protanopia or red blindness, deuteranopia or green blindness, etc., are admittedly founded upon a hypothesis which may or may not be true, but their correlatives scoterythrous and photerythrous were invented by Rivers for the express purpose of removing this objection. Rivers, indeed, introduced them when he himself was an adherent of the Hering theory; so he at any rate thought that they described two relatively well defined groups of cases, independently of any theory. However, if one is going to be off with the old it is just as well to do it thoroughly. But, mirabile dictu, red blindness pops up again in the new classification (paragraph 7). Will not this make confusion worse confounded? Because now it has got a brand new meaning: it "indicates decreased sensitivity to long wave-lengths."

Note to 7 (a) tells us that "the best method of showing the defect is to present a curve showing the increase in threshold to light of the region involved." What does this mean? Does it refer to the general threshold or to the chromatic threshold? Surely this ought to be defined, since (paragraph 3) "defects in colour discrimination are not always accompanied by decrease in sensitivity to light"! Further [Note to 7 (b)], "Both normal and hypochromatic individuals use differences in brightness as an aid to colour discrimination, therefore some method should be used in which comparisons are made of lights of unequal brightness." Is not this a non-sequitur? Surely the lights for the tests ought all to be of the same brightness—as in the Board of Trade Lantern recommended by the Sight Tests Committee.

ABSTRACTS

I.—GLAUCOMA


(1) Hamburger, following the suggestion of Ehrlich that the usual theory of the nutrition of the eye could not be correct, attacked the problem afresh in 1897. The results of his work are set out in "Über die Ernährung des Auges," which he published in 1914. Believing that glaucoma must be due to a relaxation of the vaso-constrictor mechanism, causing dilatation of the blood-vessels and repletion of the eye with blood, which effect is most pronounced in the choroid, he proposed the use of synthetic supra-
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renin in glaucoma by which softening of the eyeball with dilatation of the pupil might be produced. He draws attention to the association of a vascular naevus of the face, near the eye, with glaucoma of the corresponding eye, and quotes two cases of acute glaucoma associated with great mental stress, as showing that nervous influence may affect the blood-vessels of the eye and precipitate an attack of glaucoma.

Historical.—At first adrenaline was used by subconjunctival injection for its action on the sympathetic. It was found that by this means good results were obtained in glaucoma simplex, but not in acute glaucoma. The method was also used to dilate the pupil in simple glaucoma and to postpone or sometimes to avoid operation. It was found that where miotics had lost their effect this was restored after the use of adrenaline. With this treatment, however, there is a great rise of blood pressure associated with very rapid pulse and collapse in some cases. Accordingly, a mixture of dextro-rotatory adrenaline and its precursor in the synthesis (1 in 500 and 1 in 100 respectively) was used for subconjunctival injection. Dextro-rotatory is much less active as regards general reaction than the laevo-rotatory form. This mixture is known as "Glaucosan." The desirability of using drops led later to a return to the more active form in a concentration of 1 in 1,000, for the toxic action is not manifest if it is used in this way. "Glaucosan drops" thus contain a mixture of suprarenin and its predecessor in the synthesis (Lab. No. 23). As the drops decompose on exposure to air and in solution they are put up in sealed phials so arranged that the solid and liquid parts can be mixed at will, and then used at once.

Technique.—(a) Patient should be lying down or have head bent well back; (b) two drops are put in the inner angle of the closed lids; (c) separate the lids and instruct the patient to move the eyes about freely for thirty seconds; (d) repeat three or four times in an hour.

Effects.—The eye becomes marble white, and there is a pallor of the lower lid extending towards the mouth; the palpebral fissure is widened. These effects pass off in a few hours but the dilatation of the pupil, which is strong enough to break down recent adhesions, and the softening of the eye persist for several days. When the effect passes off the drops may be repeated or the usual miotics may be resorted to as it will usually be found that they have recovered their effect if their action had previously failed. The use of glaucosan drops should be controlled by the tonometer. No harm has been done to the cornea by the use of drops of the usual strength (1/1,000); a faint glistening haze may be seen with the loupé but this quickly passes off. Glaucosan drops, of course, must never be injected.
Indications.—Glaucosan drops should never be used in glaucoma except where the usual miotics have been tried and have failed or produced catarrh; in any event they should be used in rotation with miotics if possible. They should be given a trial in all cases of simple glaucoma before operation is decided upon, and may be used with advantage in iritis with increase of tension as they soften the eye while dilating the pupil. It is interesting to note that the accommodation is only reduced by about two dioptres so that younger patients may read J.1. with dilated pupils. Even in old people the increased amount of light entering the eye, as compared with that when miotics are used, is very acceptable.

Mode of Action.—Hamburger believes that the remedy acts by producing a powerful vaso-constriction in the uvea which forces the venous blood out of that organ and is followed by a prolonged period of arterial hyperaemia, which is very intense. He refers to it as an "inflammatory" hyperaemia, presumably meaning thereby an arterial hyperaemia with serous exudation. He draws a comparison between this and the inflammatory process of cyclitis, with its usual accompaniment of reduced tension, and makes this the basic reason for his treatment with glaucosan drops. "The tension will be reduced as soon as we succeed in changing the venous hyperaemia into an arterial one."

Amine Glaucosan.—In acute glaucoma glaucosan drops are very uncertain in their action. An alternative to immediate operation is now available however in the use of "amine glaucosan," so called by Hamburger. This is a 10 per cent. solution of B. imidazolyl-ethylamine in secale cornutum. "One single drop will narrow a pupil maximally dilated by atropine, scopolamine, or even glaucosan." The pupil becomes quite narrow, the face flushed, and there is much chemosis. The miosis remains for hours after the other effects have cleared up. It is claimed that this miotic is superior to all others in efficacy, but must be used with some caution owing to the fierceness of its action and the tendency to a fall in blood pressure. No harm has resulted from the use of 10 per cent. solutions as drops using the following technique: (a) the patient must lie down; (b) twice instil holocaine to anaesthetize the cornea; (c) warn the patient that there will be aching, smarting, and swelling of the lids for half an hour; (d) apply the drop—one drop only—as for glaucosan drops; (e) if, owing to lacrymation, the drop is washed out at once it may be repeated once only in 30 minutes. If the drug is not applied as above its action will not be complete and the atropized pupil will not contract.

Hamburger says that his observations are incomplete, but suggests that in cases of acute glaucoma, where everything depends on contracting a rigid dilated pupil, treatment by this
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drug has great possibilities. Its effect is too transitory for it to be of much use in chronic glaucoma and, of course, it can have no value in the treatment of absolute glaucoma or glaucoma due to tumour or venous thrombosis in old people.

These drugs may be obtained from the Chemische Fabric Wolm, Spangenberg, near Cassel (Germany).

F. RIdley.


(2) In the March number of La Clin. Ophtal. Darier has started a new hare which will probably have a considerable run, since the experiences of readers are invited. Of late years a number of communications has appeared on the treatment of glaucoma by adrenaline and it is the modern form of this treatment that is now under inquiry. Hamburger especially (Arch. of Ophthalm., Vol LV, No. 6) has been studying the effect of certain derivatives of adrenaline and a translation is given of his article, which deals not only with these derivatives but with the experience of ophthalmic surgeons in the treatment of glaucoma by adrenaline. In the April number of La Clin. Ophtal. the subject is followed up, in an article by Darier and Godard, in which personal experience of adrenaline leads up to a historical review which ends with the aforesaid researches of Hamburger. It is decidedly difficult to see the wood for the trees because, following all this is a series of ordinary abstracts on the subject of glaucoma from tonometry to treatment which seem to have but little to do with the subject of adrenaline, and one can hardly think that a general symposium on glaucoma is invited. Revenons à nos moutons. According to Hamburger there are three derivatives of adrenaline, two of which dilate the pupil and one which contracts it, but all of which lower the ocular tension. These are named:

1) Injectable glaucosan which is dextro-rotatory and is a compound of adrenaline (dextro-rotatory) and methylaminoaceto-pyrocatechin. It dilates the pupil.

2) Glaucosan drops, laevo-rotatory, is a compound of adrenaline (laevo-rotatory) with the above-mentioned polysyllabic substance. It dilates the pupil.

3) Amino-glaucosan is, according to Hamburger, the most powerful of the miotics. It is a white powder very soluble in water and is composed of chlorhydrate of B-Imidoazolylethylamine.

The action of the two first named in dilating the pupil and at the same time lowering the tension is distinctly important, as is at once obvious, but investigations and clinical observations
do not yet seem to be such as to warrant an attempt to give here all the uses, methods of use, and precautions to be taken. Readers who wish to test these drugs should make themselves acquainted with Hamburger's paper either in the original or in the translation (French) above referred to in *La Clin. Ophtal.* for March, 1927. The subject of the treatment of glaucoma by adrenaline derivatives has here merely been introduced to readers; more is likely to be heard of it.

Ernest Thomson.

(3) Darier, A. (Paris).—A case of severe glaucoma ameliorated by glaucosan. (Observation de glaucome grave amélioré par le glaucosan. Mode d'action.)

Hamburger, Carl (Berlin).—A letter to the Editor of *La Clin. Ophtal.*

Abadie, Charles (Paris).—The medical treatment of glaucoma. (Traitement médical du glaucome.)


(3) In this number of *La Clin. Ophtal.*, the above-named articles continue the discussion which was originally headed "Enquête sur le traitement médical du glaucome," but which in this, the May number, has been altered to "Enquête sur les traitements des glaucomes." The two titles do not necessarily cover quite the same ground.

Darier relates the details of a bad case of chronic glaucoma (a woman, aged 74 years, who had had various treatments for many years, including a technically perfect but ineffective iridectomy), in which he employed glaucosan (laevo-rotatory) after the method of Hamburger, namely, five instillations of one drop every 20 minutes. He shows in a table the Schiötz tension and the size of the pupil each 20 minutes. The tension records are 45 (at the commencement), 22, 20, 25, 25. The visual acuity of the right eye (the left being almost blind) was at the commencement of the séances (each séance comprising five instillations as above) equal to 1/10 and, at the end of 5 séances 1/3.

Hamburger writes to correct some errors which had occurred in the French translation of his article which appeared in the March number of *La Clin. Ophtal.* He courteously explains that the errors are not to be wondered at since he wrote originally in German. A translation was made into English for the *Archives of Ophthalmology,* and then another from the English version
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into French. All of which shows that wherever possible, when new treatments are in question, the surgeon should avoid translations and, be it said, abstracts. It is better to read the account in the original and better still to see the treatment carried out by the original exponent thereof.

Abadie refers to his theory introduced in 1897 at the Société française d'Ophtalmologie according to which glaucoma is a functional trouble of the ocular sympathetic, characterized by the dilatation of ocular blood-vessels. He quaintly remarks that in spite of his having supported the theory by arguments and solid proofs it has not been accepted. Acting upon his own theory he treats glaucoma (not the acute type) by the systematic and continuous use of (for an adult) one and a half milligrammes of adrenaline per day, equivalent to ten drops of one in one thousand adrenaline three times daily. With the adrenaline Abadie associates ergotine 20 centigrammes per day in two pills, and calcium chloride. Although it is not stated in the text it seems certain that the adrenaline is given by the mouth as is the case with the ergotine and calcium chloride. This internal medication is "reinforced" by the instillation three or four times daily of the following eye drops namely:

Chlorhydrate de pilocarpine ... ... Ogr. 20 cent.
Solution d'adrénaline au millième ... X gouttes.
Eau stérilisée ... ... ... 10 grammes.

(The above is reproduced exactly as in the original. It presents at least one obscurity.)

"This treatment gives quite remarkable results."

Bailliart refers to the physiology of the sympathetic, a difficult subject, and says that at least we know something about the action of the sympathetic in the eye as revealed by the action of drugs. He speaks of the work of Hamburger on glauco-san (dextro-rotatory) which acts as a powerful local vaso-constrictor and is used in the form of subconjunctival injections, on glaucosan (laevo-rotatory, or in German "links glaucosan"), which is very powerful and can only be safely applied as drops, and on amino-glaucosan "the most powerful miotic," which is a solution of histamine. Bailliart's article is very difficult to follow on account of the numerous trails he pursues, but the reviewer gathers that while conceding that adrenaline and some of its derivatives may be useful in spite of dilatation of the pupil he pins his faith to those substances which do not dilate the pupil, namely pilocarpine and Hamburger's amino-glaucosan.

ERNEST THOMSON.

(4) Puscariu and Cerkez carried out many experiments on rabbits to test the effect upon ocular tension of slight contusion, of heat application by the thermo-cautery and of subconjunctival injections of pilocarpine (0.015 gram.). The results of their experiments led to the conclusions summarized below. They incorporate in their paper reports of eight cases of injury to the human eyeball which showed somewhat similar results. In discussing some observations of other writers they report two cases of interest in addition to some cases of contusion: (1) a case of orbital cellulitis in a man, aged 21 years, due to frontal sinus suppration, in whom glaucoma was present until after the pus was released from the sinus; (2) a child, aged 11 years, who had received a stab wound in the temporal region five days before and in whom there was increase of tension (45 mm. R.; 20 mm. L.) and impaired vision (R.V. 0.3; L.V. 1.0). The diagnosis of orbital haematoma was made. Seven days later tension was normal and vision recovered.

Of the eight cases of injury to the human eyeball, in two cases within four hours of a slight contusion the tension was raised (35 mm. and 40 mm.); in another, with injury four hours before, there was slight hypotony. Of three cases injured twenty hours before, two had hypotony; the third had slight hypertony, but developed a lower tension than its fellow for a few days. In a case of severe contusion with well-marked external signs, there was high tension for three days (max. 63 mm.). There was no hypotony. No intra-ocular lesion was found in any of the eight cases.

The following facts were proved by experiments on rabbits:

(1) A slight contusion rapidly gives rise to hypertony of short duration followed by hypotony of longer duration. The pupil and iris do not show any change.

(2) Slight thermal excitations (by galvano-cautery) acting on the sclerotic produce immediate hypertony of short duration, accompanied by mydriasis and congestion of the iris; these last two signs are of longer duration than the hypertony, which is followed by hypotony lasting as much as nine hours.

(3) Slight thermal excitations of the conjunctiva or of the cornea have no action on the tension, the pupil or the iris.
Deep conjunctival cauterization produces the same effect as slight scleral cauterization.

Deep scleral cauterization produces hypertony at first, and serous opacities of the cornea, and iris congestion.

Subconjunctival injections of pilocarpine immediately arrest any hypertension that is in the course of developing; they completely suppress it if the injection has preceded the excitation which produces the hypertony.

**Clinical Facts**

1. In man, slight accidental contusions always produce temporary disturbance of the tension, frequently hypertony followed by hypotony.
2. In absolute glaucoma, slight scleral cauterization produces a lowering of the tension for some days, preceded by a temporary rise of tension.
3. Subconjunctival injections of pilocarpine have no effect in secondary glaucoma.

Humphrey Neame.


Jaensch gives here an interesting survey of this disease both in its anatomical and clinical aspects. He gives details of the microscopical examination of nine cases, and adds a very full bibliography of the subject.

The changes which he found at the angle of the anterior chamber agree closely with those described by other writers, viz., a wide-open, usually rounded angle: the embryonic structure of the corneo-scleral trabeculae, and incomplete differentiation of the uveal portion of the lig. pectinatum; narrowness; obliteration, or absence of Schlemm’s canal; defective development of the scleral spur.

In the iris the conditions vary—in young eyes it was well developed, but in the older buphthalmic eyes its tissue was rendered more dense by the proliferation of pigment and hyperplasia of the connective tissue.

Various factors may operate singly or in combination in the development of hydrophthalmus by retention of the aqueous fluid. These are found in the condition of Schlemm’s canal above mentioned, the sclerosis of the trabeculae, the changes at the root
of the iris (stretching or thickening of the tissue, or in the more advanced stages atrophy and connective tissue degeneration) associated with those in the iris itself (proliferation of pigment and the filling up of the crypts with pigment).

In late stages there is a tendency to the formation of a hyaline substance which is not confined to the anterior portion of the eye, but shows itself in the formation of colloid bodies in the choroid. The development of a hyaline layer over the angle of the anterior chamber and surface of the iris leads to shrinking and kinking of the angle.

In the clinical section of this article the most important part relates to the author's conclusions as to the results of treatment. These are: (a) purely medical treatment is useless; (b) of the various operations that were tried—iridectomy, cyclodialysis, sclerotomy, and trephining—the first and the last gave the best results; but in the case of trephining there is the risk of late infection. Even with operative methods, however, he had 59 per cent, failures (which would probably have been more if the cases had been longer under observation), and this leads the author to conclude with the remark that hydrophthalmus is a condition most difficult to treat effectively, while its prognosis must be regarded as very unfavourable.

Thos. Snowball.


(6) In order to test a new theory of glaucoma (that through the alkalinity of the intra-ocular fluid, supposed to be derived from the blood, there ensued a similar reaction of the vitreous and lens with consequent swelling, that led to an increase in the intra-ocular pressure), Schmelzer examined the reaction of the blood in a series of some forty glaucoma patients, together with an equal number of control tests in non-glaucomatous persons, carried out at the same time under exactly similar conditions. These control tests he holds to be absolutely essential and remarks that they were not sufficiently utilized by the author of the theory. He tested the reaction of the blood by the colorimetric method of Cullen as well as the total CO₂ content in the blood plasma, and his results showed that there was no increase in the alkalinity of the blood, or alteration in the CO₂ content, in glaucomatous patients as compared with the normal, and on the strength of these findings holds that this theory of glaucoma is untenable.

Thos. Snowball.
DISEASE OF RETINA


(7) In continuation of his work on the reaction of the blood in relation to glaucoma Schmelzer produced an alkaline reaction of the blood in patients in order to determine whether it would give rise to an increase in the intra-ocular pressure. This was done: (a) by the method of forced respiration; and (b) by the administration by the mouth of large doses of bicarbonate of soda.

In employing the former method he tested in four patients the reaction of the blood and total CO₂ content before the experiment and again after the onset of symptoms of tetany, and at the same time noted the tension of the eye and the size of the pupil. In ten other cases he only tested the tension with the tonometer.

In no case did he find any indication of an increased tension.

Similar results were obtained by the second method as regards the tension, which, indeed, at first was appreciably lowered; the total CO₂ content was considerably raised, and the pupils slightly contracted. The blood pressure was not altered, and therefore was not responsible for the fall in the tension. These results confirm those obtained from his observations on glaucomatous patients.

THOS. SNOWBALL.

II.—DISEASE OF RETINA


(1) Davenport describes a group of cases under this name. The condition is a bilateral change in the macular region in the eyes of senile patients, nearly all his cases being over 70 years of age. The change in one eye at least shows a massive formation, presumably exudative, lying in the outer retinal layers or subretinally. It is usually white or yellowish-white in colour, rounded with sharply-defined edges, and varies in diameter from two to three disc breadths, or even more. It is raised from the general fundus level, carrying the retina forward to a varying degree, and is sometimes irregular in outline or pear-shaped, with the thin end tailing out towards the periphery. There is often brownish pigment near the centre of the mass, and not infrequently exudate is arranged in a circinate manner around it, this varying from something very similar to the true retinitis circinata to little areas of dusty gleaming exudate, more suggestive of cholesterol crystals.
The other macula always shows some lesion; it may be slight at first, but progresses, sometimes to a typical mass like the first, though this is rare. Usually it is very blurred in detail, appearing oedematous, with either small whitish-yellow areas or wispy-looking exudate. In both fundi haemorrhages are constantly found. Beyond some vascular change no intra-ocular lesion has been found having any bearing on the condition. No eye in this series has been obtained for microscopy, but a case was reported by Beatson Hird (Trans. Ophthal. Soc. U.K., XXXVI, p. 345) in which an eye was removed for tumour formation at the macula. It answers in every respect to the conditions of the lesion under review, and the mass was found to be between the retina and its pigment layer, consisting of a fibrous coagulum undergoing organization and having spaces which suggested that they had contained cholesterol crystals. This corresponds with the appearances in Coats's disease, but the clinical picture differs in many aspects.

The aetiology is obscure. All the patients were singularly healthy for their age, and there is not usually gross diffused vascular disease or arterio-sclerosis. It seems essential that the exudative condition is based on a large haemorrhagic exudate deep in the retina as in Coats's cases. In some of the cases it is possible to trace the commencement of the mass on the site of a large deep haemorrhage previously seen, and haemorrhages of the fundus or occasionally into the vitreous are a constant feature. The retinal vessels, with the exception often of the upper or lower temporal artery, are nearly always sound. But with a large mass it is usual to see one of the temporal arteries much altered, being "craggy" in outline, with gross changes in calibre throughout its length.

Before the solid mass is established, the finer branches of the retinal vessels approaching the macula are often seen in focus in front of the general fundus, suggesting a transparent exudate, while behind them can be dimly seen the commencing white mass of organized matter. It seems possible that there is either a large, deep retinal haemorrhage, or else a serous exudate which organizes into the white, solid tumour so typical of the condition. The cholesterol crystals or circinate exudate may be the results of alteration in the other blood constituents, as in the case of haemorrhage. It is possible that in all these cases there exists a raised blood pressure which in most has fallen to a more normal level, accompanied by very limited and local arterial disease, which might be expected to cause changes in such a structure as the macular region. This is put forward by the author as a pure hypothesis. Treatment is of little avail. As regards prognosis, the only local symptom is the impaired central vision, and prognosis is good as far as peripheral vision is concerned.
DISEASE OF RETINA

Little change takes place in the mass, once formed. Three cases have died while under observation, all of them over 80, and in no case was death due to cerebral haemorrhage or uraemia, which would point to the lesions in arteries and kidneys not being of serious import.

G. G. PENMAN.


(2) Redslob refers to the observations of various authors as to the possibility that central artery spasm may cause optic atrophy, that in certain cases embolism of the artery is a cause of atrophy, but that in others thrombosis of the artery follows spasm, and that the clinical picture is identical. He produced central artery spasm in rabbits by the injection of a small dose of adrenaline into the vitreous. The spasm produced a marked narrowing of the retinal vessels in the eye treated, pallor of the optic disc, and in a few cases retinal oedema—described in one case as being like cotton wool around the area of medullated nerve fibres. This spasm persisted for several weeks or months with, in most of the cases, loss of vision as tested by the response of the pupil and eyelid on exposure to light. (In the rabbit the pupil reaction is slight but the winking reflex is very brisk on exposure to light. The pupil reaction was studied with the help of the corneal microscope and its special method of illumination.) The spasm was apparently unaffected by the injection of various antispasmodics or vasodilators (atropine, sodium nitrite, pilocarpine, dionine). Histological examination of two normal (left) eyeballs and four of those injected with adrenaline failed to reveal anything more than marked narrowing of the retinal arteries of the latter. There was no degeneration of retina or of optic nerve, and no change in the walls of the vessels and no thrombosis.

The importance claimed for this investigation is that in certain cases the clinical appearances usually accepted as denoting the presence of atrophy of the optic nerve do not necessarily denote that such degeneration is present. This may hold even where such clinical appearance persists for weeks or months. In all cases of narrowing of the retinal arteries which may be due simply to spasm, attempts should be made by antispasmodic treatment to relieve the condition. In the rabbits it is possible that the spasm was not sufficient completely to close the lumen. The application of larger doses of adrenaline might possibly have such an effect with consequent degeneration of the endothelium and thrombosis. Ophthalmoscopic examination does not allow of differentiation
between arterial spasm without obturation and without pathological change on the one hand, and spasm with thrombosis and optic atrophy on the other. In man it is stated that in spasm without atrophy the pupil reaction persists even in the presence of almost complete loss of vision. A curious phenomenon of biological significance was observed in three albino rabbits and not in the others which were not albinos. A posterior cortical opacification of striate form developed in the lens in each case.

HUMPHREY NEAME.


(3) Collin reports the case of a man, aged 25 years, who was injured by an elephant. There was an area 12 centimetres in length in the right occipital region in which the scalp was torn up. In addition there were contusions of neck and chest, concussion and loss of consciousness. On recovery, he lost 150 c.c of blood by the mouth; this blood was red and frothy and probably emanated from an injury to the lung. The right eye showed some haemorrhages, chiefly along the right inferior temporal retinal vessels, but there was also a subhyaloid haemorrhage. There were positive absolute scotomata corresponding with the haemorrhages. The possible causes of the haemorrhages were: (1) forcible contact of the eyeball against the posterior bony wall of the orbit. This was most improbable. There was no sign of direct injury to the eyeball. (2) Possibly by an effect of contre-coup from the blow on the posterior part of the skull. (3) By compression of the thorax as in the case of intra-ocular haemorrhages in the new born. The patient on regaining consciousness complained of very severe pains in the left side of the chest. There were some rents in his clothing and damage to the skin behind the right shoulder, indicating probable trampling by the feet of the elephant. Visual prognosis was bad in this case owing to involvement of the macula with haemorrhages. In one month's time, the vision was 1/10, the tension in both eyes was low and remained low for one month, the right being lower than the left.

HUMPHREY NEAME.


(4) Halbertsma precedes the description of this case with a review of the literature dealing with spasm of the central artery of the retina. He refers to three interesting cases reported by
other writers. Extraction of the root of a tooth around which had been formed a granuloma in one case and a cyst in another was followed by the disappearance of central artery spasm (quoting Bruner and Polliot). A case of Redslob's of arterial spasm with reduction of vision to 1/10, recovered vision of 4/10 after incision and curettage of the ethmoidal sinus of the same side. A recurrence of spasm occurred some months later with vision reduced to perception of light which persisted. In a few days the opposite eye suffered in a similar manner, but the vision was soon restored after suitable treatment combined with an anti-spasmodic. It is suggested that some cases of central scotoma may be due not to retrobulbar neuritis but to a reflex spasm of the central artery, the result of a septic focus in the teeth or nasal region. Abadie is quoted as having used with success in central artery spasm an immediate retrobulbar injection of 1 c.c. of 1/1,000 atropine solution followed by further injections and internal administration of small doses of atropine.

Halbertsma describes in detail the case of a girl, aged 17 years, who had noticed for several months the occasional appearance as of something black in front of the left eye. One morning the left vision was found to be and to remain definitely worse than that of the right eye. The general health was excellent. The patient appeared in very good health. A noticeable feature was blushing. The right vision with correction was 10/10, the left 2/10. The left pupil reaction was less than the right. The right fundus was normal; the left showed an appearance the description of which implies oedema of the retina around the macular area with the presence of a cherry red centre depressed below the rest. The vessels were greatly narrowed and lost to view in places in the oedematous area. With Bjerrum's screen the right blind spot was found to be normal. The left central field was reduced to a small area to the temporal side of the fixation point for white and coloured objects. Against a diagnosis of embolism, thrombosis or endarteritis obliterans were the following facts: nowhere was a vessel obliterated; the macular arteries were normal except for very narrowed lumen; contrary to the usual occurrence in embolism, the onset was gradual; the final visual acuity of 2/10 was against an embolism in which return of vision was impossible. For several weeks there was but slight alteration in visual acuity or in the field after an early return of the central field. The vision became 2.5/10. During the course of internal administration of atropine (1 mgr. per diem) the vision gradually improved to 4/10 in two to three months. No dental sepsis was found; the radiography of the nasal region showed normal conditions; the blood and urine were healthy and the Wassermann reaction negative. The optic disc became bluish-white in colour, with well-defined
nmargin. The patient's nervous disposition and the absence of any circulatory condition to account for embolism supported the diagnosis of central artery spasm. The following methods of treatment have been advocated in addition to that mentioned above: amyl nitrite inhalation, reduction of ocular tension by miotics, by paracentesis or by iridectomy. The condition of arterial spasm is found in nervous young subjects, especially in females with an abnormal vasomotor activity (prédissposition vaso-motrice) and in whom frequently a sick-headache (migraine) is accompanied by a disturbance of the vision. It is considered probable that two factors enter into the production of arterial spasm, hyperexcitability and excessive stimulation.

HUMPHREY NEAME.


(5) Hairi quotes Siegrist as expressing the opinion that transient blindness does not necessarily indicate spasm of the central artery of the retina. It may be due to a temporary defect of the heart's action in a patient with retinal arterio-sclerosis, or to a very minute embolus. The diagnosis depends essentially on the results which follow the use of antispasmodics and vasodilator medicaments. In a case in which the spasm is of such duration or so intense as to be followed by a permanent defect, the diagnosis is of no consequence—the condition is clinically the same as in embolism. Hairi refers to experimental work by Redslol in which the suggestion is made that an arterial spasm may possibly be so intense as to lead to complete emptying of the vessel with damage to the endothelium and subsequent permanent obstruction. Hairi reports the case of a patient examined when he was assistant to Gourfein at Geneva. The patient, a healthy woman, aged 23 years, complained of attacks of transitory blindness in the right eye. From the age of fifteen years the attacks had occurred irregularly with intervals of one to four weeks, with a positive scotoma in various positions. Onset was sudden, duration three or four minutes, termination gradual. One attack was accompanied by very severe pain in the right temple which lasted four minutes, and was followed by a persistent scotoma in the superior nasal field which remained ever since (three years). The visual field loss corresponded with the inferior temporal artery. The artery was visible ophthalmoscopically as a whitish streak.

HUMPHREY NEAME.
Disease of Retina


(6) Heine describes the pathological findings in three cases of Coats's retinitis. The first was a case of detached retina with the typical picture of Coats's retinitis, in which the eye was removed later for an irido-cyclitis with low tension. The original condition developed with the accompaniment of extremely severe temporal headaches and fits. It was interpreted as a detachment of the retina and ciliary body owing to post-inflammatory shrinkage consequent on a metastatic ophthalmitis accompanying a mild meningitis. The second case had the eye excised since the appearances resembled a Coats's retinitis or a tumour. Examination showed a circumscribed exudative choroiditis. The third showed a bilateral Coats's retinitis, in which pathological examination of one eye showed that a degenerated shrinking vitreous had caused an extensive retinal detachment, while the retina itself showed extensive cyst formation.

From his own observations and a survey of the literature Heine concludes that the disease which appears clinically and ophthalmoscopically as Coats's exudative retinitis may be caused anatomically and pathologically in the following ways: glioma; pseudoglioma; metastatic ophthalmia; choroiditis circumscripta; chorio-retinitis; haemorrhagic retinitis; primary shrinkage of the vitreous with detachment of the retina and the formation of perforations and cysts.

W. S. Duke-Elder.


(7) Lachman opens his paper with a short review of the literature of this condition, the references to which are given at the end of this abstract. The history of the present case was that delivery was effected by forceps without any difficulty, and that, a few months after birth the parents noted the child's eyes were abnormal. He was seen at three and a half months, when both eyeballs were found to be enlarged and under increased tension. The pupils were widely dilated, and through them a brownish mass could be seen behind the lens, flecked with haemorrhages, but not showing any definite vascularization. Three ophthalmologists independently diagnosed glioma of the retina, so both eyes were excised. Pathological examination revealed the presence of complete (umbrella) detachment of the retinal spaces being occupied by blood-stained serum. There were a few
peripheral anterior synechiae, and the iris showed an extreme degree of shrinkage. The subcapsular epithelium of the lens, instead of stopping at the equator, extended almost to the posterior pole, where there was a small subcapsular cataract. The ciliary body and the choroid showed extensive haemorrhages, the vessels of the latter being markedly engorged. There was a dense membrane passing across the globe behind the lens. The haemorrhagic mass separating from the choroid was evidently fairly old, because it showed disintegration and phagocytosis of the red cells, with commencing organization. The eyes of 73 infants, still born, or dying within a few days after birth, were examined histologically. In five of these retinal haemorrhages, in six choroidal haemorrhages, and in two others both retinal and choroidal haemorrhages were found.

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F. A. WILLIAMSON-NOBLE.


(8) v. Hippel has put this case on record as being the first one of typical uncomplicated syphilitic disease of the retinal vessels that has so far, to his knowledge, been submitted to anatomical examination.

The patient was a man, aged 53 years, in whom examination of the fundi showed the retinal arteries converted into thin white lines: the blood column in the veins broken in many places, and there and there constrictions of the veins; a few small haemorrhages and slight excavation of the papilla with some pallor.
DISEASE OF RETINA

With the aid of the clinical picture that had been made it was possible to distinguish between the main arteries and veins in the lower part of the fundus, but it was difficult to describe exactly the condition of the vessels and interpret them owing to the lack of differentiation of the individual coats; it was impossible to make out anywhere satisfactorily the muscular coat of the arteries.

The one certain feature, however, was the thickening of the vessel wall affecting both the intima and the adventitia. In the arteries infiltration with lymphocytes was only slight and occurred mainly in the adventitia. A marked proliferation of nuclei could be observed well beyond the adventitia. There was no proof that proliferation of the endothelium played an important part.

An attempt to show up the coats of the vessels by staining the elastic fibres failed to give a satisfactory result: it was, at any rate, impossible to recognize a real elastica interna, so that one could not say exactly where the increase in the intima began. In the veins no elastic fibres could be observed; in the arteries they had probably been broken up into very fine fibrils.

The changes in the retinal vessels described in this case were, as was to be expected, similar to those found in syphilitic retinitis and chorio-retinitis, and recorded by various authors, most of whom described the adventitia as the chief site of the disease, the intima being secondarily affected.

THOS. SNOWBALL.

(9) Ochi, Sadami (Sapporo, Japan).—So-called cystic degeneration in the peripheral retina. Amer. Jl. of Ophthal., March, 1927.

(9) Ochi's paper begins with a résumé of the literature on this subject in which Ivanoff is quoted to the effect that he was unable to find a single instance of cystic degeneration of the retina among 20 eyeballs taken from children up to 8 years old, yet he found 26 examples in 48 eyes taken from patients, aged 50-80 years. Greef found one example of the condition in a child, aged 6 years. Ochi examined, histologically, the eyes of 15 children, aged from birth to 4 years and 7 months, and found the condition in three instances. The first was a child, aged 3 years 8 months, who died from auto-intoxication; the second, aged 4 years and 6 months, died from tuberculous meningitis and the third, aged 4 years and 7 months, died from dysentery. In none of the cases was there any indication of eye disease. The author is not therefore inclined to look upon the change as essentially senile. His explanation of its occurrence is that the peripheral part of the retina is closely connected with the vitreous, and, at the same time, is located in a place where it might be influenced by contraction of the ciliary muscle and strain on the zonula. A result of this might be the stagnation
of lymph in the retina with the gradual development of cystic spaces to contain it. In other words, the deposition of the lymph is to be regarded as a primary condition, whereas according to the older view, it was the retinal degeneration which was the primary change, the spaces formed becoming secondarily filled with lymph.

F. A. WILLIAMSON-NOBLE.

III.—MISCELLANEOUS


(1) Harman gives a useful account of some of the commoner eye diseases likely to be met with in general practice. Ophthalmic surgeons may be reminded that of the children seen in the schools for the blind, and in the myopic classes, no less than 7.3 per cent. owe their defective vision to the ravages of phlyctenular keratitis. At the age of maximum incidence of the disease, which is the fifth year, there is the maximum decay of the milk teeth, and it is likely that the resulting irritation of the fifth nerve may be reflected in a herpetic eruption of the terminals of the ocular twigs of that nerve, such as is seen in the phlyctenules. That this association is a real one is confirmed when the seat of election of the phlyctenule is ascertained; it is found to be in the lower and outer quadrant of the limbus, the part supplied by the same nerve branches which supply the upper teeth. It is therefore important to get the mouth thoroughly cleansed. The value of artificial sunlight in the general treatment of the condition might also have been mentioned.

A. F. MacCALLAN.

(2) **Imre, Joseph** (Pecs, Hungary).—Protection of the eyes by reflecting glasses. *Arch. of Ophthal.*, March, 1927.

(2) Imre observes that although there is a considerable literature on protecting glasses, the subject still merits investigation, especially from the point of view of what kind of rays should be kept back from the diseased eye, and what rays can be regarded as exerting a healing factor. For example, we know that short wave light has a good influence on tuberculous processes and that in such cases, smoked glasses are not quite rational because they keep back both the violet and ultra-violet rays. Ultra-violet rays shorter than 300μμ do not pass the cornea and cause only superficial changes, those between 300 and 400μμ are absorbed by the lens, the absorption being greater, the older the patient. Most of the modern protecting glasses have been designed for absorption of the ultra-
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violet rays, e.g., Crookes, Hallauer, etc. For absorption of infra-red rays iron oxydul glasses are recommended. The disadvantage of most protecting glasses is that they do not give protection against heat rays, in fact, most of them may be said to generate heat through absorption of the visible rays. It seems more rational therefore to use glasses which shall reflect the harmful rays back, rather than absorb them and convert them into heat. Imre was therefore led to investigate the properties of thin metallic layers. Silver one fifteen millionth of a millimetre thick lets through 32 per cent. of the blue and violet rays between 460 and 480µ, gold of 10µµ thickness lets through the green rays between 500 and 540µµ in 38 per cent. The reflection of ultra-violet rays may be looked upon as perfect if the layer exceeds 15µµ in thickness. Platinum holds back the whole visible spectrum evenly, and its colour is therefore neutral grey. With regard to heat rays, those whose wave length exceeds 1000µµ are checked by platinum in 73 per cent., by gold in 95 per cent., by silver in 97 per cent., almost exclusively by reflection. Thus glasses may be made, covered with thin metal layers so that they protect the eyes equally from ultra-violet and infra-red rays and in any desired degree from the visible rays. Such glasses are very comfortable to wear and give a feeling of coolness in summer sunshine. For pathological cases they are also satisfactory, and patients are found to prefer reflecting glasses to any of the ordinary protecting glasses. They are mounted in a light goggle frame, which protects the eyes from side illumination and reflexes. For very acute iritis, platinum was used, in a thickness that reflects 98 per cent. For tuberculous disease, silver is better, because it reflects the visible rays in any desired percentage, but lets through the rays between 480-430µµ in greater quantity.

F. A. Williamson-Noble.

REPORT OF THE BRITISH ASSOCIATION COMMITTEE ON COLOUR VISION

The following is the report of the Committee appointed by the British Association “to report upon colour vision, with particular reference to the classification of colour-blindness.” The members of the Committee were: Sir Charles Sherrington, Chairman; Prof. H. E. Roaf, Secretary; Dr. Mary Collins, and Dr. F. W. Edridge-Green:

“1. Defects of colour vision usually consist of a decrease in the perception of colours, therefore hypochromatism or hypochromatopia is a suitable term for defects in colour vision.