particular organs where it has not been hitherto known to exist." Not even a twentieth century writer could set before himself a wiser or more philosophic aim.

One point in which Wardrop and the writers of his day were able to excel most of those of our time, was in the elegance of their diction. Take the dedication of one of his books to Sir James Simpson; for a neatly turned compliment, for frank admiration with avoidance of fulsome flattery, for an honest and self-respecting tribute from a disciple to a master, you will find it hard to beat.

Would that more of *our* medical writing could with as much justice be described as literature!

**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.

I wish in the first place to express my thanks to Major Kiep, R.A.M.C., in charge of the Ophthalmic Department, St. George's Hospital, Malta. During the time of preparing this paper he afforded me every opportunity for the examination of his patients and reference to his case books. To many of his own personal observations and comments I am deeply indebted.

The cases observed have been mainly of diagnostic interest, acute conditions being usually treated in Salonica, while those of a chronic nature were frequently transferred to England in the course of treatment.

I am classifying the cases as follows:—

1. Ocular conditions associated with general disease.
2. Ocular conditions arising from traumata.
3. Visual acuity viewed from the military stand-point.

I.—Ocular conditions associated with general disease

A.—Malaria.

1. *The Conjunctiva.* Excluding the transient hyperaemia frequently present with any pyrexia, no affections of the conjunctiva,

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

associable with malaria, were met with. This experience tallies with that of other observers.^{3, 21.}

2. *The Cornea.* Two conditions associated with malaria were observed.

The first of these was a superficial keratitis, which in the majority of cases showed signs of a herpetic origin. None of the corneae in the herpetic cases showed vesicles. Some had reached the stage of dendritic ulceration, while others had advanced to scar formation. These scars were mostly arborescing or arranged in the so-called "string of beads form." The remaining cases were of a more diffuse and indefinite type.

The pathology of "herpes corneae," as of "herpes febrilis" elsewhere, is unknown. It is possibly due to a toxic affection of the peripheral nerve endings; in the case of the cornea possibly also of the sensory portion of the ciliary ganglion. It has no connection, apparently, with a pathological condition of the Gasserian ganglion.^{1, 18}

Herpes corneae has been observed in various pyrogenetic conditions, and other states of lowered resistance. Uthoff, consulting ophthalmologist to the Sixth German Army Corps, reported it as constituting 25 per cent. of all cases of keratitis arising among the troops at the front. He attributes it to disordered metabolism, following strain and exhaustion.¹⁶

As a complication of malaria it has been mentioned by several writers.^{3, 9, 13, 21.} Kipp, of Newark, N.Y., stated that nine out of every ten cases seen by him had a malarial origin.

That the parasite is the direct cause may readily be disputed. Ellett, as quoted by Yarr, failed to find it in scrapings from affected corneae in patients showing it in their blood. This is no proof, however, against the possible action of a specific malarial toxin. If such be the primary factor in these cases, other secondary factors, as sun, glare, dust, and the general action of a pyrogenetic toxin, doubtless play a part.

Forty-four cases of superficial keratitis in malarial patients were observed during the period. No definite statistics were available, but Major Kiep has estimated the condition as occurring in a fractional percentage of the malarial cases seen in the Malta hospitals.

It must be admitted here that in some instances the diagnosis of malaria made in Salonica was based on clinical evidence alone. The great majority of cases, however, had the diagnosis microscopically confirmed. Thirty of the cases showed strong evidence of a herpetic origin; one-third of these reported an almost simultaneous eruption elsewhere on the face. They occurred mainly in the months of August and September, a season when, it should be noted, herpetic eruptions are not uncommon.¹⁸

The general condition of the patients suggested the benign variety of malaria. It is noteworthy that Castellani and Chalmers mention herpes labialis as a complication in benign tertian, and do not do so in writing of the malignant type.³

Of the forty-four cases all were unilateral. Seven gave a definite history of previous corneal trouble, and fourteen an indefinite history of a former eye affection.

The time of incidence from the malarial attack ranged roughly from one to twenty days. The average date was the sixth day.

The details in the following cases are especially illuminating.

1. *Lt. : Line Regt.*
 12 August, 1916. Malarial attack on Balkan Front.
 20 August, 1916. Herpetic eruption right lip, left lower eyelid.
 27 August, 1916. L. E. "inflamed."
 7 September seen by us. Left cornea showed typical dendritic ulceration.
 There was a very definite negative history of previous eye trouble.
2. *Capt. M., R.A.M.C.*
 September, 1916. Malarial attack on Balkan Front.
 February, 1917. Second attack.
 March, 1917. Third attack. During the febrile stage developed bilateral "conjunctivitis." R.E. rapidly cleared. L.E. became more painful and resisted treatment. No facial herpes.
 May 19, 1917, seen at St. George's. L.E. typical dendritic ulceration.
 Definite negative history of previous eye trouble.
3. *Capt. G., R.A.M.C.*
 1893. R. E. Keratitis ("phlyctenular").
 1907. Enteric fever. Herpes facialis. Right cornea "inflamed" for four weeks.
 August 1915. Severe cold. Herpes facialis. R. E. keratitis.
 July 13, 1916. Malaria on the Balkan Front.
 July 19, 1916. R.E. affected. Bilateral facial herpes.
 August, 1916. Seen in Malta. R.E. typical dendritic ulceration.

Case No. 3 was not seen by me personally. Major Kiepp reported the details in a lecture delivered to the profession in Malta, in March, 1917.

These cases all ran a prolonged course, with frequent recurrence of loss of corneal epithelium, and persistent hyperaemia and photophobia. The majority were invalided home before a cure was effected. In the few quiescent cases seen, the nebulae were faint, and visual acuity but little interfered with. The local treatment consisted of atropin, argyrol, and bandaging.

The second corneal condition noted was an interstitial keratitis, which we described as "discoïd." The infiltration, circular in shape, was centrally situated. No corneal vascularity was observed with focal illumination. A similar form of keratitis has been mentioned by several writers as a complication of malaria.^{3, 9, 21} Castellani and Chalmers describe it as "a central parenchymatous infiltration of the cornea."

Proof of the presence of the parasite in the lymph spaces, or of the direct action of a malarial toxin, is wanting. An examination in

the living subject of the aqueous humour might possibly throw some light on the question.

Four cases were observed, the details of which are as follows:

1.

October 2, 1916.	Malaria on the Balkan front.
October 14, 1916.	R.E. red and painful.
	Definite negative history of previous eye trouble.
November 8, 1916.	Examined at St. George's.
	R.E. deep seated circular corneal infiltration, centrally situated. Periphery of infiltration denser than centre.
	Circumcorneal injection. Photophobia. Wassermann test—negative.
2. L.

July 28, 1916.	Malaria on the Balkan front.
August 1, 1916.	R.E. "inflamed." An indefinite history of transitory attacks of "redness" in R.E. since coming east. These attacks did not affect the vision.
November 8, 1916.	R.E. "discoïd keratitis." Marked circumcorneal injection. V. of R.E.=hand movements. Syphilitic history negative. Wassermann test not performed.
3. H.

December 28, 1916.	Malarial attack on the Balkan front.
January 6, 1917.	L.E. affected. Definite negative history of eye trouble.
February 12, 1917.	Examined at St. George's.
	L.E. "discoïd keratitis." Circumcorneal injection. Several instillations of atropin required to produce complete mydriasis. V. 1/60.
March 1.	Wassermann test—negative.
April 11.	L.E. No external congestion—no signs of absorption of infiltration.
May 21.	V. of L.E. with + 3 = 6/18. Some absorption of infiltration since last date.
September 12.	No further change.
4. W. R.A.M.C.

Autumn, 1916.	"Fever" on the Balkan Front. For subsequent relapses, took quinine on his own initiative.
February, 1917.	"Went sick" with R.E. Case sheet labelled, "Keratitis with corneal staining and iritis."
March 26.	Examined at St. George's.
	R.E. "discoïd keratitis." Small corneal abrasion, obviously secondary condition. Circumcorneal injection.
April 12.	Febrile attack—blood films negative as regards malaria.
April 17.	Blood smear taken during rigor showed benign tertian parasite.
	Intramuscular injection quinine 12 gr. reduced temp. and caused marked improvement in R.E.
	Later a second intramuscular injection caused further decrease in redness and density of infiltration R.E.
May 7.	Wassermann test—negative.
May 21.	V. of R.E. with + 2 = 6/60. Eye quiet.
Sept. 12.	No further change.

In this case it may almost be taken for granted that the original fever was malaria. Only three or four cases of malaria during the past year, apparently contracted on the island, have been noted. Infecting mosquitoes may conceivably be conveyed to Malta on ships. The presence of a hitherto uninfected anopheles on the island, has been surmised, but not, so far as I am aware, proved.

These cases all ran a prolonged course, hyperaemia and photophobia persisting for weeks. Secondary uveal involvement, if present, was very slight. The ultimate decrease in visual acuity was considerable owing to the central position and original density of the infiltration.

We noted several instances of diffuse interstitial keratitis in malarial patients. The cases showed typical clinical signs of congenital syphilis and afforded positive Wassermann tests. Malaria may conceivably have acted in these cases as a precipitating factor.

3. *The Sclera*.—Two instances of episcleritis occurring within two to four weeks of a malarial attack were noted by us. One of the cases afforded a positive Wasserman test.

They both ran a prolonged course, punctuated with frequent relapses; neither showed any direct response to quinine.

I have seen no mention of scleral involvement in malaria in the available literature.

4. *The Uvea*.—I observed no case of acute uveitis associated with malaria. Several cases of chronic iritis were noted in malarial patients, but the history of the date of onset was too vague to suggest an association. Furthermore, other likely causes, notably syphilis, could usually not be eliminated.

Several writers mention uveitis as a possible complication in malaria^{3, 9, 21}. From the paucity of cases which came to our notice, it would at least appear evident that the malarial parasite has no predilection for the uvea. Castellani and Chalmers record its finding in the larger choroidal vessels, but make no mention of the iris or ciliary body.

5. *The Lens*.—I have seen no cases of cataract associated with malaria. Bagot, of Guadeloupe, quoted by Yarr, records two such. Yarr, himself, regards the association as accidental²¹.

6. *The Optic Disc and Retina*.—I have a record of seven cases of definite optic neuritis and about ten showing merely a hyperaemia of the nerve head, in malarial subjects. They were all binocular.

As defective vision was not a symptom in the majority of instances, the date of onset was generally obscure. One therefore can only conjecture the possibility of a malarial causation.

The following amongst the cases gave definite histories, and we are in them justified in regarding malaria as a very probable cause.

1. R. August 18, 1916. Malaria on the Balkan front. Later had a relapse, shortly after which complained of headaches and defective vision.
- October 27. Examined at St. George's. V. of R.E. 6/12, of L.E. 6/18. Slight swelling of both discs. Exudations and small haemorrhages around both discs. Later, tuberculin and Wassermann tests, also repeated urinary examinations, proved negative.

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- December 12. No further febrile attacks.
V. of both eyes 6/9. Disc margins still slightly blurred.
No fresh haemorrhages.
2. Fl.
June, 1916. Malaria on Balkan front. Later, numerous relapses.
May, 1917. Sent to Malta.
July, 1917. Complained of photophobia.
August 22. Examined at St. George's. V. of R.E. with +0.5 $\bigcirc$ +1
—6/6. V. of L.E. with +0.5 $\bigcirc$ +1.5 = 6/6. Both discs
hyperaemic, blurred margins, congested veins.
September 4. Malarial attack.
September 7. Condition of discs more pronounced.
3. Fe.
1916. Malaria on Balkan front. Ring parasite detected in
blood in Salonica. Noticed defective vision shortly
after attack. Mild attack of "Flexner" dysentery
about same time.
December 1916. Came to Malta, marked anaemia. R.B. cells 750,000
per cub. mm. Hb. 35 per cent.
Large spleen.
February 17, 1917. Examined by Capt. Kiep. Double optic neuritis.
Numerous intra- and pre-retinal haemorrhages.
March 8. Discs normal. Haemorrhages almost completely
absorbed. Patient able to read small print.

Case No. 3 was not seen by me personally. It was reported by Major Kiep in the lecture previously mentioned.

I observed two cases of retinal haemorrhages unaccompanied by optic neuritis in malarial patients.

1. B.
July, 1916. Malaria on the Balkan front.
September, 1916. Reported defective vision. Major Usher in Salonica
noted "retinal haemorrhages both eyes."
October 23. Examined at St. George's. V. of both eyes, 6/6. L.E.
small haemorrhages along course of inferior nasal
vessels. No syphilitic history. Cardiac and renal
systems, nothing to note.
October 31. Febrile attack.
Benign tertian parasite found in blood.
November 1. No fresh haemorrhages L.E. Old ones absorbed.
2.
September, 1916. Malaria on Balkan Front. Shortly after, erythropsia
for two days.
October 25. Examined at St. George's. R.E., two small retinal
haemorrhages just above macula.
November 5. Haemorrhages almost disappeared.

Optic neuritis has been recorded as a malarial complication by several authors.^{1, 3, 10, 20, 21} Probably usually due to a circulating toxin, it may also occasionally result from a mechanical plugging of the capillaries by the parasites. Retinal haemorrhages would appear from the literature to be especially associated with malignant malaria.^{8, 10} Yarr mentions two types, the first consisting of large central haemorrhages, the second of small peripheral ones; the latter type is commoner. I have myself observed none of these small peripheral haemorrhages, but realize that such might be readily overlooked.

Two cases of secondary optic atrophy occurring in malarial patients were noted. Both complained of defective vision some months after coming East. In both the diagnosis of malaria was microscopically confirmed. Neither gave histories of other recent illnesses. Wassermann tests were negative.

During the period we examined about twenty cases of reputed night-blindness occurring in malarial patients. None of them exhibited any ophthalmoscopic signs. This condition has received considerable attention during the war; its frequent detection is doubtless due to the large amount of night work which is being done by men previously unaware of their disability. At the same time many cases have arisen, conceivably the result of debilitating conditions, amongst which malaria must be reckoned. The selective action of quinine toxin on the rods has been mentioned recently by Ballantyne in the *BRITISH JOURNAL OF OPHTHALMOLOGY*. Such a possible cause of night-blindness must not be overlooked in cases receiving a prolonged course of the drug.

In our cases tonics, such as iron and arsenic, with the use of dark glasses, were recommended. The prognosis would appear to be favourable with a return to health.

(7) *The Nervous System*.—Neuralgias and paralyses have been mentioned as frequent symptoms in the so-called "masked malaria."³

Amongst the neuralgias, we found frontal headache very prominent. Refractive errors undoubtedly aggravated the condition, but as with a return to health the headaches tended to diminish² correcting glasses were seldom necessary.

Writers mention an affection of the third nerve resulting in paresis or spasm of the ciliary muscle.^{3, 21} No gross examples came to our notice; mild cases may readily have escaped observation.

In concluding the subject of malaria, it may be noted that during the period only one case of genuine quinine amaurosis, to my knowledge, was observed. I am not aware of the details. The absence of these cases is of interest when we take into consideration the fact that doses of quinine up to 60 grs. in the 24 hours were given in many instances.

B.—Dysentery.

The great majority of cases occurring amongst the troops in the Balkans and Malta Garrison were bacillary in type. Of the cases of amoebic dysentery noted, several patients were known to have originally acquired the disease in Gallipoli.

The occasional occurrence in bacillary dysentery of an articulo-ocular syndrome was first brought to our notice by Col. Garrod, C.M.G., A.M.S.

The ocular manifestations were conjunctivitis and anterior uveitis.

The conjunctivitis was metastatic in character, marked by a considerable hyperaemia with little or no external discharge. It usually disappeared in five or six days. Its occurrence in bacillary dysentery has been recently noted by several French writers.^{5, 11.}

I have a note of six cases of involvement of the conjunctiva in dysenteric patients. Five of these were definitely bacillary in type; of the sixth I have, unfortunately, no record.

Four of the cases were accompanied by arthritis; three of these showed definite signs of anterior uveitis.

In a recent publication on dysentery in Malta, Major Graham, R.A.M.C., pointed out that some of these cases of conjunctivitis may readily be accompanied by a mild, and, therefore, difficult to diagnose, cyclitis.

Six cases of anterior uveitis occurring in dysenteries, the result of a Shiga infection, were noted and recently published by us (BRITISH JOURNAL OF OPHTHALMOLOGY, February, 1918). Two of these cases, which are included in the instances mentioned above, showed conjunctival involvement in the early stages.

As in the case of the similar syndrome in gonorrhoea, the aetiology of these joint and ocular manifestations is obscure.

The negative findings of dysenteric or other organisms in the joints is suggestive of a toxic origin.

In Case 2 of our previously published series, a Gram-positive coccus was cultivated from the iris. Major Arkwright, R.A.M.C., who made the examination, told us that it was of a type commonly found in the intestine and allied to the streptococcus of rheumatism. He suggested that it might have gained access to the circulation through one of the dysenteric lesions in the intestine. Iritis is not uncommon in sub-acute rheumatism and septic conditions of the digestive tract where the streptococcus is frequently the cause: the streptococcal group may conceivably have a predilection for the uveal tract.

Against the probability of such a secondary infection in the case of the joints, is the improvement which follows the administration of anti-dysenteric serum.

In only two cases with eye symptoms do I know of the administration of serum, but here also the improvement shown was in favour of a primary dysenteric infection.

One of these cases was No. 3 of our published series, the other was a very recent case of cyclitis and conjunctivitis associated with a "Flexner" infection contracted on the Island. Here the external ocular congestion is stated to have considerably diminished within about forty-eight hours of the injection.

The immediate prognosis in these ocular conditions is apparently favourable. The question of the possibility of relapse has yet to be answered.

Two cases of corneal involvement in dysenteric patients, type unknown, were noted. One of these showed a superficial ulceration, very prone to relapse, the other interstitial degenerative changes.

In neither was the history definite enough to do more than suggest remotely an association.

Keratitis, as a complication in dysentery, has been mentioned by Castellani and Chalmers.³

C.—Nephritis.

A mild epidemic of nephritis occurred amongst the British Troops in the Balkans during the spring and early summer of 1917.

The only ocular complications we observed in connection with it were neuro-retinal changes.

I examined the fundi of thirty-four cases. Of these one gave a recent history of pneumonia, three of malaria (one of these had also had a recent attack of diphtheria), and four recorded previous kidney trouble in England.

There was no ascertainable cause in the case of the remaining twenty-six whose condition may be denoted by the useful term "War Nephritis." This is regarded by some observers as an entity, infective in character and possibly due to some specific group of organisms. Researches on the subject have hitherto proved negative. In an article in the *Lancet*, September 15, 1917, Sundell and Nankivell suggest that it may be due to some error in metabolism the result of dietary deficiency.

In my group of cases the main initial symptoms were dyspnoea, headache, and general fatigue. Oedema of the face and extremities, haematuria, and a low degree of pyrexia of short duration, were present in most instances. Prolonged albuminuria was noted in all these cases. Not less than ten patients were invalided home, passing albumen twelve weeks after the onset of the attack. The average date of its cessation in those who remained under observation was roughly eight weeks.

Five of the patients complained of defective vision, noticeable some little time after the attack. The details are as follows:

1. E.

Feb. 10, 1917.	Reported sick on the Balkan Front. Labelled "Nephritis."
End of February.	Defective vision for about twelve days
March 12.	Reported in Salonica "slight retinal changes."
April 14.	Examined at St. George's. V. of both eyes 6/6. Discs—hyperaemic—traces of fibrous tissue around margins.
May 17.	Hyperaemia of discs diminished. Urine—nothing to note. Patient marked for Convalescent Camp.
2. P. Age 38.

February 24, 1917.	Reported sick on Balkan Front. Marked haematuria.
Middle of April.	Defective vision.

- April 24. Examined by us. R.E. "Macular Star." Disc margin blurred. Retinal haemorrhage—exudative plaques. Patient very debilitated—four grammes albumen to litre.
- May 21. V. of both eyes—fingers at two metres. No fresh haemorrhages in retina. One and a half grammes albumen to litre.
- June 10. V. of R.E. with $-1.5 = 6/18$. V. of L.E. with $-2 \text{ C} - 0.5 \text{ 180}^\circ = 6/12$. Disc margins well defined except on nasal sides. No fresh haemorrhages; exudations everywhere absorbing; "Macular star" in R.E. less well defined. Half a gramme albumen to litre.
- July. Patient fit for transport home.
3. H. Age 32.
November, 1916. Malaria—attack on Balkan Front.
End of 1916. "Nephritis."
Beginning January, 1917. Defective vision L.E. R.—anophthalmos.
February. Examined at St. George's. L.E. disc cloudy; retinal haemorrhages and exudations. Marked haematuria and pyuria.
May 5. V. of L.E. 6/9. Disc margins distinct; inferior temporal artery slightly constricted. Haemorrhages absorbed. Two minute white spots between macula and disc. Urine—nothing to note; patient convalescent.
4. C. Age 38
April 26, 1917. Reported sick on Balkan Front. Defective vision lasting about a week. Cough, oedema, mild pyrexia, albuminuria.
May 14. Haematuria noted.
July 3. Albuminuria noted.
Sept. 20. Examined at St. George's. V. of R.E. with $-0.5 \text{ sph.} = 6/6$. Vision of L.E. with $+1/70^\circ = 6/6$. Right fundus—nothing to note. Left fundus—upper temporal artery obscured in places near disc suggestive of recent haemorrhages or exudations. Patient convalescent.
5. N.
May, 1917. Reported sick on Balkan Front. Albumen +++
June 5. Defective vision for about three days.
July 15. Examined at St. George's. Fundi—nothing to note.
End of July. Invalided home. Albumen ++
- Four patients, none of whom had complained of defective vision, showed fundus changes.
6. S., age 40.
February 12, 1917. Reported sick on Balkan front.
March 22. Examined at St. George's. Slight oedema of discs and neighbouring retina. Albumen +++.
May 12. V. of R.E. with $+0.5 \text{ C} + 1.5 \text{ 75}^\circ = 6/6$. V. of L.E. with $+1.5 \text{ 60}^\circ = 6/9$. Albumen ++.
June 4. Right disc normal. Left disc—nasal margin slightly blurred. Urine, nothing to note. Convalescent.
7. B., age 40.
February 5, 1917. Reported sick on Balkan front.
March 22. Examined at St. George's. Slight oedema of discs and neighbouring retina. Albumen ++.
April 16. V. of both eyes, 6/6. Fundi normal. Albumen ++.
June. Urine normal. Convalescent.

8. Ne.
February 26, 1917. Reported sick on Balkan front: "marked haematuria."
April 25 Examined at St. George's.
Vision of both eyes 6/6. Both discs hyperaemic. Trace
of fibrous tissue at upper temporal margins. Urine,
nothing to note. Convalescent.
9. Sh.
This patient showed a patch of atrophied choroid
surrounded by pigment in periphery of left fundus,
when examined six weeks after onset of nephritis.
Subsequent examinations showed no change. In the
absence of any recent signs the condition can hardly
be attributed to the nephritis.

A survey of these cases shows:

First.—That neuro-retinal changes were not infrequent. The oedema is probably analogous in its pathology to renal oedema elsewhere. Had more cases been examined in the early stages, it would doubtless have been more frequently detected. Whether the grosser changes were merely a question of degree, or due to a different toxin, is quite obscure. Second.—That the prognosis as regards the restoration of the retinal function was excellent. Third.—That, granted the cases were more or less severe in type, and all of prolonged duration, the neuro-retinal changes were not of any additional serious prognostic import. This statement might readily require modification with a further knowledge of the ultimate course of the cases.

(To be continued.)

ON CASES OF ACUTE ANTERIOR ETHMOIDITIS IN YOUNG SUBJECTS

BY

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IN my experience, the form of orbital suppuration described in this communication is tolerably common in young children, although there are grounds for believing that the essential nature of the condition is by no means always recognized. It is not rare for a young child or even a baby to be brought to the casualty department with a swelling of the lids of one eye, and a statement that he has been "out-of-sorts" for a day or two. Unless the two eyes are compared with respect to prominence, the fact is likely to be overlooked that the eye of the affected side is more or less prominent. The condition goes unrecognized as an instance of orbital suppuration. Many of the milder cases get well under simple treatment, or, indeed, in the absence of any treatment. With or