Major Meyer Wiener, as Director and Chief of Service, and of eight instructors, selected on account of their records as teachers and practical ophthalmic surgeons prior to entering the Medical Corps of the American Army. Material is obtained from several sources: (1) the regular dispensary service of U.S. General Hospital, No. 14, (2) patients from the eye ward of the same hospital, (3) recruits examined elsewhere, and (4) patients in the general medical, surgical, and neurological departments of the General Hospital. At the present time between 500 and 600 patients attend the School per month. The length of the course is four weeks, and it includes the teaching of refraction, muscle and other functional testing, anatomy and histology of the eye and its appendages, external diseases, ophthalmoscopy, operations, and ophthalmic neurology. Liberal use is made of the lantern, diagrams, freehand drawings, and microscopic slides. A feature of importance is the work done in co-operation with the other departments of the General Hospital, notably those of anatomy, surgery, oto-laryngology, X-rays, pathology, and bacteriology.

ABSTRACTS

I—INCONGRUENCE IN HEMIOPIA


Rönne's article deals with the interesting and difficult subject of the relationship of lesions of the optic paths to changes in the visual fields, especially in regard to the presence of incongruence in hemiopic fields.

It is generally accepted that corresponding retinal points are represented by "point centres" in close juxtaposition in one or other occipital lobe. Such an arrangement does not exclude the possibility of incongruence, and it is of great theoretical and practical interest to know in what circumstances we may expect it. Various types of incongruence may occur:

1. Incongruence due to errors of observation in perimetry. This may be avoided by using a series of test-objects.

2. True incongruence is present when the lesion is at a part of the optic path where the fibres from corresponding retinal points are not yet associated. This is more likely to be the case the further
forward the lesion is. Rönne believes that a pronounced incongruence in hemiopia indicates a lesion of the tract near its junction with the chiasma.

3. Owing to the normally greater extent of the temporal field, its outer part is not associated with any part of the nasal field of the other eye, but remains unpaired. Incongruence may thus exist in so far as the temporal defect in one field may be greater than the nasal defect in the other, to the extent of the unpaired portion of the former.

4. Incongruence may occur in respect of an upward divergence of the vertical margins of hemiopic fields. This symptom is not concerned with the arrangement of the nerve fibres, but with the fact that the hemianopic symmetrical plane does not fall exactly in line with the sagittal plane of the eyes.

5. According to Wilbrand, the cortical representation of corresponding points may be irregularly arranged, and thus incongruence in the fields may be produced.

6. The sparing of the macula or overflowing field (überschüssiges Gesichtsfeld) of Wilbrand is another form of incongruence. Rönne believes that this is due to a purely peripheral interweaving of the nerve-fibres in the retina. At the same time a difference in the two sides in this respect must in all probability be referred to an irregularity in the arrangement of the cortical representation.

Cases illustrating the various forms of incongruence are described, and numerous charts are given. Rönne concludes that individual irregularities in the arrangement of the nerve-fibre bundles may exist. Although this explanation may not be considered very satisfactory, he sees no other way out of the difficulty. The mixing of the fibres is in the great majority of cases extremely regular.

H. M. Traquair.

II.—THE PROPRIOCEPTIVE NERVE-SUPPLY OF THE EXTRINSIC OCULAR MUSCLES


In this paper Sherrington adduces evidence in support of the view that the oculo-motor muscles possess a muscular sense, and that by virtue of this they must be considered to contribute in an important way towards orientation.

These muscles are copiously supplied with afferent nerve fibres; and this anatomical fact, taken along with certain physiological
PROPRIOEPTIVE NERVE-SUPPLY OF OCULAR MUSCLES

phenomena to which he refers, appears to Sherrington clearly to suggest the rôle which the eye muscles play, in combination with the retinal images and the labyrinth, as well as, though to a minor degree, with the muscular sense of the neck muscles, providing for complete spatial orientation.

No reference is made to the bearing which pathological conditions of the eye muscles, and the frequently occurring deviations of the eyes, may be supposed to have on the subject. Even the important point of faulty physiological projection is not alluded to. His arguments will therefore, no doubt, appear more completely convincing to the physiologist than to the ophthalmic surgeon. Coming, however, as they do, from an authority of such eminence they deserve the fullest consideration on the part of ophthalmologists. But, as both anatomical and physiological data must be brought into accord with pathological and clinical phenomena, and not vice versa, it would certainly appear as if some modification of the author’s views were necessary.

Admitting the existence of a so-called proprioceptive nerve supply to the oculo-motor muscles, what may the real function of these nerves be? Clearly they do not always serve to indicate through the muscle or muscles the exact position of the eyes; yet it may well be possible that they are concerned in giving information as to the state of innervation, and, still more, the state of change of innervation in these muscles. In other words, they may be end-organs, though possibly not the only end-organs, of an innervation sense. However closely analogous they may be to the ordinary muscle sense afferents, it seems unlikely that they are identical with these. Their interdependence on other factors indicate that they are, in the first place, mere adjuvants. And, in this connection, it is significant that Sherrington has found that “the proprioceptive afferents of the eye muscles at their exits from the central nervous system are, unlike the proprioceptive afferents of most muscles, not separated from the motor fibres.” There are other difficulties in fully accepting Sherrington’s extremely valuable explanations and suggestions which will probably occur to ophthalmologists. But the readers of this journal, who are specially interested in the complex subject which is so suggestively treated by Sherrington must be referred to his paper to be in a position to appreciate the force of the argument by which he seeks to associate a muscular sense with the other factors which subserve orientation.

GEORGE A. BERRY.
III.—TRAUMATIC HYPOPHYSEAL DYSTROPHIA ADIPOSA


Behr has recently had the rare opportunity of observing two cases of injury to the pituitary body in which the patients survived and developed typical dystrophia adiposa.

The first case was that of the attempted suicide of a 17 year old girl who shot herself with a small-bore revolver in the right temporal region. She had previously been a patient at the clinic and had a marked amount of opaque nerve fibres.

When first seen after the injury, the eye was greatly proptosed and the lids oedematous. Both pupils were widely dilated and there was a complete amaurosis. Owing to maniccal excitement she had to be put under restraint for some time. One month after the injury there was complete right and partial left ophthalmoplegia. She was completely blind. A slight amount of contraction could be obtained in the left pupil with concentrated light, but none in the right. Ophthalmoscopically the temporal half of the right disc was grey, while the nasal half still preserved some colour; vessels normal. A broad band of opaque nerve fibres, through which the vessels could be seen, was below the disc. The left disc was of a pale reddish colour and there were opaque nerve fibres below.

Radiography showed the bullet in the neighbourhood of the sphenoid close to the anterior wall of the sella Turcica. This structure was much thickened and splintered with two small fragments of the bullet.

Menstruation, which had previously been regular, after missing one period, became re-established. Six weeks after the injury, the left pupil showed pseudoparadoxic light reaction, contracting considerably after prolonged closing of the lids. In extreme abduction, also, this pupil contracted, and in fixation for near point it was possible to make out definite accommodation by retinoscopy. None of these effects could be observed on the right side. Since, in addition, pressure phosphenes and light appearances on faradisation existed on the left side, indicating that the conduction in the left optic nerve was not completely abolished, an attempt was made to remove the bullet, but this failed.
Three months later the atrophy had become more marked with smaller vessels, and the opaque nerve fibres were more transparent.

About this time a great increase was noticed in the subcutaneous fat and the feet had grown larger. In eight months the body weight had increased 48 pounds. Menstruation had remained normal after the first disturbance and external genital characteristics were unaltered. The thickening of the walls of the sella Turcica, due to callus, were no longer visible by radiography.

It is noted that during the first month after the injury there was an increase of 3½ cm. in the height which Behr thinks was a beginning gigantism, as also was the change in size of hands and feet. This effect ceased after nine months. Behr considers that the gigantism was the result of stimulation of the function of the anterior lobe of the hypophysis, while the over-development of fat followed the subsequent loss of function of the same part of that structure.

As regards the opaque nerve fibres, these remained perfectly clearly defined in the case of the left eye for two and the right for six months after the disc had become quite atrophic. Behr explains this difference between the two eyes as due to the more complete destruction of the conducting elements on the right side. The fact that the disc appeared completely atrophic before there was much alteration in the opaque nerve fibres, he considers indicates that destruction of the nerve sheath is not the primary cause of the paleness of the optic disc which is really to be attributed to vascular causes.

The second case was that of a 22 year old soldier who was struck on the head with a club. He had a superficial wound extending horizontally from behind the left ear for ten centimetres, in which the bone was exposed and the surface splintered. For a month after the injury he suffered from loss of memory, alexia, and sensory aphasia. He also had paresis of left oculomotor nerve and left optic atrophy when first seen by Behr three months after the injury. Visual fields, absolute right sided hemianopia. This improved later to a defect in the right temporal field, but left a typical bitemporal colour hemianopia with the dividing line passing through the fixation point. The oculo-motor paresis recovered and vision in both eyes was 6/6 six months after the injury. The left disc remained pale. Excessive fat development was first noticed three months after the injury. In nine months the weight had increased 50 lbs. This was unaccompanied by glycosuria, thirst, or affection of vaso-motor system. No definite change in the sella Turcica could be made out by radiography. Diet had no effect on the fat development, which was rapidly checked by the administration of pituitary gland substance. That the organic preparation was responsible for the improvement was shown by the effect of leaving it off, the weight immediately rising again.
The rest of the paper discusses the views of writers on the functions of the hypophysis with some account of other recorded cases.

Behr concludes that his cases support the view that overaction of the anterior lobe of the pituitary results in acromegaly, diminished development of fat and genital hypertrophy, while underaction produces the opposite effect.

A considerable bibliography accompanies the paper.

E. E. H.

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IV.—TONOMETRY


This fascinating paper by McLean should be closely studied by all those who have learnt to value scientific tonometry. It first outlines the disadvantages of the existing tonometers, which are stated to be: (1) the distance between the foot-plate of the instrument and the reading scale; (2) the fact that the original readings are on an arbitrary scale; (3) the necessity for the translation of these readings by a chart which is none too easy to decipher; (4) the trouble in changing weights, and (5) the mechanical disadvantages of the plungers used, since the force of capillary attraction impairs the accuracy of the readings. After dealing with the various models of impression and applanation tonometers that have been before the profession, the writer describes his own instrument, which would appear to have many and great advantages. It has been graduated by the aid of experiments made on enucleated human eyes, the correct reading being indicated in each case by control experimentation with a water manometer, specially devised for the purpose. The most ingenious part of the apparatus is the needle employed and the device used to guard against any possibility of altering the original tension of the eye by the volume of the metal thrust into it for manometric purposes. McLean claims that with the exception of Weber and Wahlfors, he is the only man who has done experimental work on living human eyes by connecting the interior of an eye to a manometer. The importance of these experiments lies in the fact that "the large number of tests made on living eyes *in situ* agreed with the tests of those same eyes after enucleation." From this he infers that his "testing apparatus for enucleated eyes is fairly correct." Apart from having furnished us with an instrument a trial of which will be welcomed by all who value accurate tonometry, the inventor has incidentally made some
important discoveries. He finds both in man and animals, that the reading of the Schiötz tonometer is far too low as an expression of true intra-ocular pressure, though the disparity would appear to be greater in animal than in human eyes. In this he differs from the findings of Polak-van-Gelder, who stated as a result of experiments on animals, that the discrepancy between his tonometer (Schiötz) and manometer readings, was negligible, not more in fact than 1 mm. of mercury. Another new point made by McLean is that the induction of general anaesthesia by ether is productive of a marked fall in intra-ocular pressure. This was shown both by tonometer and manometer readings. Those who use the new instrument will have to accustom themselves to an entirely new conception of what the normal intra-ocular pressure should be taken to be. This, however, is far from being an insuperable objection. The paper is illustrated by clear diagrams and equally clear tables.

R. H. ELLIOT.

V.—REMEDIES


(1) Galyl is a French and not a German preparation of arsenic. This, at any rate according to Richard, is one very good reason for its use. He employs the drug in intravenous injections of concentrated solutions in accordance with the technique of Ravaut for neo-salvarsan. Large doses are avoided, the total quantity being 1.6 to 2 grammes in 35 to 45 days, by eight or ten injections. For after-treatment Richard gives six injections of 0.2 gramme each. The treatment is very well borne, and unless the technique has been imperfect, there is no induration of the vein. Some patients have a rise of temperature five or six hours after the first injection, but only when they are in the secondary stage of syphilis. The rise is not great (to 38.5 or 39 degrees Cent.), and does not recur at the second injection. Diarrhoea, properly so-called, does not occur, but there may be some slight looseness of the bowels. The author has not met with albuminuria and the drug seems to be without effect on the kidney. On the other hand, he has been most careful to eliminate cases of cardiac or aortic disease; such cases are not treated by galyl. Where there is non-syphilitic disease of the lungs, liver, spleen, kidneys, eyes, or ears, the treatment may be carried out with an extra amount of caution. In primary syphilis the chancre is very quickly affected by the drug, while, in the secondary stage, the evolution of the disease seems to be cut short when it is treated.
in time. In fact, in the cases seen from the very beginning, and treated from the beginning, there has been neither rash nor affection of mucous membranes. The secondary rash yields rather slowly, eight to ten days. Mucous patches heal very quickly. Finally, it may be said that the author employs mercury concurrently, in the form of intramuscular injections of grey oil or intravenous injections of cyanide of mercury. These associated treatments are quite well borne.

Ernest Thomson.


(2) Darier, hitherto content with paraspecific serum therapy, has lately had occasion to try the antigenococcic vaccine of Nicolle and Blaizot which is named Dmégon. He had a very good result, and seems inclined to give the vaccine full credit; nevertheless, he employed local treatment as well (argyrol, ichthargan), and considers that, at any rate, the combination was excellent. It may be mentioned that according to an article dealing with Nicolle and Blaizot's work which is reproduced in this number of *La Clinique Ophtalmologique*, Dmégon is one of a series of vaccines prepared by these workers. There are two classes of such vaccines, the preventive and the curative. Belonging to the latter class are the antigenococcic Dmégon, antistaphylococcic Dmesta, antityphoid Dmedo, and the pertussis curative Dmeco. In the former (preventive) class are the antityphoid Drepado, the anticholera Drepachol, and the antidysenteric Drepidys. The Greek root *Dme* is reserved for the names of curative vaccines and the root *Drep* for the preventive vaccines. These vaccines are called fluorised vaccines (*vaccines fluorurés*) and are stable, atoxic, and multivalent. The preserving fluid is an aqueous physiological solution of fluoride of sodium. Fluorides have the property of killing microbes without coagulating them. To this is due the stability of the vaccines. All these vaccines are prepared in such a way that the volume of micbic emulsion to be inoculated is half a cubic centimetre. This has two advantages. In the first place it prevents mistakes, and in the second place since the fluoride is slightly caustic, the less the volume of the fluoride the better. But since a dilute vaccine is better absorbed than a concentrated one, the amount of the vaccine is diluted with three times its volume of sterilized physiological saline. The vaccine and the dilutant are supplied ready in ampoules. The best method of use is intramuscularly.

The reviewer would like to remark that as a lucid summary of the nature of vaccines and sera, quite apart from these particular vaccines of Nicolle and Blaizot, the article transcribed in this number of
La Clinique Ophtalmologique to which reference has been made, would be very hard to beat.

(3) Domec, Th. (Dijon).—The treatment of various ocular affections by means of sterilized cow's milk injected intra-muscularly or hypodermically. (Traitement d'affections oculaires diverses, par le lait de vache stérilisé, en injections intra-musculaires ou hypodermiques.) La Clin. Ophtal., September and October, 1917.

(3) Domec's article is interesting but somewhat discursive. The author was attracted to the question of using cow's milk injections by the work of Müller and Tanner, of Vienna. What Domec has to say is almost entirely the result of clinical observation. Only in one instance were experiments on animals adopted as control. He has used these sterilized injections in a number of different eye affections where formerly, he would have used Roux serum, and apparently has been more satisfied with them than with the serum. The following is a list of the conditions which are specially referred to, namely, severe traumatic ulcer of cornea, traumatic and non-traumatic infective irido-choroiditis, post-operative infections, lacrymal abscess, eczematous kerato-conjunctivitis, hereditary specific keratitis. Having had very satisfactory results in these classes of cases, Domec then argued that as the milk injections seemed enormously to increase the defensive power of affected tissues, it might act in this way even though the cause were non-microbial. The proof that he was right in his supposition came to him in the form of a case of severe burn of the eyes by sulphuric acid. The milk injection treatment resulted in an almost complete absence of cicatricial tissue and consequent symblepharon, such an absence as he had never seen before under similar circumstances. In confirmation of this result experiments on animals (rabbits) were carried out, and it was found by comparing milk-injection-treated rabbits with non-treated, after the eyes had been injured by sulphuric acid, that the same remarkable absence of cicatricial tissue occurred in the treated animals as opposed to the untreated. Domec hopes that the treatment will be tried in the case of injuries by burning gas or liquid.

As to details of the preparation of the milk injections, the frequency of employment, the complications to be looked for and avoided (though these are few), the reader must refer to the original. The reviewer does not think he will find therein any very satisfactory explanation of the good effects of the milk injections.

ERNEST THOMSON.


(4) Shahan's article is apparently a sequel to a paper read at a
meeting of the American Medical Association at Detroit, 1916. At this meeting, Shahan introduced his "thermophore," an instrument for the application of regulated heat to the cornea, short, that is to say, of cauterization. The instrument is not illustrated in the present article. It consists essentially of "a resistance coil for generating heat, a sensitive zinc-iron regulating strip to admit or shut off electric current as more or less heat is needed, variously sized applicators for conducting the heat into variously sized areas of the cornea and a thermometer for measuring the intensity of the heat." The author describes certain experiments with low degrees of heat applied for some time, and with higher degrees for short periods. It was found that organisms (pneumococcus) could not be killed within the cornea by degrees of heat lower than that necessary to cause permanent clouding of the cornea. The method of prolonged application of low degrees of heat was therefore abandoned in favour of the one minute exposure. This minute unit was chosen because it was found that for any constant quantity of heat, the posterior surface of the cornea reached its maximum temperature in one minute. Increasingly higher degrees of heat were applied to virulent pneumococcus ulcers on rabbit's eyes, until a point was reached where the organisms were killed within the substantia propria. This point was 152° F. In a special series of experiments it was found that after one minute at 152° F. the epithelium was completely destroyed over an area somewhat greater than the facet of the applicator, and that the surface of the cornea was clouded so that the iris was scarcely visible through the heated area. The epithelium was replaced in four or five days, and the clouding slowly diminished to almost complete disappearance within six or eight weeks. The experiments had now reached a practical stage and the method was applied to serpiginous ulcers on human corneae. Since the application was to last only one minute, the complication of electric supply of heat could be abolished, and the instrument was simplified so that the core could be heated in a spirit or a Bunsen flame. Since the temperature in this modification of the instrument is constantly, though slowly, falling, the initial temperature has to be a little higher. The routine temperature found best by experience is 158° F. The action of the heat on the ulcer is threefold, namely, destruction of the organism, expulsion of dead bacteria and pus cells from the ulcerated surface, and corneal leucocytosis. The last does not appear till after the second or third day, and "can only be depended upon to take care of small and attenuated foci unaccompanied by pain or renewal of hypopyon." It is really not advisable to count upon leucocytosis to do much. "If the process is to be stopped abruptly and permanently by one application it is necessary to make the application with an initial temperature of 158° F. for one minute to
every part of the infected area. If the area is irregular or larger than the largest applicator surface, the application must be made to a part of the ulcer for one minute, the apparatus re-heated and an application made to another part of the ulcer, using differently sized applicator surfaces if necessary until the whole ulcer is completely covered.” The author rightly points out that this method adds slightly to the quantity of scar tissue caused by the ulcer, increasing slightly the final opacity. This compared with the opacity caused by even a slight extension of the ulcer is “practically a negligible quantity.” The author reserves this method for cases that will not heal in any other way. It should be considered as a “radical means of successfully overcoming a severe and dangerous form of progressively destructive ulceration that frequently leads to blindness, and should be reserved for the treatment of such conditions.”

Finally, the author describes the actual technique, which may here be condensed as follows, namely, thorough local anaesthesia; avoidance of all reference to “cautery” or “heat” when speaking to the patient about the operation, so as to obtain good fixation; the method of heating the core; application of argyrol when the heat application is completed, and of cocaine and atropin when the patient complains of pain half an hour later. Should there be an exacerbation, this is to be treated by further application of heat. Atropin for the frequently occurring iritis is best applied in oily solution.

The thermophore can be obtained from Messrs. Erker Bros. Optical Company, 608, Olive Street, St. Louis.

Ernest Thomson.


(5) Shahan describes a modified thermophore, but the new instrument cannot be manufactured for general use until after the war.

S. S.


(6) McPherson’s experiences in India and Mesopotamia have convinced him that smoked glasses should be worn under exceptional circumstances only, and that even then they should be but moderately tinted.

S. S.


(7) Three years after the surgical removal by Sweet of an
endothelioma, attached to the upper and inner wall of the orbit, which had perforated the bone, a swelling of the frontal bone was noticed, particularly of the outer portion, while the temporal bone also showed enlargement. The condition was treated by x-rays, in full therapeutic doses, for five minutes once a month, which succeeded in holding the process in check for several years, while, as shown by x-ray plates, regeneration of bone took place in the frontal region. The man, however, died with cerebral manifestations ten years after the first symptoms of the orbital growth had been observed.

S. S.

CORRESPONDENCE

FACTORS IN STEREOSCOPIC VISION

To the Editor of The British Journal of Ophthalmology.

Sir,—I have read with great pleasure the interesting contribution of Dr. E. M. Eaton on "Factors in Stereoscopic Vision and the Visual Estimation of Distance," which appeared in the February number of the Journal. On repeating, however, the experiments with the stereoscope which he describes, I find I am unable to agree with his statements of fact, and consequently with the deductions therefrom.

If an ordinary stereoscopic photographic view be divided into two halves and the left half, i.e., that part of the picture which is placed in the stereoscope opposite the left eye, be placed in the stereoscope opposite my left eye, I see it double. The view seen by the left eye is projected well towards the right, while the portion of the picture seen by the right eye is projected towards the position which the picture actually occupies. With the right half of the picture before the right eye, duplication occurs again, the projection being as already described. The two views in each case show distance and solidity very clearly indeed, the erroneously projected view being lighter than the other. If now the left half of the picture be placed in the stereoscope before the left eye and the right half of the picture brought forward so that the projected view of the left is overlapped by the correctly placed view of the right eye, the resultant view shows depth and solidity well marked. By reversing the pictures, the only difference I found between the perspective views due to one eye and that due to the use of two, was that the combined view was somewhat blurred in its fine details.