concerned in visual perception and the rest of the brain must be the main anatomical basis of this psychical synthesis. When they are interrupted spatial orientation is affected, though visual perception may be intact.

The angular gyri contain centres from which the movements of the eyes can be elicited, and it may be to damage of these portions of the cortex that the disturbance of ocular fixation, the failure to accommodate near objects, and the absence of the blinking reflex were due, in so far as they were not a direct result of the defective recognition of the position of the object in space, and especially of its distance.

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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.

(*Concluded*)

C.—Sunlight.

The pathology of sunlight is not apparently completely understood. A difference in action between the thermic and actinic rays is generally recognized, but observers differ as to which are the more deleterious.³ The result of the recent researches of Verhoeff and Bell,¹⁷ suggest that the actinic rays may have an irritative action upon the conjunctiva and cornea, but that, owing to their ready

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absorption by corneal tissue, pathological conditions of the retina, following exposure to sunlight, are due, except in very rarefied air, to the thermic rays.

I am unaware of the conditions of glare and heat in the various sectors on the Balkan front. In Malta the glare is considerable, while during the late summer and early autumn months the high humidity renders the climate very enervating.

A few ocular lesions, attributable in whole or in part to the sun's rays, came to our notice.

1. *The conjunctiva*.—Amongst the garrison troops several cases of persistent hyperaemia were seen. There were also cases with chronic enlargement of the lymph follicles observed; these showed some resemblance to trachoma in their slow response to treatment.

We saw three cases of pterygia in men under thirty years of age who had been serving in the Balkans. These were apparently due to irritated pingueculae.

2. *The cornea*.—Sunlight must not be forgotten as a possible factor in the cases of superficial keratitis mentioned under "Malaria."

In some few instances where a blood examination did not settle the question, heat prostration may have been the cause of the febrile attack.

The patient with relapsing keratitis mentioned under "Dysentery" had had sunstroke shortly before his eye symptoms commenced.

Dust may also readily play a part in the production of these conjunctival and corneal lesions. Lieut.-Col. Eason, R.A.M.C., has recently reported the frequency of superficial keratitis amongst the troops in the Egyptian desert, and attributes it mainly to this cause⁷.

3. *The Retina*. Several instances of night-blindness, unaccompanied by fundus defects or any general disease, were noted amongst the garrison troops. Here sunlight must be reckoned with as a possible cause, as also in the cases of disc hyperaemia, mentioned under "Malaria." One case from the Balkan front with fundus defects, the result probably of undue exposure to sunlight, was noted.

H. August, 1916. Had to fall out, during a long march due south, with "heat prostration."

Sept. 5, 1916. Examined at St. George's. Blepharospasm—photophobia—jerky movements of eyeballs. V. of both eyes=6/60. Refraction not recorded. Fundi—maculae red, with marked deposition of pigment in neighbourhood.

The protective power of the body pigment against the harmful effects of sunlight has been noted by several observers.^{8 14}

In this connection the unsuitability of albinos for service in the Near East may be mentioned. One such case with visual acuity of military standard was invalided home from Malta on account of

distressing photophobia. High myopes with thinning of the choroid and a scanty amount of retinal pigment would appear to be similarly unsuitable.

The question of protective glasses is of practical importance. They are most needed in air work and look-out posts near wide stretches of water. Peripheral scotomata in airmen and anti-aircraft gunners have been observed by Zade²², who attributes them to glare.

The goggles in use in the Air Service are probably adequate in most cases, as ordinary white glass is said to cut off the harmful actinic rays²²

Dark glasses might be served out with advantage in cases of chronic blepharitis, irritable conjunctivae, or nebulae of the cornea, where the men are otherwise fitted for garrison duty or lines of communication in the Near East. The uses of dark glasses in the front line must be very limited. They have been frequently necessary for hospital patients.

Crookes' glass is almost universally regarded as the most efficacious. His "A" glass cuts off 27 per cent. of the thermic rays, and nearly all the actinic rays, while it leaves 99 per cent. of ordinary illumination.

The first Army issue in Malta consisted of smoked, a more recent one of chlorophyll, glass. Both have given satisfaction. We had no opportunity for adequate comparison.

D. *Insect Bites*. The following ophthalmic case is worthy of record.

T.	1916.	Several attacks of malaria on Balkan front.
	August, 1916.	Invalided to Malta.
	Sept. 4.	(Morning.) Insect bite of skin of outer canthus of L.E., accompanied by localized conjunctival hyperaemia, noted.
	Sept. 5.	(Evening.) Examined at St. George's.
		L.E. Marked exophthalmos with limited movements in all directions. Eyelids and conjunctiva oedematous. Cornea hazy. Red reflex visible with ophthalmoscope. Details indistinct, but retinal veins apparently somewhat swollen. V. of L.E.=3/36, of R.E.=6/6.

In the absence for two days of the history of September 4 the case was suspected to be one of malarial thrombosis, and quinine was given intravenously.

Sept. 7.	L.E. Eyelids just able to cover globe. Blood count, mild leucocytosis.
Sept. 10.	L.E., cornea clear. Fundus normal. Tension normal.
Sept. 17.	V. of L.E.=6/9. Exophthalmos disappeared. Still some conjunctival hyperaemia.
Oct. 1.	No trace of conjunctival hyperaemia.

III.—Visual acuity viewed from the military standpoint

The following points are emphasized in my survey of a large number of refraction cases seen at St. George's.

1st. That no visual defect, the result merely of a refractive error, should cause exemption from military service. This is practically contained within the Army Order "that no man will be accepted for any form of military service with a lower standard of vision than 6/60 in one eye, with or without glasses." Higher standards of vision are naturally expected for various units, and further subdivisions can be subsequently made to a lesser degree for various posts within a unit.

In the case of suspected malingerers with defective vision and no pathological signs, a statement of the retinoscopy is essential, and should in most instances, suffice for classification.

Cases of defective vision, the result of pathological conditions, must be dealt with individually.

2nd. That the prescribing of glasses for men with refractive errors, *not previously corrected*, should be avoided, as

1. They prove a useful tool in the hands of malingerers.

2. They are unavoidably frequently lost and broken, and, in wet weather in the trenches, are often useless.

3. They necessitate a labour and cost to the country probably out of proportion to the increased efficiency they create.

Exceptions to this should be made :

1. In the case of medium degree myopes, where the wearing of glasses is a prophylaxis against progression, and increases the visual acuity to the greatest degree.

2. In the case of men with difficulty who are required for clerical work.

3. In the case of men otherwise specially fitted for posts requiring marked acuity of vision.

In this connection, it may be noted that night-blindness is thought by many observers to be accentuated by or to be the direct result of errors of refraction.⁷⁻¹⁹ Lt.-Col. Eason, R.A.M.C., attributes the difficulty of the myope in the dark, to the greater diffusion of images resulting from his dilated pupils: of the hypermetrope, to his inability to fix surrounding objects upon which to accommodate. Night-blindness is difficult to diagnose, and its aetiology is obscure. The prescribing of glasses at the front at the present time for this condition cannot be regarded, except in very special instances, as a practical measure.

No rules can be laid down for men accustomed to wear glasses in civil life. Their cases must be dealt with individually. The distinction between these two classes is recognized in Army instructions.

The question of the advisability of prescribing glasses assumes a different aspect if the soldier is wounded or ill. His ocular muscles share in the general lowering of his condition, and the headaches and discomfort which may arise from refractive errors or faulty muscle balance, should be relieved.

In the majority of cases, the use of the glasses can be discontinued on return to health. Spherical lenses can always be used again on subsequent occasions, as also, in most instances, cylinders, owing to the round shape of the lenses issued by the Army.

3rd. That amblyopia, the result of squint or refractive error, should not cause exemption from active service. Army instructions are to this effect.

It is to be remembered that individuals with amblyopia have had from early life to accustom themselves to a condition, which is often so slight a handicap as to pass unnoticed. Amblyopic eyes, moreover, usually retain good peripheral vision.

In this connection the Army instructions "that if a man has lost one eye, or completely lost the sight of one eye, he will not be considered fit for category 'A'" may be noted and criticized.

Where recent loss has been sustained, the mental state and markedly lessened effectiveness of the individual render him unfitted for active service. On the other hand, many civil occupations, frequently of a hazardous nature, are competently engaged in by men in whom the loss of one eye is of long standing. That such an individual should be forced into the firing line is hardly, at the present time, to be advocated. That the disability, under modern fighting conditions, should serve as a bar to active service in the case of the voluntary recruit, is another matter.

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