In more, however, a foreign body is obscured by cloudiness of the media, by blood or by exudate.

(5) Radioscopy or radiography show the presence of a foreign body except when this is very small. Its location within the eyeball can be determined by taking landmarks and by observing whether the shadow of the foreign body moves with movements of rotation of the eyeball. In three circumstances the observations may lead to error. (a) If the foreign body is at the centre of rotation of the eyeball its shadow will not move. (This position can, however, be determined by direct observation or by measurements of the distance of the shadow from the marks.) (b) If the foreign body is in a tendon or muscle it will move, but less extensively than if within the eye. (c) If fixed to the surface of the eyeball the position of a foreign body is more difficult to determine.

(6) The magnet will cause pain in the case of magnetic substances except when the foreign body is very small or is fixed in a relatively insensitive structure.

(7) The galvanometer gives a positive result in every case of magnetic foreign body, even when very small. If at first the galvanometer needle is not deflected the giant magnet should be used, as a result of which an iron foreign body becomes magnetized and then more readily deflects the galvanometer needle. By the application of the galvanometer to different parts of the eyeball, while the latter is moved in different directions, definite information as to the position of the foreign body may be obtained.
(8) Examination of a visible foreign body with the ophthalmoscope or loupe before and after the application of the magnet. If the foreign body, or exudate covering it, is found to have altered its position, it is certainly composed of a magnetic substance. A negative result is not conclusive, for such a foreign body may move under the influence of the magnet and return to its place when the current is cut off. van der Hoeve asserts definitely that, in the case of a visible magnetic foreign body, under examination by the loupe, corneal microscope or ophthalmoscope, in proximity to the giant magnet, the foreign body can always be seen to move when the electric circuit is closed. It is wise to use a hand magnet first in case the foreign body is not firmly embedded, and if to this test a negative result follows, the giant magnet should be used. van der Hoeve reports in detail four cases in which this combined method of examination was of use. In one it determined the magnetic nature of a foreign body, which was not possible by any of the other methods. In another it showed that the foreign body was bound to the retina by bands, and indicated that a transcleral route was necessary for its extraction. Vision of 5/10 followed this operation. In the third case it gave information as to the progress of the extraction of the foreign body and prevented the unnecessary adoption of a change of method. In the fourth case, it demonstrated that one of three spots visible with the ophthalmoscope was a magnetic foreign body. This was extracted by the anterior route.

The anterior route is advocated except in cases where the foreign body is firmly fixed to the retina and where the use of the giant magnet is liable to cause retinal detachment. In such cases two parallel scleral sutures (not perforating) are arranged meridionally in a situation as near as possible to the site of the foreign body, beneath a large conjunctival flap. A meridional incision is made between the sutures through the coats of the eye into the vitreous cavity. The sutures are held up by an assistant so as to cause the wound to gape. A hand magnet removes the foreign body. The sutures are then tied without the loss of any vitreous, and the conjunctival flap closed.

(A simple and useful additional help in the localization of a very small body or one not completely opaque to X-rays, is the use of a dental X-ray film as advocated by Vogt. The edge or corner of the film is pressed backwards on to the skin between the eye and the nose as far as possible in a sagittal plane. The X-ray tube is arranged to the temporal side. Such a radiograph shows the presence of foreign bodies of very small size in the anterior half or third of the eyeball.—H.N.)

Humphrey Neame.