were revived some years ago at the Inns of Court, might be attempted at the eye hospitals in Great Britain. Such a plan would give the student confidence and would help to balance the knowledge acquired in the week in question. Ophthalmology offers plenty of subjects for serious discussion and if a wag once in a way were to ask the question whether strabismus came to England with William the Conqueror or was indigenous among the aborigines; such a light-hearted theme, incapable of proof, might help to vary the monotony. The arrangements might be left as a rule in the hands of the chief clinical assistants, and a weekly rota of attendances for the seniors, who would occupy the position of judge or arbiter, would let each man know beforehand the date of his attendance and would not add very greatly to his labours.

At the present time when the question of post-war reconstruction is being much discussed, we commend this idea to those in authority for what it is worth. On a small scale the scheme would have some affinity to the ophthalmic club which has been for many years a feature among the seniors in the profession.

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**ABSTRACTS**

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**I.—LENS**


(1) Fischer recalls that Vitamin B₁ in the lens is present in the form of co-carboxylase, *i.e.*, phosphorylated vitamin B₁. It is, therefore, effective not as a vitamin but as a ferment. It is the cause of the break-down of pyruvic acid, the accumulation of which characterizes the progressive turbidity of the lens and explains the deficiency of lactic acid in the cataractous lens.

**Arnold Sorsby.**

(2) **Bencini (Siena).**—The parathyroid and thyroid glands and the lens. (Sistema tiro-paratiroido e cristallino). *Boll. d'Ocul.*, June, 1939.

(2) There are four parathyroids in the dog, two situated on the upper end of the thyroid, two smaller, on the deep surface of the gland. This makes the removal difficult. Bencini operated on four dogs in 1934; all suffered from convulsions which were relieved by the injection of calcium and parathyroid hormone. In
all the animals the amount of calcium in the blood fell after the operations. Three of the dogs died within a month; the fourth lived for more than a year although the injections were stopped after a month on the cessation of the convulsions. In this animal fine opacities were noticed in the lens after six weeks, under the anterior capsule; later, similar opacities were seen under the posterior capsule and radial striae. The cataract became total in nine months. The animal became cachectic with loss of appetite, intense conjunctivitis, and loss of hair in patches, and eventually died. In 1935, the author operated on four other dogs; these showed similar convulsions but under treatment by calcium and hormone survived for two years. During this time no opacities appeared in the lenses. He then removed the remainder of the thyroids, noting marked hypertrophy of the piece that had been left; in one dog he implanted a fragment of this gland on to the surface of the iris. This animal alone survived but showed in the other eye fine subcapsular opacities. The author thinks that the total cataract which was formed after the striae had remained stationary for months while the animal was losing weight, was due to the total cessation of the functions of the thyroid.

HAROLD GRIMSDALE.


(3) It is well known that the removal of the parathyroids is followed by the appearance of opacity in the lens; it has been generally supposed that this is due to a disturbance of the electrolytic equilibrium, causing a rise in the Ph of the aqueous and a consequent increase in the imbibition of the lens and of the calcium content. In a previous paper, Taliercio has shown that administration of parathyroid hormone does not increase the calcium in the lens, although the calcium content of the blood is raised. He has examined a number of rabbits, in each case testing the respiration and glycolysis of the lens before and after the administration of the hormone. He finds no difference between the two states. He holds that these observations confirm Campos’s opinion that the lessening of the glycolysis in rabbits after parathyroidectomy is in direct relation to the increase of calcium in the lens of such animals.

HAROLD GRIMSDALE.


(4) Some thirty-four cases of cataract in connection with scleroderma have been published. Other symptoms may be present but
those of the skin are the most marked. The disease seems to be due to some endocrine disturbance; the thyroids, the parathyroids, the pituitary and the genital glands seem to have the greatest importance in its production. There is in most cases some disturbance of the calcium metabolism, probably due to impaired action of the parathyroid. Rubino gives the history of a case which has been under his observation; there was a history of familial cataract affecting a brother, a sister, and the father, but it seems to have been impossible to see these. The patient was operated on for cataract at the age of 21 years (he was 38 when seen). The right eye was aphakic; the left showed mature cataract. Perception of light and projection were good. He had noticed for about two years whitish areas of skin on the abdomen which had gradually spread; they had been benefited by treatment with thyroid. The opacity of the left lens was remarkable for the presence of white patches on the anterior capsule—due apparently to the deposition of calcareous matter. The remainder of the lens was turbid and appeared slightly shrunken. Rubino raises the question whether the cataract and the endocrine changes are part of the same disease or whether they depend on some hereditary taint. He thinks that this cannot be settled at present. When examined by Rubino, the patient showed hypercalcemia, but the state of the calcium metabolism at the appearance of the cataract, cannot be known. Rubino thinks that the calcareous spots on the capsule may be due to the hypercalcemia which may be only recent.

Harold Grimsdale.


(5) Sironi has had the opportunity of seeing cataract due to high tension current and to lightning stroke and comparing the two, he finds the changes identical. He thinks that in lightning stroke the main discharge often misses the person who is affected only by some of the branches, into which the whole breaks up. Thus the potential is reduced to something like that of high power industrial current. It has been said that the occurrence of a cataract shows that the discharge must have passed through the head; the author’s cases seem to show that this is not necessary since the burns produced at the point of entrance and exit were on the body and leg. The appearance of the opacity may not follow the accident immediately but may be delayed for many months.

Harold Grimsdale.

Pinkhof describes the changes in an eye removed in a child aged four because of secondary buphthalmos. The eye had previously shown lens opacities, capsulo-pupillary vessels and afterwards spontaneous resorption of the lens. Apart from changes resulting from chronic intra-ocular hypertension, there were found: resorption of lens substance, signs of capsule rupture and upward displacement of the lens residue; irregular displacement of the ciliary processes, mostly backward, but locally much forward; a membranous septum behind the iris, connected with the ciliary body, the lower pupillary border, the lens residue and a remnant of the hyaloid canal. This septum, containing elements with both glial and mesenchymatous properties, also showed elements with the properties of zonular fibres and membranes, finding insertion on the lens residue, the ciliary body, the hyaloid canal rest and on the anterior and posterior aspect of the lower pupillary border.

Arnold Sorsby.


Weekers reports that the isolated adult rabbit’s lens irrigated with Ringer or glucose-free Tyrode-solution becomes turbid by the second or third day. On addition of glucose to the perfusion medium the lens keeps clear for a longer period. Neither fructose nor galactose can be substituted for glucose. The period of survival of the organ under the experimental conditions of this work is in no case so long as that of Bakker who used abdominal fluid.

Arnold Sorsby.


Borsotti has tried during the past three and a half years to see whether injection of emulsion of lenses, cataractous and other, has any effect on the absorption of remains of lens from the anterior chamber, after cataract operation. He gives notes on 34 cases; of these, 15 showed no reaction to the injections; 19 seemed to have an unusually active absorption after injection, but it is not possible to say how much was due to the treatment. When
the operated eye showed iritic reaction, injection was in all cases followed by rapid improvement. In as much as no inconvenience was seen after injection in any case, the author thinks that this method should be tried whenever the remains of lens are slow in becoming absorbed.

HAROLD GRIMSDALE.


(9) Rochat failed to find lactoflavin in the human lens, but a fluorescent substance was present in normal lenses of all ages, and in cataractous lenses in which any clear substances remained, which in its chemical behaviour was probably a breakdown product of lactoflavin. He does not contradict Fischer’s observation as to the presence of lactoflavin in animal lenses.

D. R. CAMPBELL.


(10) Marchesani describes the occurrence of a globular lens with brachydactyly, as a congenital defect. The lens is abnormally small and prone to subluxation. It causes myopia and often gives rise to glaucoma. Brachydactyly is a lack of growth of the hand and fingers, and is a striking contrast to arachnodyactyly, a condition which can occur with ectopia lentis. The possibility that the size of the lens is influenced by the mode of growth of the ciliary body (a mesodermal structure) is discussed.

D. R. CAMPBELL.


(11) Fischer reports that the yellow-brown substances of ageing and cataract lenses belong to the melanoidines, These are condensation compounds of amino acids or amines with carbohydrates. They are sharply distinguished from the humine and melanin substances.

They have anti-toxic properties owing to the fact that they use up amines in their synthesis. Other views as to the nature of the colouration of the lens are discussed.

ARNOLD SORSBY.

(12) On a detailed study with special apparatus Colenbrander concludes that it is possible by means of monochromatic objects to determine accurately the chromatic aberration of the eye and to get trustworthy values for the chromatic aberration of the lens. The not unlikely hypothesis that the specific chromatic aberration of all human eyes is the same makes it possible to detect the power of the lens and to compute the length of the eye.

Accommodation was determined with a new test-chart designed by the writer. A moderate correlation could be found between the power of the lens and the accommodation.

**Arnold Sorsby.**

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**II.—MISCELLANEOUS**


(1) **Måhén's** paper consists of tabulated details of 65 patients treated with dinitro-orthocresol, the table indicating the absence or the degree of lens changes and the effect on vision.

**Arnold Sorsby.**


(2) **Sjögren** recalls the clinical picture produced by irritation from sulphuretted hydrogen (conjunctivitis and superficial punctate keratitis). He describes two cases of his own and emphasizes that different people respond unequally to the irritant.

**Arnold Sorsby.**

(3) Kaye, Herbert (Johannesburg, South Africa).—Treatment of angiomatosis retinae. *Arch. of Ophthal.*, March, 1941.

(3) **Kaye** gives an account of two cases of angiomatosis retinae which were successfully treated by H. B. Stallard. One is the son aged 24 years, and the other the daughter aged 26 years, of a woman already blind in both eyes from the end results of angiomatosis retinae, which had been treated unsuccessfully by radium. In
the daughter, the right eye had already been treated by radium and had a complicated cataract; the left eye, which saw 6/6, had a globular angioma in the temporal periphery of the retina. The son had a similar, but less advanced lesion. Both were sent to England and treated by Stallard with a combination of katholysis and surface diathermy. The former method was used for localisation of the growth and the katholysis needle was also passed into and around the large feeding vessels just proximal to it. The growth itself was treated by katholysis punctures (3 m.a. for 3 seconds), three applications of surface diathermy (100 m.a. for 8 seconds) and several punctures with a 1.5 mm. needle (40 m.a. for 3 seconds). These cases have now been followed for 12 months since the operation and show a satisfactory result with full preservation of vision. The previously enlarged vessels, feeding the growth, are normal in size, the area formerly occupied by it being densely white with a good deal of fibrous tissue.

F. A. W-N.


(4) Starting with the statements that post-operative infections of the eye were relatively infrequent in pre-Listerian days, and that the earlier bacteriologists noted how few were the organisms which could be cultivated from normal conjunctivae, Thompson gives an interesting review of the work done up to date on lysozyme and the antibacterial actions of the tears.

The results obtained by earlier workers were somewhat contradictory, but analysis brings out certain facts. Thus there is a fair unanimity about the killing or inhibition of cultures of staph. aureus by tears, but there is doubt about other organisms. Ridley, using a new technique, found that staph. aureus, haemolytic and faecal streptococci, pneumococci, and cholera vibrios were markedly inhibited, whereas b. coli and b. typhosus were not affected. He also found that a slight decrease in tear concentration would cause complete loss of anti-bacterial action. Fleming in 1922 appears to have been the first to demonstrate the lytic effect of tears against many saprophytes and a few parasites (e.g., some strains of streptococci were dissolved by tears even in a dilution of 1:100). Zur Nedden in 1907 found that while normal tears had no action against b. typhosus and other organisms, the fluid obtained from the conjunctivae after treatment with silver nitrate had a marked bactericidal action on these bacteria, an effect which was later proved to be due to enzymes liberated by the breakdown of leucocytes consequent on their exposure to silver nitrate. Fleming, when he made his discovery of the lytic properties of tears found that the same effect
could be obtained with egg-white, nasal mucus and various tissue extracts. He gave the name "lysozyme" to the enzyme responsible for producing this lysis of bacteria, and its properties are as follows:—it is a polypeptid enzyme, of small molecular size, soluble, heat stable and filterable in acid but not in alkaline solutions. It is inactivated by oxidising agents and by some heavy metals, though under some conditions this action is reversed by sulphide or cyanide groups. The enzyme is first adsorbed on to the wall of the susceptible organism and then makes this permeable so that lysis occurs, probably through a specific action on the sugar linkages of certain amino-carbohydrates. The rate of lysis is increased by heat up to 60°C, and by an increase of acidity, the optimum pH being about 4.

It is notable that although lysozyme is present in most mammalian tissues and fluids, it is absent in the cerebro-spinal fluid, the aqueous and the urine. Also, although it is present in high concentration in human tears, it is present in very small quantities in the tears of cats and rabbits. Lysozyme is produced by the lacrymal gland, and Ridley showed that hypersecretion of tears causes an eventual diminution in its concentration.

Its formation is related to vitamin A intake as shown by its absence in the tears in xerophthalmia. The effect of lysozyme action on organisms other than the sensitive micrococci differs markedly with the pH, an apparently specific reaction being obtained against certain organisms only at a certain hydrogen ion concentration. The position is further complicated by the possible presence of other bactericidal substances, e.g., saliva has an inhibiting action against diphtheria bacilli which can be destroyed by temperatures or by filtration processes which leave the lysozyme intact. The effect on lysozyme of various antiseptics used as lotions was found to be injurious, with the exception of merthiolate. The indirect effects (e.g., silver nitrate), however, might be different, though they have not yet been adequately studied. The same observation applies to the general antibacterial action of tears which is almost certainly not due entirely to their lysozyme content. The action of egg-white, however, as a remedy for eye diseases dates back to the earliest Roman and Anglo-Saxon periods and recent work by two observers shows its efficacy in surface infections of the eye. This is probably greater than some of the other historic eye remedies, such as "rain water, caught on Ascension Day."

F. A. W-N.


(5) Statti gives some useful hints about the administration of pentothal, based on his experience in 100 consecutive eye cases.
For smooth anaesthesia, pre-operative medication is essential. An injection of morphia and atropine is given, 30-45 minutes before operation, and a 0.50 per cent. solution of pontocaine hydrochloride is instilled into the eye in 3 doses at 5 minute intervals before operation. The amount of pentothal used has to be adjusted to the requirements of each individual patient, and it is best given intermittently. The initial dose in adults is 2-3 c.c. and in children and aged patients 1-2 c.c. The injection is then stopped for 30 seconds, before a further 2-3 c.c. are administered— as a rule the patient is ready for operation after 5-10 c.c. It must be remembered that since the agent is given intermittently, the effect of each successive dose is increased, the pause between injections is therefore highly important. It is equally important that oxygen or a mixture of oxygen and carbon dioxide be administered continuously during operation, owing to the tendency to respiratory depression.

F. A. W-N.


(6) Mauthner fifty years ago noted that all chronic forms of sleeping sickness were associated with ptosis, ocular muscle palsies, and engorgement of the walls of the third ventricle and of the aqueduct. He therefore deduced that sleep depended on a temporary suspension of function of the periventricular grey matter which interrupted conduction to and from the cortex. This work was confirmed in 1939 when Ranson found that excitation of the hypothalamus produced wakefulness, destruction of it, sleep. This region includes the tuber cinereum, the corpora mammillaria and the adjacent nuclear masses, extending from just behind the chiasma to the opening of the aqueduct. The ocular concomitants of sleep can be explained as a sequence of muscular fatigue, and depression of cortical and sympathetic activity. As a result of this latter, the upper lid droops and the antagonistic orbicularis is stimulated, lacrimation ceases and the eyes feel dry. Conjunctival vaso-dilatation excites production of mucus, with accompanying sensations of grittiness and burning. These symptoms bear a close resemblance to those of so-called conjunctival asthenopia, a condition often associated with insomnia and the resemblance led Lebensohn to postulate a depression of activity of the sympathetic nervous system as the underlying cause. He therefore tried small doses of thyroid (gr. $\frac{1}{2}$-1 daily) in patients with chronic conjunctival hyperaemia not yielding to other measures, and the results in a large number of cases were most encouraging.

F. A. W-N.

(7) In October, 1939 Nicholls carried out a survey of the incidence of abnormal ophthalmic conditions among rural school children in Pontiac County, P.Q. In May, 1940, another similar survey was carried out in this County and in Wakefield County. The pupils were examined without selection. In all 512 children (255 male and 257 female) between the ages of five and eighteen years were examined. The examination comprised the anterior segment, adnexa and extra-ocular movements. Vision was tested at 20 ft. under proper illumination and all children showing subnormal acuity were examined under a cycloplegic. The results are given in tabular form and in commenting on them the author writes as follows:

"Of the ophthalmic conditions found the most important and interesting comparisons are seen with regard to defects of vision. In the present survey 14.6 per cent. of the children had subnormal visual acuity as compared with 29.7 per cent. in the previous survey. A search for the reasons of this reduction discloses some interesting facts. It is found that the incidence of hypermetropia and hypermetropic astigmatism in the two surveys is almost identical. The same is true of anisometropia, which is another frequent cause of subnormal visual acuity. It is found that the lower incidence of subnormal visual acuity in the present survey is due entirely to the smaller number of cases of strabismus and myopia. There is a definite hereditary factor in both these ailments. A larger proportion of the children of the previous survey were related in some degree than in the present series. In the more detailed analysis carried out in the first survey it was found that myopia became less common, the younger the age-group. In the present series a greater proportion of the children belong to the lower age-groups. Apparently something else, statistically less definable, is operating. In the first survey fully one-half of the children examined attended Shawville High School, practically under urban conditions. Whereas, in the present series, much the larger proportion of children attended school under rural conditions. In some places it was found that school closed down during the severe winter months. In other words, the children in the previous survey were under a more continuous and determined educational drive than the children in the present survey. This has taken its toll in myopia.

In the two surveys glasses were prescribed in almost the same percentage of cases. However, fewer children were found already wearing glasses in the present series. In four such cases it was found that the glasses worn were not necessary. As in the last survey, a medical practitioner was not responsible for the mistake in diagnosis in any of these cases."

R. R. J.
(8) Cogan, David G. (Boston).—Bullous keratitis, with particular reference to the pathology of experimental corneal vesiculation. Arch. of Ophthal., June, 1941.

(8) Cogan's purpose in writing this article is to compare the pathological changes produced in his experimental cases of bullous keratitis in cats with those seen in a clinical case in man, where the eye was removed less than three weeks after the onset of the condition. There are four current theories of the production of bullous keratitis. (1) That the fluid is derived from the aqueous by percolation through the substantia propria. (2) That the epithelial changes are the expression of a neuro-dystrophy. (3) That they are secondary to disease of Bowman's membrane. (4) That they are due to osmotic imbibition of fluid from the tears. The author cites objections to all these theories except the last which is strongly supported by his experiments. In these he injected salt solutions into the anterior chambers of cats' eyes, concentrations of 2-5, 5, 10, and 20 per cent. being used. The surface of the cornea was kept moist either with tears or with tears mixed with normal saline. Oedema of the epithelium and superficial opacity appeared within five minutes of injection and quickly went on to formation of bullae of gradually increasing size. The stronger the concentration of the salt solution the more quickly did the changes occur and the greater was the vesiculation. If distilled water was used for moistening the front surface of the cornea, the changes were more marked still and if the endothelium of the living cornea had been scratched, prior to the injection of salt solution, the epithelium overlying the scratched area showed oedema and vesiculation first. Histologically, the epithelium increased in thickness, the swelling involving both the cytoplasm and nuclei of the cells. It was not always uniform and sometimes there were left strata of relatively less swollen cells occupying one or two layers. Similar stratification occurs in human bullous keratitis. The subepithelial debris found in the bullae probably represents the contents of basal cells which have swollen and burst.

Although the substantia propria is little changed in experimental or clinical bullous keratitis, it was found to be swollen to double or treble its usual thickness over those areas where the endothelium and Descemet's membrane had been scratched off, prior to injection of salt solution.

There are three main differences between (a) the acute experimental type of bullous keratitis, and (b) the chronic clinical condition. In (a) the vesicles are subepithelial; in (b) intra-epithelial. In (b) a concentric arrangement of cells is found rather like cell nests, which is absent in (a), while finally the subepithelial material in (a) is a mixture of amorphous debris and free nuclei, but in
(b) there is also some organised tissue. The author considers that none of these differences invalidates the analogy between the two conditions.

F.A.W.-N.


(9) Reese has studied 174 cases of orbital tumours for the purpose of eliciting certain important clinical points in their differential diagnosis, the incidence of various lesions, the treatment indicated and the prognosis.

He has subdivided this clinical material into three groups. (1) New formations primarily in the orbit, 109 cases. (2) Those arising in structures contiguous to the orbit, 51 cases. (3) Orbital new formations arising from systemic disease or from a neoplasm situated at a distance from the orbit, 14 cases.

The growth of a haemangioma of the orbit may stop with the body growth. Pseudo-tumours, the result of chronic inflammation, show a more rapid onset of exophthalmos than orbital neoplasms other than carcinoma and lymphosarcoma. Prodromal symptoms of diagnostic importance are diplopia, transitory oedema of the eyelids and conjunctiva and retro-ocular pain. Radiographs are frequently negative. Regression may take place and in 4 or 5 months enophthalmos is evident.

Meningioma is a slow growing tumour and innocuous recurrences may appear 20 years after excision of the neoplasm. These growths are radioresistant. Dermoid cysts of the orbit remain dormant for a long time and then undergo rapid growth in a few months.

Glioma of the optic nerve may extend from the optic disc to the hypophysis and sometimes be manifest at multiple focal points of origin in one or both optic nerves in the chiasma and the brain. It is remarkable that recurrences do not appear in spite of incomplete removal in some cases.

Carcinoma of the lacrimal gland is very rare and only two cases of sarcoma have been recorded. Lacrimal gland tumours are more commonly "mixed-celled." There is a high frequency of recurrence after excision and distal metastases and intra-cranial extension occur.

Haematoma of the delayed type becomes manifest many months after trauma. The new formations described above formed 87 per cent. of the 174 cases of unilateral exophthalmos investigated by the author.

In group (2) neoplasms arising in the naso-pharynx were in some cases small enough to elude detection at the site of the
primary growth. Such neoplasms extend to the foramen lacerum, along the carotid artery and through the superior orbital fissure into the orbit. Carcinoma of the ethmoid is frequently associated with secondary infection and orbital cellulitis.

In group (3) the principal systemic disorders responsible for orbital new formations were metastatic carcinoma, Hodgkin's disease of the lacrimal gland, lymphatic leukaemia, Schuller-Christian's disease and gumma.

The author discusses the value of X-rays in diagnosing bone involvement, enlargement of the optic foramen and intracranial extension. He recommends aspiration biopsy in some cases. In performing exploratory operations on the orbit it is important to avoid cutting through the upper lid in which the levator palpebrae superioris muscle may be damaged. For neoplasms in the temporal part of the orbit he states that satisfactory exposure for the removal of the neoplasm may be obtained by an external canthotomy and a conjunctival incision around the temporal half of the globe from 12 o'clock to 6 o'clock about 10 mm. posterior to the corneo-scleral junction.

H. B. STALLARD.