ABSTRACTS

I.—CORNEA


(1) Kuo Ping Kuan here adds to the list of cases of white rings in the cornea already recorded (vide Brit. Jl. Ophthal., Vol. XVII and XVIII) a description of eleven observed by himself.

In offering a theory of the aetiology of this condition, which is always situated in Bowman’s membrane, he remarks that it seems natural to suppose that it arises from some change in the pores in that membrane or the nerves passing through them from the plexus under it; disease of a portion of this nerve plexus might cause a breaking-down of the most superficial layers of the stroma and the adjacent parts of Bowman’s membrane. But as this would not account for the arrangement of the white spots in rings he suggests that Bowman’s membrane may be invaded by some process from the pores in the form of toxins passing through the pores and producing cloudy swelling or necrosis in the membrane, which may lead to precipitation of albumin, fatty degeneration or deposit of mineral salts at the margin.

He concludes that the formation of these white rings is due to disease of a perforating nerve, but leaves it open as to whether the cause is the direct action of toxins on the membrane with subsequent necrosis or a trophic disturbance.

He thinks that this change very possibly takes place in foetal life, i.e., he regards the white rings as congenital; an exogenous cause scarcely requires consideration.

THOS. SNOWBALL.


(2) Saul followed up 100 cases of interstitial keratitis seen between 1905 and 1920. He found

(1) Vision of less than 1/6 in 16 cases, 11 of whom were practically blind.
(2) Myopic astigmatism in 53 eyes.
(3) Vertical elongation of the cornea in 13 eyes.
(4) Pupil disturbances (absolute or reflex rigidity) in 15 cases, who were otherwise free from neurological lesions.
(5) Deafness of varying degree in 35 cases.
(6) Hutchinsonian teeth in 31.
As far as the course of the affection was concerned, the time of onset did not seem to be a matter of significance, nor could any difference be established as between the cases treated with N.A.B. or mercury. An excessive incidence of sterility is also probable.

ARNOLD SORSBY.


(3) It is well known that it is often possible to see, when the cornea has cleared after interstitial keratitis, patches of choroiditis, generally in the periphery, but sometimes scattered all over the fundus. It has been a question whether the choroiditis preceded the keratitis or was part of the same process. It is not often that there is an examination made of the fundus before the eye is attacked by keratitis, but there are sometimes cases in which the eyes are not attacked simultaneously, and one may escape entirely. In the hope of throwing light on this point, Colomba has examined the eyes of a number of subjects, some of whom had suffered only in one eye; the rest had recovered from the keratitis and had practically normal central vision.

Of the seventeen who had escaped with one eye attacked seven showed no appreciable disturbance of the fundus. The central visual acuity was normal and the visual fields and peripheral acuity were also approximately normal.

Of the other ten, six showed in both eyes small isolated patches of choroiditis, for the most part unpigmented; three showed in the affected eye, in addition to the small patches common to both, large reddish yellow areas covered with abundant pigment; one had escaped all change in the unaffected eye, but the other showed gross changes in the periphery.

All these had normal central vision; the attacked eye showed slight loss of eccentric acuity.

In twelve both eyes had been attacked, of these three had no appreciable fundus change; three showed small foci in the periphery with little pigment, the others showed more gross changes.

In all members of this group the indirect acuity and the visual field were reduced in the sectors in which there was visible choroidal change.

From these and other records, it seems probable that the choroidal change precedes the attack of keratitis, in so far as concerns the small unpigmented patches, but that the grosser change is part of the same process as the keratitis.

HAROLD GRIMSDALE.
II.—GLAUCOMA


(1) Control examinations, after at least one year, were undertaken by Holst in 281 out of 534 eyes which had undergone iridencleisis operation at the Oslo University Clinic between 1928-32. It was found that:

(1) Vision had remained unaltered or had improved in 83.6 per cent.
(2) The field was satisfactory in 96.6 per cent.
(3) The tension had become normal in 75.1 per cent. and could be brought down to normal in a further 15.7 per cent. by the use of a miotic.
(4) Vision, field and tension—taken together—were satisfactory in 68 per cent., or 79.4 per cent. if the group which required miotics is also included.
(5) Cataract could not be demonstrated as a complication of the operation.

Late infection occurred in three cases and sympathetic ophthalmia in one. Cystic scars were present in 17.1 per cent., and posterior synechia in over 42 per cent., this latter without deleterious effects.

ARNOLD SORSBY.


(2) Vannus draws on the results obtained during 1921-31 in Elschnig's clinic at Prague in cataract extraction in 62 cases of primary glaucoma and 38 cases of secondary glaucoma. Dividing his material into groups as to whether iridectomy, cyclodialysis, other glaucoma operations and no operations at all had been performed before the extraction, and noting further whether the tension was normal or not, at the time of extraction. The author shows that the best results were obtained in cases of primary glaucoma, particularly in those who had iridectomy performed; as between the previously non-operated eyes are those that had cyclodialysis done, the first group fared the better. The least favourable were those in which the tension was uncompensated before operation. No hypotony was observed in any case, though in a few cases vision kept on failing in spite of the lowered tension following extraction. In more than half the cases the field remained unaffected, but in three the central area became engulfed. In eight
cases tension became increased after operation, but was easily controlled by pilocarpine; in general, extraction influences raised tension so favourably, that the procedure may be regarded as an anti-glaucoma operation.

ARNOLD SORSBY.


(3) Basile has used X-rays in a number of cases of haemorrhagic glaucoma and has found them useful in small doses in relieving pain. The dose given was 1/6 of that producing erythema. In most cases the intra-ocular tension fell to some extent. In four of the eleven it fell to normal, and remained. Most of the cases had lost all vision, and in these the cessation of pain made it possible to avoid enucleation.

HAROLD GRIMSDALE.


(4) In January, 1935, Dr. E. M. Josephson advocated the use of an extract of adrenal cortex in the treatment of glaucoma simplex, on the theory that this hormone served to render the capillaries less permeable to the water in the blood plasma. He reported one cure of glaucoma, and claimed to have arrested the advance of progressive myopia by the same treatment. His article attained a considerable degree of publicity and in the journal "Time," there appeared a statement to the effect that Dr. Josephson, Manhattan Eye and Ear Specialist, had at last ascertained the true cause of glaucoma, and could cure it with a drug. Woods therefore decided to investigate the effects of this treatment on patients in the Wilmer Ophthalmological Institute. The action of this hormone is not yet fully known, and its injection into normal animals and men has no demonstrable effect on the blood or body tissues. Its repeated injection into an adrenalectomised animal will, however, serve to keep it alive indefinitely, whereas without injections, the animal dies in a state of shock. The extract of the cortex does not of course contain adrenalin. Eleven glaucomatous patients were treated by intramuscular injections of a properly tested preparation with a total absence of any effect on their intra-ocular pressure, or composition of the blood plasma. A twelfth case was treated by intravenous injection of the hormone and again the intra-ocular pressure was not lowered.

F. A. W-N.
III.—CONJUNCTIVITIS


(1) Bishop Harman’s paper was read before the general assembly of the International Association for the Prevention of Blindness, in Paris, on May 11, and deals with the chief social features of the disease. The evidence cited has been mostly collected in London, but similar has been obtained elsewhere. There are three sources of evidence for the basis of this report:—A large ophthalmic hospital, a children's hospital and the London elementary schools.

From these sources the author concludes that conjunctivitis is greater in infancy than in youth, and in youth than in age; in the poor, the dirty, and the overcrowded, than in those whose conditions of life are relatively clean, comfortable and open; in the early summer months, April-June, than at any other season of the year; and in females than in males.

Both in the children’s hospital and at the ophthalmic hospital analysis of the annual returns shows that the peak of incidence is in infancy. The graph shows a sharp fall from birth to the second year and thereafter a steady fall year by year.

The incidence per 100,000 was found to be as follows:—Infancy; 22; school age, 20; young adults, 18; adults, 15; elders, 7. These figures have also been related to a group of eye diseases which occur fairly uniformly in all ages; and here the relative figures of the incidence of conjunctivitis shows a steeper curve:—150, in infants; 110, in school age; 50, in young adults; 35, in adults; and 10, in elders. Exceptions to this general statement were to be found in the curves of blepharo-conjunctivitis, phlyctenular disease and angular conjunctivitis.

An interesting table under the heading “Social influence,” gives the figures related to the ‘constant’ of other diseases among native and alien cases. Here conjunctivitis in natives number 100 to 471 in aliens. For trachoma the figures are 3·4 and 58; for phlyctenular, 3 and 28·4; and for blepharitis, 15 and 126·5 respectively.

As regards cleanliness a table shows 19 cases in 2,174 above the average; 134 in 9,463 average; and 197 in 10,256 below the average.

Fifty clean children examined bacteriologically gave 20 sterile conjunctivae and the same number of dirty children gave only 3 sterile.

Bishop Harman concludes *inter alia* that “the prevention of conjunctivitis can be secured through an improvement in sanitary
conditions and personal cleanliness. The risks of epidemics in resident institutions can be eliminated by the strict rule that toilet articles shall be used only by the person to whom they are issued. The measures for prevention of conjunctivitis can be most effectively applied through the School Medical Service, whereby all children are periodically examined and the necessary treatment arranged. The presence of chronic conjunctivitis such as trachoma is a legitimate ground for the exclusion of immigrants."

The paper is a most valuable contribution towards the public health and should be read, in its original form, by all concerned in the administration of the health services of the country.

R. R. J.


(2) While ophthalmia neonatorum is very rare in Egypt, children hardly commence life before they fall victims to other form of conjunctivitis. This is assisted, according to Wilson, by the practice among the poorer classes of instilling into the eyes of their babies a mixture of onion juice and salt, in the belief that this is a prophylactic against eye diseases. As this is done for forty days the conjunctiva is kept inflamed and more susceptible to the implantation of pathogenic bacteria.

In Egypt the principal causes of infectious conjunctivitis are the gonococcus, the Koch-Weeks bacillus, and the diplo-bacillus of Morax-Axenfeld. These may occur in an acute, sub-acute or chronic form. All are endemic throughout Egypt, but the first two show very constant epidemic and seasonal variation.

The diplo-bacillus may be found in conjunctival smears all the year round, and often in children who have no acute conjunctivitis. Few children reach the end of the first year of life without suffering from acute conjunctivitis, the result of infection with the Koch-Weeks bacillus or gonococcus. However, the higher one ascends the social scale the less frequently are the acute ophthalmias met with. The epidemics of ophthalmias which have attacked the inhabitants of Egypt and invading armies from time immemorial have been often described and still constitute a severe menace in the absence of careful sanitary precautions.

Gonococcal conjunctivitis, as has often been pointed out, is not of venereal origin. It is the aetiological variety of conjunctivitis which causes the most damage to the eyes. It may be found in the conjunctival sac months after the initial attack. The author has
found that Koch-Weeks infection is more common in children during the first year of life, but that after this, and up to the age of fifteen years gonococcal ophthalmia is more common. Later Koch-

- Weeks infection regains its predominance.

The author states the pneumococcus is often found in smears but is seldom the primary cause of the acute ophthalmia. This was not the experience of MacCallan and Sohby as shown in the Reports of the Ophthalmic Section of the Public Health Department for 1919 and 1921, who found that the pneumococcus was considerably more dangerous to the cornea than the gonococcus; they are shown as percentages of cases of ulceration seen:

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<tr>
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<th>1919</th>
<th>1921</th>
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<tr>
<td>Pneumococcus</td>
<td>...</td>
<td>36.27</td>
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<tr>
<td>Diplo-bacillus</td>
<td>...</td>
<td>35.92</td>
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<tr>
<td>Gonococcus</td>
<td>...</td>
<td>30.23</td>
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<td>Mixed infection</td>
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The seasonal variation of the various aetiological forms of conjunctivitis was first studied in Egypt by Meyerhof, and later, with enormously increased numbers of patients to study, by MacCallan, who published graphs showing the relationship of different bacteriological causes of conjunctivitis to the mean maximum atmospheric temperature of Egypt and the relative humidity. These were begun in 1914 and continued until 1921 in the Reports of the Ophthalmic Section. They are approximately similar to Wilson's findings. MacCallan attempted to make a fly census, but failed to do so, owing to the defective fly-traps with which he was supplied. The author gives the results of fly censuses, but does not state if they were obtained by any scientific method or were the results of casual observations.

The incidence of Koch-Weeks conjunctivitis is at its lowest in January or February, the coldest period of the year. Then an epidemic commences, the height of which is reached in May or June, when the atmospheric temperature is rising. After this although the temperature remains high there is a marked falling off in the number of cases until the middle of August, when a new rise begins, which is never so great as the first. From October onwards the cases steadily diminish.

The incidence of gonococcal ophthalmia is low until June, when a check occurs: after which a new and much higher maximum is reached in October, when the temperature has begun to fall. This is a constant phenomenon and was noted both by MacCallan and Meyerhof.

It is thus seen that a certain degree of warmth is required before
the Koch-Weeks epidemic begins, and a still greater degree of heat before the gonococcal epidemic starts. The gonococcus does not resist drying so well as the Koch-Weeks bacillus, so it begins to die off in May with a lessened atmospheric humidity. With increased humidity in September, owing to the rise of the Nile flood, there is an increase both of Koch-Weeks and gonococcal.

The author says that there are two fly-breeding seasons in Egypt, the first begins in March, when the temperature is about 26°C., but the flies die off rapidly when the temperature reaches 35°C. in May. The second fly-breeding season begins in September when the temperature has fallen to about 31°C., and continues till the middle of October.

It is noteworthy that the Koch-Weeks epidemic begins just after the flies begin to increase, and the maximum coincides with the height of the fly-breeding season. The maximum of the gonococcal epidemic coincides with the second fly-breeding season. The summer minimum of Koch-Weeks cases and the August fall in the gonococcal curve coincide with the summer minimum incidence of the fly pest.

It is thus seen that the seasonal epidemics are closely related to the three factors, temperature, humidity and flies.

It is stated in "The System of Bacteriology," published by the Medical Research Council, Vol. VII, p. 247, 1930, "that trachoma does not supervene on a normal conjunctiva, but that some form of inflammatory reaction is necessary before the condition appears." While this is almost invariably true among the poorer classes in Egypt, it is a statement which must be repudiated as of universal application. Every surgeon who has had any extensive experience of trachoma has seen numerous patients who have become infected in the absence of the slightest previous inflammatory affection of the conjunctiva. The reviewer has under observation at the present time two medical men and two females who have undoubted trachoma, but who have never, previous to infection, had any acute conjunctivitis. It is noteworthy that none of them has ever been out of England, and to the best of their knowledge has never been in contact with, nor seen a case of trachoma in their lives. However, there is no doubt that they must have received contagious material from an infected person.

The author is no doubt right when he says that in a country like Egypt the guiding principle in the prevention of trachoma must be the prevention of acute ophthalmias. However, there is no doubt that neither a Koch-Weeks nor a gonococcal conjunctivitis can give rise _per se_ to trachoma whether in the presence of adenoidism or any other diathesis.

A. F. MacCallan.

(3) Terrien discusses the value of various methods of classification of the different forms of conjunctivitis. He makes several interesting remarks, among which is his statement that phlyctenular conjunctivitis appears to be merely an anaphylactic reaction. Phlyctenular formation is an anapage of youth, of puberty at the latest, which is observed in individuals with scrofula or latent tuberculosis. The tuberculin reaction is always positive. As we know this is not sufficient proof; but an X-ray examination shows the presence of active tuberculous foci in the inter-tracheo-bronchial glands, and the instillation of tuberculin, or simply of irritants, gives rise to phlyctenules only in animals which are tuberculous or which have already received tuberculin injections.

A. F. MacCallan.


(4) Amat says that the solution of mercurochrome he uses in ophthalmic practice is in the form of a 4 per cent. watery solution. Dr. Klenfield, of Brussels, uses this solution as a disinfectant for operation wounds, in acute conjunctivitis and in marginal corneal ulcers. The author first used it most satisfactorily for serpiginous ulcers, for sterilisation of the silk used in ophthalmic surgery and for the pre-operative treatment of cataract. He quotes three cases of ophthalmia neonatorum which were completely cured by mercurochrome after the classical treatment with silver nitrate had failed. In two cases the causative organism was the gonococcus, and one of them had a purulent ulcer. The author considers that in all cases of ophthalmia neonatorum caused by pneumococcus, staphylococcus or streptococcus this treatment is vastly superior to that of silver nitrate.

E. E. Cass.


(5) Selinger has found by experiments on animals that the normal conjunctiva and cornea, as well as the traumatised cornea, show no ill effects from the daily application of quinine salts in various concentrations. Clinical experience with over 60 patients gave the same results with daily applications of quinine bi-sulphate in the form of 2 per cent. or 4 per cent. ointment, or the application
of a 10 per cent. solution two or three times a week. The latter is painted on the conjunctiva of the everted lids after instillation of 1 or 2 per cent. butyn or some other suitable anaesthetic, the ointment being applied night and morning at first in 2 per cent. and later in 4 per cent. strength. The effect in trachoma has been to bring about decrease in the hyperaemia, papillary hypertrophy and the degree of corneal opacity, the latter effect being also noted in interstitial and disciform keratitis and in old opacities of the cornea. Quinine therapy has been successfully employed in other forms of hypertrophic conjunctivitis too.

F. A. W-N.


(6) Gardilcic recalls that the tears of inflamed eyes lose their alkalinity, but found that treatment with alkalies gave disappointing results. He was more successful with oxydising agents using chloramin, sodium or potassium hypochlorite and Dakin's solution. Good results against trachoma, superinfection and scrofulous complications in trachoma were obtained by the use of a combination of alkali, oxydation and heavy metal, the best being p. Toluolsulfochloramin silver in ointment form. Fuller details are promised in a later publication.

ARNOLD SORSBY.

IV.—MISCELLANEOUS


(1) Johnson has carried out a study of the visual field defects associated with certain intra-cranial lesions in order to determine the extent to which homonymous hemianopia, quadrant and sectoral defects, when correlated with other symptoms of cerebral tumour, could be used for localisation of the neoplasm. Homonymous hemianopia was present in 143 cases which he examined with the perimeter and in 49 of these the cerebral lesion was demonstrated at autopsy.

Five cases of frontal lobe tumour had produced homonymous hemianopia by pressure on the optic tract, in four this field defect was complete and in one incomplete. The author found that neoplasms at the base of the frontal lobe in the early stages produce
symptoms of retro-bulbar neuritis manifesting a central and paracentral scotoma in the ipsilateral visual field and when pressing upon the olfactory lobe altered the sense of smell on the same side. Exophthalmos is common in meningioma of the frontal lobe. The author believes that it is probable that only neoplasms at the base of the frontal lobe produce ipso-lateral optic atrophy and contra-lateral papilloedema.

Neoplasms causing pressure irritation on the second frontal gyri cause conjugate deviation of the eyes to the ipso-lateral side, those which have destroyed the centre by pressure or infiltration prevent conjugate movement of the eyes to the same side. Tumours on the borders of the frontal and temporal lobes may cause pressure effects on the ipso-lateral optic tract thus producing a contra-lateral homonymous hemianopia. When the pressure is not directly upon but adjacent to the visual paths a central scotoma is sometimes found in the ipso-lateral field.

In a series of 28 cases of temporal lobe tumour the author found complete homonymous hemianopia in seven cases and incomplete in 21 cases, three being quadranitic and seven crescentic defects. Papilloedema was present in 21 cases. The field changes appear to be more frequent in cases of temporal lobe neoplasms than when the growth is situated in other parts of the brain. Transitory ptosis, ipsilateral miosis and later permanent pupillary dilatation were noted. In 11 cases of occipital lobe lesion the author found complete homonymous hemianopia in six cases and incomplete in three. Visual hallucinations, flashes of light and mind blindness are associated with occipital lobe lesions. The author comments on the fact that homonymous sectoral field defects indicate a lesion posterior to the chiasma but do not localise it to any specific area. Frontal lobe tumours rarely cause incomplete homonymous hemianopia, and neoplasms situated in the temporal lobe produce these visual field defects more frequently than those in the occipital lobe. Crescentic field defects indicate that the lesion is external to the visual pathway and in the same lateral plane.

At the end of this paper is a brief evaluation of the field changes in cases of homonymous hemianopia.

H. B. STALLARD.


(2) Balado and Oliva describe a case of a boy aged 9 years, who had a meningo-encephalocele. His general health was perfect and no other abnormalities were
present; he had a past history of two head injuries, one at the age of one-and-a-half years and the other at 3 or 4 years, the second injury resulting in a large haematoma in the temporal region; the mother says the second injury occurred after she had noticed pulsation in the left eye. Soon after birth the parents noticed that the left palpebral aperture was small. At the age of two years they noticed pulsation of the left globe, and some downward displacement; after this there was a slow growing proptosis.

When seen by the authors there was marked facial asymmetry in all diameters, the left side being the larger. The left palpebral aperture was small, and the eye was displaced downwards and outwards and was pulsating, the pulsations coinciding with the carotid pulse. The dimensions of the orbital cavity were enlarged especially vertically. There was some atrophy of the left temporal muscle.

A pulsating mass with well-defined borders was palpated in the left upper lid and orbit.

The right eye was normal in all respects. The left eye had a hypermetropia of 0.5 D. and the vision with difficulty was 2/3; the fundus, tension and visual fields were normal.

On examination by X-ray the left maxillary antrum was seen to be opaque, the floor of the orbit was rarified, and the tumour was invading the antrum.

The whole orbital cavity was considerably enlarged in all dimensions; there was some separation between the frontal and malar bones, and between the great wing of the sphenoid and the frontal plate of the orbital bone.

Under general anaesthesia, a classical incision was made as for the exposure of the chiasma, the frontal lobe was lifted and the tumour was found to be continuous with the temporal lobe of the brain. The membranes were incised and the protrusion pushed back; the enlarged sphenoidal fissure was closed by means of a bony lamina, which was fixed into position by ligaturing the fibrous capsule of the tumour in front of it.

Recovery was uneventful, and when seen nine months later the palpebral aperture was larger, the horizontal axis of the eye had been raised, but there was still some slight pulsation. The visual acuity was still 2/3.

Extensive references to other cases of this condition are given.

The pathology of meningo-encephalocele is still a debatable point. The malformation may begin in foetal life, when it may be due to a defective development of the bones of the skull resulting in a hernia of the brain and meninges, or there may be a premature ossification of the sutures, which upsets the equilibrium between the cranial capacity and the size of the brain. Another foetal theory is that there is a ventricular hydrops,
resulting in a secondary destruction of the bones of the skull.

Another theory is that the condition originates in the embryo and there is a lack of development of the cranial membrane.

In the opinion of Berger the condition is a tumour, i.e., encephaloma.

Characteristic of this condition is the appearance of cerebral symptoms due to pressure on the encephalocele. There are also always alterations in the bones of the orbit and face, and there is pulsation of the tumour. The growth is always slow.

The prognosis of this condition is usually very grave, and the majority of cases die. The only possible treatment is surgical, and replacement of the hernia accompanied by plastic operation to repair the bony defects of the orbit is infinitely preferable to excision of the cerebral hernia.

E. E. Cass.


(3) Hossmann reports the occurrence of eczema of the lids and keratoconjunctivitis in man of 48 years, who a month later suddenly developed acute agranulocytosis. His case is of interest as an earlier observer (Reye) has reported necrotic changes in the lids in this affection.

Arnold Sorsby.


(4) Gasser here records a series of experiments on human eyes and the eyes of pigs and other animals to prove the existence of the hyaloid canal; a solution of carmine or other fluid was dropped on the posterior or anterior surface of the exposed vitreous or injected through the optic nerve and disc.

In pigs' or foetal ox eyes it was easy to demonstrate the presence of a sharply defined axial canal extending through the vitreous from the optic disc to the lens; in eyes of calves or oxen it was much more difficult, and the results were less certain. In adult human eyes it was impossible to show the canal owing to the change in the original structure of the vitreous, but in the eyes of four new-born infants and one child examined it could be seen as a fine straight canal in the vitreous.
This research on a much disputed question was undertaken afresh because of its significance in posterior vitreous detachment (vide Brit. J. of Ophthal., Vol. XX, p. 107) and its alleged relation to spontaneous tears of the retina.

THOMAS SNOWBALL.


(5) de Sanctis has examined the visual fields of patients who have been successfully operated on for detachment of the retina, under varying illumination; he finds that with reduction of the lighting, there becomes manifest some loss of light sense in the part of the retina which was previously detached. In all his cases, there was even in full daylight, some contraction of the field, generally affecting the detached area, but occasionally concentric.

HAROLD GRIMSDALE.


(6) This paper forms part of a study of all the effects of compressed air on animals, undertaken by the Institute of Physiology of the University of Modena. This part, alone, has special interest for ophthalmologists. It is well known that when any animal, which has been for some time in compressed air, is brought suddenly into an atmosphere of normal pressure, it rapidly dies as the results of the liberation of bubbles of gas which have been dissolved under pressure in the blood. These bubbles form multiple small embolisms. The gas is chiefly nitrogen; if to avoid this, the animal is kept in an atmosphere of oxygen under pressure there follow paralyses and death from oxygen poisoning. Since the experiments were conducted on animals, no information about subjective symptoms, such as have been recorded in caisson workers, could be obtained. The physical signs were an increase in the intra-ocular pressure; this was found almost constantly. It was transitory only, receding within 24 hours. Less constantly there was contraction of the pupils. Often the corneal sensitivity was lessened. In a few cases there was slight temporary conjunctival redness and secretion.

HAROLD GRIMSDALE.