and, as is constantly being proved in our courts of law, two honest independent witnesses will carry away quite different impressions of the same scene. If this is true even immediately, how much greater must the difference be at a later period, when the varying nature of the visual memory is taken into account? As was well said by this year's Bowman Lecturer: "Increased knowledge of the psychology of perception, in which in man vision plays a predominant part, must depend on increased knowledge of the physiology of the special senses. And, further, that the advance of ophthalmology also depends upon increased knowledge of the physiology of the eye and of vision."

ABSTRACTS

I.—MISCELLANEOUS

(1) Fergus, A. Freeland (Glasgow).—Miners' nystagmus. Lancet, May 23, 1925.

(1) Fergus, who, as a medical referee, has had a large experience of miners' nystagmus, comes to the conclusion, in spite of the great amount of work which has been done upon it by such investigators as the late Mr. Simeon Snell, Mr. Llewellyn and Mr. Robson, that the theory of its aetiology, which attributes the disease to deficient illumination, constrained posture, and inhalation of gases is difficult of acceptation, or, as Fergus says, "the verdict must be one of not proven." In support of the contention that we do not yet understand the aetiology of the disease quite the most important point brought out by Fergus is, in the reviewer's opinion, that miners' nystagmus is almost unknown in America. American literature deals with European, not American, nystagmus. Hoffmann, dealing with an investigation in Illinois, states that five hundred miners working under conditions which would render them liable to nystagmus in this country were carefully examined and not a single case of miners' nystagmus found. Hoffmann says:—"No reasons suggest themselves, however, why this peculiar affliction should be limited to mining districts of European countries and not be found in American coal-mining districts, where, on account of the gaseous nature of the mines, the use of safety lamps is compulsory." Again, from his own experience in the Glasgow Eye Infirmary, Fergus recalls that in his early days miners' nystagmus was but rarely seen. This, one may suggest, is not such a strong point as the one previously given from America, for it will be admitted that if
compensation has not increased the incidence it has certainly increased the number of cases seen. In addition to the usual accompaniments of vertigo, tremors, photophobia and night-blindness, Fergus has noted actual diminution of visual acuteness (which he attributes to a central defect and not merely to the oscillatory movements of the eyeballs), and marked disturbances of the circulation. The diminution of visual acuteness, the disturbances of the circulation, and the paroxysmal nature of the attacks lead the author to say that the disease is not purely ocular in origin, and that it is a much more general condition affecting a large number of centres. Because of this wide-spread involvement of nerve centres a possible explanation seemed to be the presence of some micro-organism not hitherto discovered. The author therefore wrote to the Minister of Mines enquiring whether any investigations had been carried out in this direction, and received a reply in the negative. "I must say," writes Fergus, "considering the immense importance of the disease, I think it is high time that such investigations were made. The disease, so far as I know, is never fatal, but still post-mortem investigations might be made on persons who during life were known to have had it, and also there is no reason why, during the attacks, the condition of the cerebro-spinal fluid and of the blood should not be made the subject of investigation." Fergus then deals with the treatment (one might perhaps rather say the management) of the disease and the legal aspects, notably the question of unfitness for work, in a manner which betokens great sympathy with the sufferer from this affection. Readers who are in close touch with cases of miners' nystagmus would do well to study Fergus's article for themselves. Whether one agrees wholly with it or not, it bears the stamp of large experience and much thinking.

ERNEST THOMSON.


(2) La Cascio reviews the writings of other workers on this subject, beginning with the observation of Arago that stars of low magnitude appear brighter when gazed at not quite directly. The review of the literature shows that previous workers have arrived at very diverse conclusions. The author remarks that, as some previous experimenters worked in daylight and others after varying periods of dark adaptation, it is not possible to compare their results. He makes special reference to the work of Schultze and of von Kries, which resulted in the latter formulating the "duplicity theory."
Lo Cascio, in his experiments, used as his source of light Nagel's adaptometer, reducing the illuminated area by means of a diaphragm to 3 cm. (diameter). He arranged the distance from the illuminated area to the nodal point of the subject's eye so that the illuminated disc subtended an angle of 2°. This distance was 85 cm. During the experiments, the source of light remained stationary, and different zones of the retina were examined by moving the fixation point by measured distances on a tangent plane. The observations were made between 10 p.m. and midnight. The subject was first put in a well-lit room for fifteen minutes, and then examined in the dark-room after varying periods of dark adaptation. The author made two sets of observations, one to determine the manner of increase of light-sense after varying periods of dark adaptation, the second to determine the light-sense of different parts of the retina after full dark adaptation.

In the first series of observations, he found that there are two types of dark adaptation, one rapid, the other slow. Two of his graphs illustrate these two types. At a part of the retina in the horizontal plane, 10° temporally from the fovea, the light-sense increased rapidly during the first seven minutes, then less rapidly up to fifteen minutes, after which it remained stationary. At 30° nasally from the fovea, he illustrates the other type, the light-sense increasing slowly and steadily up to thirty minutes, after which it was stationary. He found in none of his experiments any increase in light-sense after thirty-five minutes.

In the second series of observations the subjects were dark adapted for forty minutes. He found important variations in light-sense in different parts of the retina. Following the temporal half of the retina in the horizontal plane he found a small perimacular zone in which the light-sense was lower than that of the macula itself, with its lowest value at 2° from the fixation point, beyond this the light-sense increased until at 8° it was greater than at the macula; it remained at the same level from 20° to 40°, where it fell rapidly to a value lower than that of the macula. In the nasal half of the horizontal plane the retina behaved, up to 6°, in a manner similar to the temporal half. From 6° the light-sense increased until 10°, where it rapidly diminished, to become nil from 13° to 19° (the region of the blind-spot), thereafter rising less rapidly to 30° from the fixation point, where its value was higher than that of the macula, and then rapidly fell off again. He found the area of complete blindness slightly greater than that corresponding with the ophthalmoscopic limits of the papilla. The zone of low light-sense surrounding the area of absolute scotoma he found to correspond fairly accurately with the green-blind pericentral zone. The findings in the vertical plane correspond generally with those in the temporal part of the horizontal plane.
The zone of low light-sense surrounding the macula he calls the "physiological perimacular night-blind zone" (zona emeralopica perimacular fisiologica), and suggests that it may be explained by the greater thickness of the retina in this region. The rapid diminution of light-sense beyond $30^\circ$ or $40^\circ$ is not due to the progressive narrowing of the pupillary aperture with increasing obliquity of the light because it occurs so suddenly, but is rather due to the alterations in the structure of the retina in the periphery.

The paper is illustrated by graphs, and gives an extensive bibliography of Continental writers.

Arthur Griffith.


(3) Salvati claims that the examination of the aqueous humour is of considerable help in certain cases in the diagnosis between inflammation and neoplasm. The points for investigation are as to whether the albumen content of the aqueous is increased, whether the Wassermann reaction is positive even if the blood reaction is negative, whether there are any cells suggestive of or typical of neoplasm?

Technique. A Pravaz syringe, with a platinum needle is used. It is so designed that, on pressing the piston with the thumb, the needle pierces the cornea and enters the anterior chamber. On releasing the piston, fluid is drawn up into the syringe.

Salvati describes the case of a man, aged forty years, in whom a mass was visible within the eye. The aqueous contained an excess of albumen, had a positive Wassermann reaction and slight lymphocytosis. Specific treatment was adopted and cure resulted with improvement of vision from 7/10 to 10/10. In another case, the cells of glioma of the retina were discovered, and in yet another, pigmented cells of a sarcoma of the choroid.

Humphrey Neame.

(4) von der Heydt, Robert (Chicago)._Contributions of the slit-lamp to our knowledge of anatomy, diagnosis, pathology, and prognosis of ocular disease. Amer. Jl. of Ophthal., February, 1925.

(4) von der Heydt aims at giving a brief outline of the more important facts disclosed by the slit-lamp. It is not possible in an abstract to give all the observations made by the author. The following, however, though well known to those who use the slit-lamp, serve to show its clinical value. Early diagnosis: (1)
Trachoma by finding the otherwise invisible incipience of pannus at the upper limbus; (2) keratoconus by thickening of the nerve fibres, a change in the endothelial reflex, and the presence of the haemosiderin ring; (3) uveitis, by the presence of cellular elements in the aqueous, fluidity of the vitreous and early posterior polar cataract. Opacities in the lens can be localized exactly, small perforations in the cornea are easily seen, e.g., in a case of suspected traumatic cyst of the iris, and numerous other conditions can be studied in detail. With regard to prognosis: In iridocyclitis a retardation of motility of the elements in the aqueous indicates added exudation, while a reversion to greater fluidity indicates improvement. In senile cataract the presence of lamellar separation or of water clefts indicates a tendency to rapid progression—their absence the reverse. The presence of subcapsular vacuoles in advanced cataract indicates an easy extraction.

F. A. WILLIAMSON-Noble.


(5) Yudkin, with a view to examining the progressive ocular changes from a clinical and pathological standpoint, investigated the changes occurring in six groups of albino rats, 21-30 days old. The first group was fed on a mixed diet, the second, third, and fourth groups on a mixture lacking vitamin A, the fifth on the same diet except that phosphorus was also lacking, the sixth on a diet lacking vitamin A, until eye changes were well marked, when the deficiency was made up with cod liver oil or butter fat. The second group was killed when it showed excessive lacrymation and commencing photophobia, the third when fatty plaques appeared in the fornices and the cornea showed some dryness, the fourth when the cornea showed signs of breaking down. The animals were first stunned, then guillotined in order to avoid any irritating effect from anaesthesia.

The lacrimal apparatus in the rat is represented by an extraorbital gland in front of the ear and an intraorbital gland at the outer angle of the orbit. In addition the eye is lubricated by a more viscid secretion supplied by the Harderian gland, in close apposition to the eyeball and secreting its fluid at the inner canthus.

Ocular disturbances occurred from 30-60 days after deprivation of vitamin A. The first signs were lacrymation, photophobia and a sinking back of the eye into the orbit. The lacrimal secretion then became viscid and blood-stained and dry secretion accumulated in the ocular cul-de-sac. The lid hairs fell out, and the lids became matted together. The cornea is unaffected in the early stages, but...
later it shows some peripheral haze and yellowish fat-like patches extend on its surface. When these are removed there is no disturbance of the surface and it will not stain with fluorescein. The cornea now becomes dry, oily, lustreless, and partially opaque. Ulceration, perforation, and panophthalmitis follow if the animal does not succumb. Histologically, the earliest change was the development of small inflammatory lesions in the lid and nictitating membrane, the site of election in the lid being near the palpebral fold. The animals of group 2 had normal corneae and lacrimal glands. The Harderian gland, however, showed definite granulation and vacuolation of the cytoplasm. In group 3, proliferation of the epithelium with slight keratosis at points opposite the early lid lesions were the first changes in the cornea. The epithelium was then invaded by leucocytes and by vessels growing in from the periphery, it became thicker and the keratinized parts were thrown off. Bowman’s and Descemet’s membranes and the posterior endothelium were intact. The Harderian gland in groups 3 and 4 was smaller showing vacuolation and disintegration of the cytoplasm. In one case there was an acute inflammation. The acute process passed on to fibrosis and atrophy. The lacrimal glands showed no histological changes. Some cases in group 4 developed iritis and hypopyon. The changes in group 5 appeared earlier and were very severe. The keratitis for instance was of a fulminating type.

In group 6 there was almost complete regeneration of the cornea and the Harderian gland.

The author is of opinion that the protective substances in the secretion of the para-ocular glands are diminished as a result of the insufficient diet. Thus the avirulent organisms, constantly present in the conjunctival sac, are enabled to produce a progressive low-grade infection.

F. A. Williamson-Noble.


(6) Canities prematura has been found associated with sympathetic ophthalmitis, severe double irido-cyclitis, a blow on the eye, strong emotional excitement, myopia, eczematous conjunctivitis, hysteria, trachoma and migraine. It has also been noted to occur spontaneously. Gasteiger gives the following instance of grey cilia associated with interstitial keratitis in a boy aged 9 years. The whitened lashes were confined to the upper lids, a set of discoloured ones alternating with about double the number of normal ones. Both the normal and the abnormal offered
equal resistance to epilation. They varied in length. According to the parents of the boy the cilia suddenly turned grey within a few days of the onset of interstitial keratitis. There was nothing abnormal about the hair of the head. While it is hardly to be doubted that strong emotional excitement is sometimes followed by sudden discolouring of the lashes, it is not clear that the diseases above enumerated bring about the change. The whitening may occur suddenly or gradually. In the former case it is thought to be due to increase in the quantity of air or air-like gas in the pith of the hair; in the latter to either defective formation of pigment at the root resulting from circulatory disturbance or to defective distribution of pigment from the root to the shaft, while the air or air-like gas content of the pith cannot be left out of account altogether.

D. V. GIRI.


(7) These reports on the new local anaesthetic tutocain deal with its pharmacology and its application in rhinology, ophthalmology, urology and dental surgery. In the report on pharmacology by E. Watson-Williams the drug is described as the hydrochloride of di-methyl-amino-methyl-p-aminobenzoyl-oxybutane, having the formula C\(_{14}H\_220,N_2.HC\). It is related to alypin and to stovain (formulae given). It occurs as a faintly creamy-white powder consisting of microscopic crystals soluble in cold distilled water up to 12 per cent. It can be boiled for a short time without decomposition but should not be autoclaved. The solution will keep good for several days in a stoppered vessel but there must be no trace of alkali; and some glass is alkaline. Normal saline may be used to dissolve or dilute tutocain. Adrenalin may be added immediately before use. Tutocain is insoluble in oils. It is not subject to the Dangerous Drugs Acts. The author discusses the toxicity and concludes that tutocain is about three times less toxic than cocain hydrochloride and rather more than twice as toxic as novocain. “No laboratory investigations of the local effects of tutocain have been made for the purposes of this report, since the clinical evidence seemed so much more valuable.”

Omitting the reports dealing with the use of this drug in rhinology, urology and dentistry, it will suffice here to mention the report on its use in ophthalmology by Chambers and Dixon. These clinicians have employed tutocain in about 100 cases. Fresh solution is advisable, the addition of salicylic acid (as a
preservative) proving too irritating. They found that for superficial work a 1 per cent. solution gave a degree of anaesthesia equivalent to that of 2 per cent. cocain, but with a rather later onset. For deep anaesthesia a 5 per cent. solution appeared to give an effect similar to 4 per cent. cocain. As regards irritation effects the weak solution is non-irritating, the stronger is slightly more irritating than cocain. There is definite injection of the conjunctiva, controllable by adrenalin. Drying of the cornea is less than with cocain. The pupil is dilated by this drug but more slowly than with cocain and to a less extent. The effect on the ocular tension is not mentioned by the authors.

**Ernest Thomson.**


(8) There seems to be at the present time a perfect epidemic of discovery, or perhaps one should rather say of invention, of new local anaesthetics. A very casual glance over some French literature reveals Tutocain (recently described by Watson-Williams and others in the *Lancet* for May 2), Butocain, the description of which is sulphate of paraminobenzoyledibutylamino-propanol, Surocaine, an ether of paraminobenzoic acid, Psicaine, belonging to the cocain group is obtained by synthesis, as is the subject of this abstract. Diocaine, described by Koby as an allylated derivative of holocain in which the two radicles C₃H₅ of holocain are replaced by two C₂H₅ groups. The principal points about diocaine are as follow:—

(1) It is soluble in water and in alcohol and can be sterilized by boiling. It is (like tutocain q.v.) precipitated if the glass vessel containing it contains alkali. Therefore it should be dissolved in boric acid (two to three centigrammes to 10 grammes of saturated solution of boric acid). (2) Anaesthetic power superior to that of holocain. Two or three instillations of 1 per cent. diocaine permit extraction of corneal foreign bodies. (3) Tension not altered at all either in the normal or glaucomatous eye. (4) Pupil and accommodation not influenced. (5) Instillation up to 1 per cent. is painless. (6) The author has made a special investigation as to action on the corneal epithelium. The slit-lamp and corneal microscope show that diocaine has no action on the corneal epithelium of the normal eye, although apparently, slight alterations of the epithelium may occur in the glaucomatous eye. (7) Diocaine does not appreciably alter the calibre of the conjunctival vessels. (8) Its toxicity to the rabbit is said by the manufacturers to be about double that of holocain, but since diocaine has greater
anaesthetic power than hocain equally active solutions have about the same toxicity. 

The author suggests that for repeated instillations the strength should not exceed 2 to 3 per thousand.

**ERNEST THOMSON.**

(9) **Beckershaus, F. (Kiel).** —Pituitary hyperplasia in pregnancy and the visual fields. (Schwangerschaftshyperplasie der Hypophyse und Gesichtsfeld.) _Zeitsch f. Augenheilk._, March p. 181, 1925.

(9) **Beckershaus** has gathered together a considerable bibliography on the subject of the influence of the enlargement of the pituitary during pregnancy on the visual fields and on the light sense.

He finds it incontestably established that this gland increases in weight and in size in all diameters with each successive pregnancy. His résumé of the literature shows that the most contradictory views are held on the visual effect of this enlargement. At one extreme Cavill (1923) finds a definite temporal shrinking of the fields; Beckershaus, having investigated 150 cases of pregnancy, 83 of which were examined within four weeks of labour, and of whom 95 were primiparae, and 55 were multiparae (up to the eighth pregnancy), finds that the visual fields for red and blue were diminished in one case bilaterally, and in one unilaterally on the temporal side, while the field for white was in every case unaltered. Similarly only in a negligible number of cases was the light sense impaired.

He concludes, therefore, that pituitary hyperplasia at this time has practically no influence on the visual field or on the light sense.

**W. S. DUKE-ELDER.**

(10) **Poynter, C. W. M. (Omaha, Nebraska).** —Lens antigen as a factor in congenital and hereditary eye anomalies. _Amer. Jl. of Ophthal._, March, 1925.

(10) **Poynter and Allen** have performed a series of experiments in order to test the statement made by Guyer and Smith, to the effect that the injection of fowl anti-lens serum and rabbit lens emulsion into pregnant rabbits, produced abnormal eyes in the young, and further that these defects were transmissible.

Finlay, Huxley, and Carr-Saunders have already published papers reporting their failure to secure a single rabbit, rat or mouse with eye defects although Guyer’s technique was carefully followed, and the result of Poynter’s and Allen’s investigation is the same. Their first experiments consisted of using rat, rabbit, and sheep lenses for sensitization of fowls and injecting the fowl anti-lens
serum into pregnant white rats and rabbits. Later the sera of the fowls were tested by a complement fixation reaction and methods were adopted that gave a high measure of sensitization. Incidentally it was noticed that when a fowl's serum was rendered sensitive, say to rabbit lens protein, it also gave a positive reaction with that of an ox, sheep, pig, rat or fowl, thus furnishing additional evidence of the organ specificity and not species specificity of this protein. In not one of the experiments cited was a positive result attained. An interesting result, however, occurred in one of the control animals. This was a well-developed doe which was mated to a Belgian buck and was given 5 c.c. of salt solution intra-peritoneally every three days after the tenth day of pregnancy. She had a litter of four which grew well but were unable to open their eyes. The lids were therefore opened and the conjunctival sacs were found to be filled with sterile cell debris. The corneae were atrophic and partially opaque, while the lenses were all densely cataractous; this latter condition persisted, though in two cases the cornea cleared. Later, the young all contracted snuffles and died. The doe was again mated to another buck and had a litter of five, two of which had bilateral cataract, the whole litter dying before they could be bred from. The doe was again mated but died of a brain abscess. In order to attack the subject from a different aspect, a series of twenty rats were successfully injected with the tubercle bacillus by injection into the anterior chamber. Six weeks later a complement fixation test was positive for about half of the series with both rat and rabbit lens antigen. Some of the rats died from generalized tuberculosis, but 48 of the first generation of progeny were obtained and not a single eye defect was found nor has any appeared in subsequent litters.

F. A. WILLIAMSON-NOBLE.

BOOK NOTICES


Two years ago the British oculist who wished to study the microscopy of the living eye was handicapped by the lack of a book dealing with the technique of the slit-lamp in a simple manner. There was nothing to be found in the journals written in English, and the German articles were quite unsuitable for one ignorant of