OBSERVATIONS ON EYE CONDITIONS MET WITH
IN MALTA, 1916-1917,Occurring among British troops in the Balkans and Malta
Garrison.

The Montgomery Lecture, 1916-1917.*

BY

EUPHAN M. MAXWELL, M.B., F.R.C.S.I.

(continued)

II.—Ocular Conditions arising from Traumata.

A. Gun-shot wounds.

The immediate results of gun-shot wounds were not seen in Malta, but the cases which came to our notice were frequently of interest in showing the later stages.

The thirteen cases detailed below represent the majority of ocular and orbital wounds seen in St. George's during the period. Cases 1-5 are illustrations of penetrating wounds of the globe.

1. O.
  - August, 1915. Shrapnel wound of face in France. Piece of metal removed from below left orbit. Enucleation of L.E. refused.
Subsequently saw Garrison service in Salonica.
  - November 8, 1916. Examined at St. George's. V. of L.E. = Light perception. Pupil sluggish but reactive to light. Media clear—tension normal. Fundus—glistening body embedded in lower portion of retina, connective tissue and pigment deposits in its neighbourhood. Pigment deposits at macula. Movements of globe perfect.
X-ray—Several small foreign bodies in outer and lower quadrant of left globe, large foreign body behind nose. There was no history of nasal trouble in this case.
V. of R.E. = 6/6. No pathological conditions.
Condition of both eyes as above.
  - April 4, 1917.
2. R.
  - November, 1914. Wound of left orbit in France. Subsequently saw Garrison service in Salonica. Invalided to Malta with hernia.
  - November 28, 1916. Examined at St. George's. L.E. outer halves of eyelids cicatrized. Movements of globe perfect. V. of L.E. = hand movements. Pupil sluggish but reactive to light. Tension normal. Media—clear. Fundus.—Two large grey bodies visible, one at macula, the other in outer and lower quadrant.
X-ray report not obtained.
V. of R.E. = 6/9. No pathological conditions.
3. B.
  - 1915. Wound of R.E. in France. Plastic operation right lower lid performed.
  - Autumn, 1916. Contracted malaria in the Balkans. Shortly after developed "keratitis" R.E.

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* Read on November 28, 1917, in the School of Physic, Trinity College, Dublin.

- December 9, 1916. Examined at St. George's. R.E. slight ectropion lower lid, nebula lower half of cornea. V. of R.E.=light perception. Pupil sluggish, but reactive to light. Tension normal. Lens and vitreous clear. Fundus.—Glistening body embedded in lower portion of retina, surrounded by pigment. Retina detached ? in outer quadrant.
X-Ray report not obtained.
V. of L.E.=6/6. No pathological conditions.

These three cases illustrate the tolerance of the globe to foreign bodies posteriorly situated, a fact commented on by several ophthalmic surgeons since the commencement of the war.

4. September 7, 1916 Wound of right eye on Balkan front.
Beginning October, 1916 Seen at St. George's. R.E. scar outer part upper lid. Conjunctival cicatrix upper and outer quadrant. V. of R.E. nil. Hyphaema, green iris. Tension—2. No fundus details. X-ray—Five foreign bodies in R. orbit, three reported to be in globe. V. of L.E.=6/6.
October 12 R.E. enucleated. Two metallic fragments just behind lens. One adherent to outer surface of globe beside optic nerve. Nothing palpable in orbit.
5. Bew.
May 9, 1917 "Immediately blinded" by bomb explosion on Balkan front.
May 14 R.E. enucleated in Salonica.
July 13 Examined at St. George's. Right socket healthy—no cicatrization. V. of L.E. nil. Leucoma adherens lower inner corneal margin. Tension—2. Traumatic cataract. No fundus details. No facial wounds. X-ray.—Foreign body located within left globe.
September 2 L.E. as above.

Cases 6-8 demonstrate the successful extraction of foreign bodies from the orbit, in so far as the operation did not disturb the integrity of the globe. They also illustrate changes in the globe, the result of the near passage of a foreign body.

6. McC.
September 11, 1916. Shrapnel wound below L.E. on Balkan front. Fragment 1 in. by $\frac{3}{4}$ in. removed from left orbit in Salonica.
October 3 Examined at St. George's. V. of L.E. with $-1.5 \text{ } \odot + 360^\circ = 6/18$ partly. Sluggish dilatation of pupil with homatropin. Tension normal. Opacities in vitreous. Fundus—slight blurring of disc margins. Veins somewhat swollen. Small pigment deposits around macula. V. of R.E. 6/9. No pathological conditions.
June 26, 1917 V. of L.E. as above. Vitreous clearing. Still some blurring of disc margins.
7. D.
September, 1916 Shrapnel wound below R.E. on Balkan front.
November 3 Examined at St. George's.
R.E. lower lid split about centre, edges everted. Entrance of fragment apparently about 2 cm. below globe. Exposed conjunctiva hyperaemic. V. of R.E. light perception. Tension—normal. Media clear. Fundus—linear scar in lower temporal quadrant of retina. Pigment deposits at macula and in lower half of retina. X-ray—Foreign body in floor of right orbit. V. of L.E. 6/6. No pathological conditions.

- November 16. Major Kiep removed metal fragment 2.1 cm. by 1.7 cm. Fragment was firmly imbedded in bone. Sinus extended from it into lower fornix.
- December 4. Ectropion right lower lid diminished. Downward movements of globe impaired.
- December 9. Lid scar excised and wound sutured vertically.
- February 8, 1917. Ectropion much reduced. Downward movements of globe much improved. Condition of R.E. otherwise as above.
8. M.
January 19, 1917. Shrapnel wound left side of face on Balkan front. Fragment removed from left orbit in Salonica.
- February 26. Examined at St. George's. Slightly discharging wound just above and internal to outer orbital angle. Oedema of conjunctiva upper outer portion. V. of L.E. nil. Tension normal. Pupil—consensual reaction to light. Vitreous opacities. Fundus—large retinal haemorrhages everywhere, obscured details except in extreme nasal periphery. Strands extending from retina into vitreous. Upward and outward movements of globe gone.
- V. of R.E.=6/6. No pathological conditions.

Cases 9-13 further illustrate changes which may occur, as a result of the near passage of a foreign body.

9. H.
February 12, 1917. Shrapnel wound of right side of face on Balkan front.
- February 14. R.E. enucleated. "Brain matter" came away from socket.
- L.E. marked oedema of conjunctiva with globe pulsation persisted for some days. X-ray—Foreign body behind left temporal bone, lying apparently on dura mater.
- July 4. Examined at St. George's. Right socket slightly contracted. Cicatrisation of edge of inner half of lower lid. V. of L.E.—Light perception below. Tension—1. Pupil dilated, but could be contracted slightly with strong light. Lower half of cornea ulcerated. Vitreous hazy. Fundus—? detached retina lower half.
- September 5. V. of L.E. nil. Cornea healed. Tension—1. No fixation.

The fragment, in this case, apparently entered the right eyeball low down, grazing the left globe in its passage upwards and to the left.

10. V.
May 9, 1917. Trench mortar wound of right side of face on Balkan front. Patient reported removal of dead bone from cheek.
- July 16. Examined at St. George's. Discharging wound at upper outer angle of right antrum of Highmore. Antrum dull on transillumination. No nasal discharge. V. of R.E.—counts fingers in lower field. Pupil sluggish, but reactive to light. Tension normal. Vitreous—large opacities. Fundus—large area of ruptured choroid involving macula. Nerve apparently normal.
- V. of L.E.—6/6. No pathological conditions.
11. S.
May 9, 1917. Shrapnel wound of right side of face on Balkan front.
- July 13. Seen at St. George's. Superficial scars above right eyebrow and on right side of chin.

- R.E.—Vertical wound in inner half of upper lid. Slight ptosis. Granulation in inner half of lower fornix suggestive of presence in orbit of foreign body. V. of R.E.—Fingers at 0·5 metre. Tension normal. Vitreous opacities. Fundus.—Slight pigmentation of macula. Patch of connective tissue in extreme lower periphery. X-ray—Three negative reports. V. of L.E.—6/6. No pathological conditions. Conjunctival granulation removed. No sinus discovered. Granulation as large as before. Ptosis disappeared. Condition of R.E. as above.
- July 20
September 2
12. T.
March 7, 1917 Bomb wound of right temple on Balkan front. Report in Salonica: "intra-ocular haemorrhages in both eyes. Vision—nil."
X-ray—Foreign body in L.E.
L.E. enucleated.
March 26
June 2 Examined at St. George's. Scar on right temple. V. of R.E.—Nil. Globe movements restricted, least so when looking down. Pain on attempting to look towards the light. Tension normal. Media clear. Granulation tissue in fundus, except in upper periphery. Disc completely involved in tissue. Protrusion of bands into vitreous. Lower portion projected forwards.
August 12 R.E.—Tension minus. Otherwise condition as above.
13. St.
April 24, 1917 Shell wound of face on Balkan front. Metallic fragment extruded later from wound just below right orbital rim.
September 4. Examined at St. George's. R.E. Slight cicatricial ectropion between centre and inner angle of lower lid. V. of R.E.—4/60. Tension normal. Vitreous opacities. Fundus—blurring of disc margins. Choroidal rupture below and to inner side of disc. V. of L.E. 6/6. No pathological conditions.

The question as to whether any of the lesions were preventable is suggested by a survey of these cases. Goggles of various kinds have been advocated as a protection for the eyes.^{2, 15} The steel visor, attached to the helmet, designed by Capt. Cruise, R.A.M.C.,⁶ has the advantage of not adding to portable equipment. It also affords considerable lateral protection, an omission in the helmet which has been severely criticised. Any protection which does not seriously hamper visual acuity, must be strongly recommended. The personal observer in the front line should always have the last word as to the most effective method.

The injuries in cases 1, 2, 3, 4, 5, 6, 8, 11, and 13, may be classed as probably preventable. Adequate protection in cases 9 and 12 might have saved the second eye.

The lesions in cases 7 and 10 suggested considerable velocity and

force on the part of the fragment. They must therefore be classed as non-preventable.

B. "Functional" disorders.

It is obvious in these cases that a disturbance has taken place in a nerve system; its nature and position of maximum effect in the nerve path are quite obscure. The term "commotion nerveuse," to my mind, more aptly describes the condition than the expressions in use in our Army.

The disturbing factors illustrated in the following cases may be roughly divided into:—

- (i) Emotional.
- (ii) Physical.

In many instances both factors would appear to have played a part.

LEFT

November 1, 1916.

RIGHT

FIG. 1.

No perception for blue or green.

No perception for green.

The eighteen cases detailed below represent the majority of instances of "commotion nerveuse" seen at St. George's during the period.

An examination of the visual fields of the patients was initiated by Major Kiep. It was performed in daylight. The white and coloured mires were 10 mm. square; their distance from the eye 20 cm. A mirror served as the fixation point of the perimeter, which was held in the hand.

1. E., age 26.

October 3, 1916.

On Balkan front a bursting shell shattered bridge across which patient was marching, and he was flung into a river. Unconscious for some days. Power of speech lost, and defective vision noticed on regaining consciousness.

October 28
November 1

Power of speech regained.
Examined at St. George's.
V. of both eyes—4/36. Refraction, emmetropia.
Right fundus, nothing to note.
Left fundus, patch of connective tissue in superior nasal quadrant extending down to disc. This doubtless due to a kick between the eyes, received three years previously, subsequent to which sight in L.E. had been somewhat defective.
See Fig. 1 for visual fields.
V. of R.E.—4/18, of L.E., 2/18.
See Fig. 2 for visual fields.

December 12.

LEFT

December 12, 1916.

RIGHT

No perception for green.

Central perception for green.

FIG. 2.

LEFT

December 3, 1916.

RIGHT

FIG. 3.
Green not tested.

2. G.
 August 29, 1916. Contracted dysentery on Balkan front.
 September 10. Struck on left side by lightning while in bed in a Salonica Hospital. Felt a tingling sensation down left side.
 November 13. Noticed defective vision in L.E. a few days later.
 Examined at St. George's.
 V. of R.E.—6/6. No pathological conditions visible in either eye.
 V. of L.E., with $+1 \text{ C} - 2 = 6/18$.
 Left-sided hemianesthesia, defective movements in left leg.
 December 3. V. of both eyes as above.
 See Fig. 3 for visual fields.
 No change in general condition.

LEFT

November 14, 1917.

RIGHT

FIG. 4.

3. H., age 23.
 September 27, 1916. On Balkan front hit on back of head by a "dug-out," blown inwards by exploding shell. Complained subsequently of headaches and defective vision.
 November 14. Examined at St. George's. V. of R.E.—6/18 with $+3.5 \text{ C} + 1.90^\circ = 6/9$.
 V. of L.E.—6/24 with $+3 \text{ C} + 0.75 \text{ } 90^\circ = 6/9$.
 Fundi and media both eyes — normal.
 L.E.—periodic concomitant convergent strabismus. This became permanent and very marked during examination.
 December 31. See Fig. 4 for visual fields.
 No change in vision.
4. P.
 October 26, 1916. On Balkan front received a scalp wound caused by bullet which indented front of helmet.
 October 30. Admitted to hospital with symptoms of "cerebral malaria." Blood examined—negative. Pyrexia responded to quinine.
 X-ray of head negative.
 Fundi examined by Major Usher—normal.

November 18

Landed in Malta. Symptoms of headache, insomnia, loss of appetite, easily acquired fatigue. Showed marked tremor of fingers.

January 8, 1917

Examined at St. George's. V. of both eyes—6/6. Complained of rapid and progressive failure of accommodation when playing billiards. See Fig. 5 for visual fields. General condition somewhat better.

5. G., aged 27.

December 6, 1916

On Balkan front flung to ground by bursting shell. Was able to notice that several men near him were killed. Felt dazed for about $\frac{1}{2}$ hour. Noticed almost at once defective vision in L.E. with flashes of light and contortion of images. The vision improved in a few days, the other ocular symptoms persisted for some weeks. Suffered from constant headaches.

LEFT

January 8, 1917.

RIGHT

February 16, 1917

Examined at St. George's. V. of R.E. with -3 Cyl. $-6/9$, of L.E. with $-2 = 6/18$.

Right fundus—normal. Left fundus—Some blurring of inferior and nasal margin of disc. See Fig. 6 for visual fields.

During examination patient trembled continually.

6. T.

February, 1917

In a "dug out" on Balkan front received blow on head from falling rafter. His glasses were smashed. Began to suffer from insomnia and found difficulty in keeping upright. Noticed great variations in his power of sight.

March 7.

Examined at St. George's. V. of R.E. with $-6 = 6/60$, of L.E. with $-5 = 6/36$. Fundi—small myopic crescents.

LEFT

April 1, 1917.

RIGHT

FIG. 7.
No perception for green.

LEFT

May 6, 1917.

RIGHT

FIG. 8.
Central perception for green.   Spiral fatigue curve.

April 1.

V. of R.E. with $-7 = 6/18$, of L.E. with $-5 = 6/12$.
See Fig. 7 for visual fields.

May 6.

V. of R.E. with $-8 = 6/9$, of L.E. with $-6 = 6/12$.
See Fig. 8 for visual fields.

General condition improved.

7. W.

Jan. 6, 1917.

On Balkan front, flung to ground by bursting shell.

March 17.

Examined at St. George's. Complained of defective vision; general condition unknown. Diagnosis "shell shock." V. of R.E. with $-2.5 \bigcirc -3.5 = 6/9$. V. of L.E. with $-2.5 \bigcirc -3.5 25^\circ = 6/18$. No pathological conditions visible in either eye. See Fig. 9 for visual fields.

1st May.

Fields for green slightly enlarged, red and blue fields as before.

LEFT

March 17, 1917.

RIGHT

FIG. 9.

8. C.

March 5, 1917.

On Balkan front, buried by trench mortar shell.

April 4.

Examined at St. George's. Complained of defective vision. General condition unknown. Diagnosis "Shell shock." V. of R.E. $6/12$ with $+0.25 = 6/6$, of L.E. $6/9$, with $+0.25 = 6/6$. No pathological conditions visible in either eye. See Fig. 10 for visual fields.

9. A.

March, 1917.

Shrapnel wound left side of chin on Balkan Front.

April 17, 1917.

Examined at St. George's. Complained of defective vision. General condition unknown. Diagnosis "Shell shock." V. of R.E. with $-1 = 6/9$, of L.E. with $+3 \bigcirc +2_{105^\circ} = 6/24$. No pathological condition visible in either eye. See Fig. 11 for visual fields.

10. D.

January 13, 1917.

Hurlled through carriage window in railway accident in France. Unconscious for some hours. During subsequent service on Balkan Front suffered from insomnia—very "jumpy" at shells.

May 4

Examined at St. George's. V. of R.E. $6/12$ with $+0.5 \bigcirc -2_{110^\circ} = 6/9$, of L.E. $6/9$. Refr. L.E. -0.75 . No pathological conditions visible in either eye. See Fig. 12 for visual fields.

General condition—very little change.

11. B.
January, 1917.

Buried in "dug-out" on Balkan Front. Unconscious about half-an-hour. Subsequently suffered from insomnia and trembling fits. Air-raid while in Salonica Hospital. Was able to get under his bed—several patients in ward killed.

May 27.

Examined at St. George's. V. of both eyes—6/9. Refr. +1. No pathological conditions visible in either eye. See Fig. 13 for visual fields.

Spastic gait—exaggerated plantar and knee reflexes.

LEFT

April 4, 1917.

RIGHT

FIG. 10.
No perception for green.

Spiral fatigue curve.

LEFT

April 17, 1917.

RIGHT

FIG. 11.
Green indefinite.

12. N.

September, 1915.

November, 1916.

June 6, 1917.

Gun blew up near him in France. Subsequently suffered from "nerves."

Ammunition dump blew up near him on Balkan Front. Nervous condition increased. Headaches, trembling fits.

Examined at St. George's. V. of R.E. = 6/6, of L.E.

with $+1.5\text{C} + 3.5_{105^\circ} = 6/9$.

No pathological conditions visible in either eye. See Fig. 14 for visual fields.

General condition improved.

LEFT

May 4, 1917.

RIGHT

FIG. 12.

LEFT

May 27, 1917.

RIGHT

FIG. 13.

Spiral fatigue curve.

13. McD.
May 14, 1917.

Knocked down by bursting shell on Balkan Front. Remembers the stretcher bearers. On regaining complete consciousness felt pains in side and back—vomited, had dyspnoea. Orbital haemorrhages reported. "Casualty Clearing Station." No nasal or oral discharge.
Examined at St. George's. V. of both eyes = 6/9, with +0.75 cyl. 105° = 6/6. No pathological conditions visible in either eye. See Fig. 15 for visual fields. Still had pains in his side, with general feeling of fatigue.

July 11.

LEFT

June 6, 1917.

RIGHT

FIG. 14.

LEFT

July 11, 1917.

RIGHT

FIG. 15.

Spiral fatigue curve. Blue perceived as grey.

14. Bea., aged 20.

Previous history of chorea and stammering for four months following a motor accident when 12 years of age.

June 20, 1917.

Attacked by Bulgar aeroplane and forced to descend in parachute from observation balloon. On second ascent was again attacked. Descended in balloon. On reaching ground felt "nervy" and tremulous. Two days later went up again. Strong wind began to blow. He "had to crouch on the bottom of the basket" to prevent throwing himself over. Suffered from severe headache.

July 1.

Admitted hospital in Salonica. Insomnia, bad appetite, pain behind eyes, difficulty in looking at near objects, trembling limbs, feeble grasp.

July 2

Periodic convergent squint noted. Knee jerks exaggerated. Ankle clonus.

July 11.

Diplopia. Squint still noted. Hypnotism unsuccessfully attempted.

August 25,

Examined at St. George's. V. of R.E. = 6/24, of L.E. = 6/18. See Fig. 16 for visual fields. Patient too exhausted for examination of fundi or refraction.

LEFT

August 25, 1917.

RIGHT

FIG 16.

Spiral fatigue curve.

I am inclined, from the history, to regard the defective vision in this case as due to hypermetropia associated with paresis of the ciliary muscle.

15. Br.
1909.

Enlisted in R.F.A. Had occasional attacks of scintillating scotoma with headache and giddiness.

September, 1916.

Scalp wound over R.E. in France. "Gassed" about the same time. Subsequently saw service in Ireland at training dépôt.

- February 27, 1917. Fired an anti-aircraft gun on Balkan front. Immediately after the report, "lost the target, and another man had to be put on the gun." Stated that it was the first time he had heard a gun fired since September, 1916. Began to suffer from defective vision, headaches, and giddiness.
- September 4. Examined at St. George's. V. of R.E., 3/60. Emmetropia. No external congestion. Floating opacities in vitreous. Thin fibrous curtain hanging from upper portion of ciliary body, just visible. Fundus readily seen, nothing to note. V. of L.E., 3/60 Emmetropia. Lids kept tightly closed, no paresis of lid muscles. Some ciliary hyperaemia. Mild blepharo-conjunctivitis. Fundus and media, normal. See Fig. 17 for visual fields R.E.
- The cyclitis in R.E. may have been caused by the wound received in France; the conjunctival condition in L.E. by the "gassing."
- Conceivably, the gun-fire on February 27 recalled to his sub-conscious mind the train of ultimate events in France. The resulting nerve disturbance would be readily aggravated by existing pathological conditions.

September 4, 1917.

FIG. 17.

Central perception for green.

16. S. R.A.M.C. Case of Erythropsia.

August 6, 1916.

Shell burst near him on the Balkan Front. Carried on with work for some weeks, during which time he frequently saw "pink flashes." Was subsequently invalided to Salonica with a diagnosis of shell shock.

February 27, 1917.

Air-raid while in hospital.

March 4.

Aeroplane bomb burst near his bed in hospital. "Pink flashes" again appeared.

May 2.

Examined at St. George's. V. of both eyes=6/6. White and colour fields—nothing to note. "Pink flashes" only very occasionally seen at this time.

17. Har.
February, 1917.

Buried beneath sand-bags. Knocked over by shell on Balkan Front. Unable to speak for a week. Subsequently lost power of speech again, but quickly regained it. Complained of muscae volitantes.

V. of R.E. 6/9. Refr. $\begin{array}{c} +.5 \\ \hline +1.5 \end{array}$

V. of L.E. 6/9. Refr. $\begin{array}{c} +.5 \\ \hline +1. \end{array}$

No pathological conditions visible in either eye. See Fig. 18 for visual fields. Suffered at this time from insomnia and trembling fits.

June 21, 1917.

June 21, 1917.

FIG. 18.

June 9, 1917.

FIG. 19.

18. Bo.
 January, 1917. Admitted to Salonica Hospital with pain in left shoulder due to a wrench.
 March. Air-Raid. Was able to get under his bed—several patients in ward killed. Commenced after this to suffer from headaches and dizziness.
 June 9. Examined at St. George's. V. of both eyes = 6/6. No pathological conditions visible in either eye. See Fig. 19 for visual fields. General conditions somewhat improved.

FIG. 20.

The following case of simulated shell-shock is of interest in this connection :

- Br. M.
 March, 1917. Shrapnel wound of left cheek on Balkan Front. Fragment carried away some of upper left molars and came out through mouth. Patient subsequently complained of defective vision in L.E.
 April 18. Examined at St. George's. Vision R.E. = 6/9 with +0.75 = 6/6. V. of L.E. 6/24 with +5.5 in front of R.E. = 6/9. Refr. normal. No pathological conditions visible in either eye. See Fig. 20 for visual fields.

The patient obviously started when any attempt was made to touch the scar on his cheek, and behaved altogether in a theatrical manner.

A survey of these cases brings into prominence the following points :

1st. That defective central vision, where present, was due in the majority of instances to asthenopia of the ciliary muscle.

Only in cases 1, 6, and 15, could it not be attributed to an error of refraction.

The very prominent symptom of headache was probably largely due to the same cause.

2nd. That a concentric contraction of the white and colour fields, with a further relative contraction of blue and green as compared with red, was an outstanding feature. Fifteen cases definitely exhibited these symptoms.

Cases 16, 17, and 18, showed normal or indefinite fields. The condition was bilateral.

Cases 1, 2, 5, 8, and 10, showed a more marked deviation from the normal in the eye with the greater defect of vision: in case 11, with equal vision, there was a greater defect in the left eye.

The frequent presence of these symptoms in "functional" cases is well known.²⁰

If the rods be more susceptible to disturbance than the cones, the concentric contraction for white with preservation of central vision could be thus explained. This would also help to explain the colour inversion, should Sivén's theory be correct that the rods are mainly concerned in the perception of lights of short wave lengths.¹² In this connection it is of interest to note that Landolt in a recent article quotes several authors who have detected red and blue inversion in night-blindness.

Colour inversion may conceivably result from a general "lowering" of the colour vision system. Red produces a greater retinal excitement than blue or green, and may therefore more readily produce an impression on the conscious mind in these cases. Edridge-Green, in the July number of the BRITISH JOURNAL OF OPHTHALMOLOGY, attributes the inversion to a hyperaesthesia of the retina.

Despite the necessarily crude methods employed, I entirely agree with Major Kiep, that, taken in conjunction with other signs and symptoms, these fields were of distinct diagnostic value.

3rd. That the progress in all the cases was very slow, a fact already frequently commented on by observers of this condition.

I take the essential lines of treatment to be rest, mild occupation, good and varied diet, and abstention from smoking. Dark glasses are advisable where photophobia is present, and any existing error of refraction should be corrected.

Hypnotic suggestion has undoubtedly many brilliant results to its credit⁸, but I think it may be regarded as a refinement of treatment, unnecessary in the majority of instances.

(To be concluded.)