pension for retired workers are needed. It is not necessary to emphasise the great honour of being a member of this institute. The nomination of outstanding foreign ophthalmologists as corresponding members of the institute would stress its international character.

There is no time or space here to deal with linguistic difficulties, but we stress the fact that all the governments of the United Nations accepted English as *the* second language. The knowledge of English or of Basic English will spread to a hitherto unknown extent. Or an artificial language will link the nations. But these difficulties are practically inconsiderable. I remember the American assistants of Elschnig's clinic in Prague 20 to 30 years ago. Most of them spoke English only, but they had no difficulty with our Czech patients. These so-called difficulties will be negligible in the near future when isolationism will be obsolete. And finally, the population of the city in which this central institute is erected will feel rightly proud and fortunate.

I do not doubt that the old system—being no system at all—with its *laissez faire*, leaving all to chance without offering a fair chance to all, produced many great men.

We shall improve the selection of the able and we shall improve the conditions of training. In this way we can expect very good results.

The fact that the path we tread is a new one is no reason to refute the idea, especially in these times when progress goes forward at an increasing pace.*

* On reading the proofs I want to add that Joseph Needham explained his idea of international scientific collaboration recently (*Nature*, Nov. 25, 1944), in a very interesting article from which concrete proposals emerge.

THE EYE OF THE WEST AFRICAN NEGRO*

BY

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GLASGOW

THERE are certain differences between West African and European eyes which are noteworthy.

1,000 Gambian schoolchildren, 1,100 Gambian, 300 Gold Coast, 300 Nigerian and 300 Cameroon soldiers were examined in addition to hospital and out-patients seen at a West African Military Hospital over a period of 18 months.

The most obvious difference was pigmentation [mentioned by Duke-Elder (1932)]. Ninety per cent. of African soldiers presented

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scattered dots of pigment in the interpalpebral conjunctiva, frequently associated with signs of hyaline degeneration. This was less in children, and was taken to be a normal development and not harmful. The pigment was found in the basal cells of the epithelium. No evidence was found to suggest that avitaminosis was a factor.

(One case of subconjunctival ecchymosis was found to have the whole bulbar conjunctiva raised with blood except two triangular areas based on the limbus and extending out 5 mm. towards the canthi. This suggested that the pigmented conjunctiva was bound down to the underlying tissues. The other eye showed no more than the usual pigmentation and yellow degeneration in the corresponding areas).

On raising the upper lid, normal conjunctiva was seen, frequently studded with pigment around the perforating arteries.

Three per cent. of cases showed the marbled sclera of melanosis bulbi.

Early pterygium was found in 7 per cent. of soldiers but invasion of the pupillary area of the cornea was not seen.

A complete ring of pigment was found in all natives at the corneo-scleral junction. Children and lighter coloured natives had this ring also, but in a lesser degree. The ring was 1 mm. to 1.5 mm. broad, and tended to be wider above and below. The pigment was more concentrated at its outer rim and tapered off on to the clear cornea as fine dots or sometimes as finger-like processes. The latter suggests pigment slides, resulting from a healed epithelial scar, described by Mann (1944). Pergens (1898) noted this ring of pigment in Congo negroes, but it is still sometimes wrongly taken to be a result of inflammation.

Old channels could be seen as grey lines crossing the ring, often obliquely. There was a marked contrast in vascularity of the limbus between natives and Europeans. No healthy native eye had vessels visible beyond the pigment ring or in the pigment ring, but 35 per cent. Europeans had vascularity of or beyond the limbus. (Scott 1944.a.) This is an argument against the opinion that "the average degree of corneal vascularity in a group of subjects is a reliable index of their general state of nutrition." (Lyle *et al.* 1944)

In all the natives examined it was found that limbal vascularity was pathological, and that by far the most common cause was trachoma. Vascularising keratitis should not be diagnosed as being caused by tropical diseases until trachoma has been excluded.

The iris was pigmented brown except in the half-caste. Strands of persistent pupillary membrane were more common and more gross than among Europeans.

Five per cent. of cases had parts of the iris stroma filled with white exudate. This can only be seen by magnification. This might suggest congenital syphilis in a European (Dennie, 1941) but none of these cases had stigmata of congenital syphilis and a Kahn precipitation test in a small number showed no higher incidence of positives than normal. It is worth noting here that enlargement of the epitrochlear gland is found in 40 per cent. of natives on routine examination.

Five cases of flocculi iridis were seen in the 3,000 cases.

The lens, vitreous and fundus were not examined in all cases but presented no special points, except perhaps the rarity of congenital lens changes.

No essential difference was noted between the normal African and European fundus despite the denser choroidal pigment of the former. The chocolate or slate grey negroid fundus of some text-books was never seen. Tigroid fundus was found in 2 per cent. cases. Opaque nerve fibres were seen once only.

In 5 per cent. of cases, the retinal vessels were cuffed as they left the disc. The significance of this will be discussed later.

Visual acuity.—Visual acuity of natives compared favourably with that of Europeans. In 1,500 soldiers (taken equally from Gambian, Gold Coast, Nigerian and Cameroon regiments and all enlisted without any test of visual acuity) 94 per cent. had vision of 6/6 R. and L. and 86 per cent. could see 6/4 R. and L. (tested with Landolt's rings).

1.5 per cent. required glasses and the majority of the remainder had corneal opacities from trachoma.

Less than 1 per cent. were unfit for military service on visual findings. Myopia was rare and strabismus exceptional.

Vision among the Cameroon soldiers was surprisingly good, considering the high incidence (nearly 100 per cent.) of onchocerciasis, sometimes called the blinding filaria.

Drugs. The action of drugs merits comment. It was soon found that 2 per cent. homatropine and cocaine had little or no effect on the African pupil. Fresh solution gave similar negative results, although Europeans responded in the normal way to the same drops.

Using one drop in one eye only, the effect of drugs was tested in Africans in batches of 40 or 50, using Europeans as controls. It was found that (a) 2 per cent. cocaine hydrochloride, alone or with 1:1,000 adrenalin, and (b) 2 per cent. homatropine hydrobromide, while dilating the European pupil, failed to dilate the African pupil when used separately or together.

Using 2 per cent. cocaine with 5 per cent. homatropine, a modest mydriasis resulted in most cases.

Atropine 1 per cent. produced full mydriasis in 20—30 minutes, lasting 5 or 10 days, and eserine produced a normal contraction.

Unilateral nerve block of the cervical sympathetic was induced in two Africans whose pupils had failed to respond to cocaine and adrenalin. A typical Horner's syndrome resulted, indicating that the failure of drugs was not due to faulty innervation.

Diseases.—A review of cases admitted to hospital indicated the common eye diseases among soldiers.

A similar review of out-patients seen at Lagos by Dodds (1942) was found very helpful, though differing in some conclusions.

Work has been done in the past on individual diseases, such as trypanosomiasis (Daniels 1918) and onchocerciasis (Hissette 1932), but there is little knowledge of the common eye changes found in West Africa or of what constitutes a departure from normal.

In the earlier paragraphs an attempt has been made to indicate what constitutes a normal African eye. The common ocular diseases and their causes will now be described.

In seeking a cause for eye changes one is confronted with the facts that yaws, filariasis, intestinal worms, avitaminosis, gonorrhoea, and malaria are very common, while syphilis, leprosy, tuberculosis, trypanosomiasis, and small pox are not unknown, and that many natives have two or more of such diseases.

It is planned to publish more detailed reports later to support the views expressed on trachoma and on onchocerciasis.

The natives presented some eye changes not seen among Europeans, but conversely no case of chronic marginal blepharitis and only one of phlyctenular conjunctivitis was seen. Ophthalmia neonatorum is almost unknown despite the prevalence of gonorrhoea. Wilson (1935) has noted the same immunity in Egyptian babies. A list of 218 hospital cases treated in 16 months is given in the following table.

	Cases			Average number of days in hospital
Conjunctivitis ...	32	90	...	12
Trachoma ...	58		...	20
Keratitis ...	12	40	...	25
Keratitis punctata on-				
chocercosa ...	28		...	25
Corneal ulcer ...	21		...	18
Irido-cyclitis ...	21		...	32
Choroido-retinitis ...	16		...	30
F.B. and injuries ...	10		...	7
Styes and cysts ...	9		...	7
Other disease ...	11			

Conjunctivitis.—A few cases of follicular conjunctivitis and of spring catarrh were treated. The absence of pannus differentiated such cases from trachoma.

Four cases of gonorrhoeal conjunctivitis were seen. The number of cases of gonorrhoea treated in the same period in the central division was 660. Cases were treated with four intra-muscular injections of 1 gm. sulphapyridine suspended in 10 c.c. saline. This treatment cleared up the gonorrhoeal conjunctivitis in effective fashion, but the injections are painful.

In general, conjunctivitis was not common and responded well to irrigations and protargol 10 per cent. drops.

Trachoma.—This was a mild disease of infiltrative rather than of follicular type. It was found in 5 per cent. of schoolchildren, in 10 per cent. of Gambian soldiers, and in 25 per cent. in some villages. Gold Coast and Nigerian soldiers showed 10 per cent. but only 2 per cent. of Cameroon soldiers were affected.

Among 300 American negroes, no cases were seen, but 2 negroes from the same battalion had developed trachoma after 3 months in Liberia.

Many of these cases were subclinical and gave no history of past or present eye trouble despite the presence of tarsal changes and of pannus. In some cases, pannus was the sole sign of trachoma and, as has been stated, the most common cause of vascularity of the cornea was trachoma.

The hospital cases complained of photophobia and epiphora but often had no secondary infection. The upper rim of cornea was usually macerated superficially, but the eyes settled with 1 per cent. atropine and 10 per cent. protargol drops. Sulphonamides did not hasten the improvement. Trichiasis was such a rare complication that active treatment with copper sulphate was held in reserve.

Keratitis.—Keratitis was a rare complication in 150 cases of trypanosomiasis although corneal changes due to trachoma were common in this series.

Over 1,500 malarial cases were treated in hospital but no ocular symptoms were reported.

Apart from corneal ulcers and scars, deeper maculae and grey nebulae were common and were seen in the cornea of 2 per cent. children and of 5 per cent., 18 per cent. and 25 per cent. of Gambian, Nigerian and Cameroon soldiers.

No evidence was found to suggest that avitaminosis was a factor.

A high proportion of cases were associated with trachoma or with onchocerca volvulus.

Keratitis due to leprosy or to small pox must be borne in mind, but no cases were observed in this series.

Keratitis punctata onchocercosa.—Onchocerciasis was found in 5 per cent. Gambians, in 50 per cent. Nigerians and in 100 per cent.

Cameroons (approximate figures). Half of the cases had no palpable nodules and were diagnosed by skin snip.

Small discrete yellow speckled nebulae in the substance of the cornea were suggestive of onchocerciasis and, if a fine deposit of pigment was seen on the posterior corneal surface, the diagnosis was almost certain.

The yellow nebulae either fade or develop into the grey nebulae referred to in the previous paragraph [described by Robles (1916) and Luna (1918) in America and by Hissette (1932) in the Belgian Congo.]

These changes are probably due to toxins from the adult worm, as microfilariae were seen not uncommonly in anterior chambers of eyes with clear corneae. No microfilariae other than *O. Volvulus* were found in the aqueous.

Many cases of an onchocerciasis were found without palpable nodules which suggests that the rôle of the non encapsulated worm is important in producing eye changes, and that the removal of nodules is of doubtful value.

Iridocyclitis.—This subject overlaps keratitis punctata onchocercosa, as many of these cases have a mild iritis also, characterised by the deposit of fine pigment on the posterior corneal surface, previously described by Hissette (1932). Other cases of iritis were associated with strongly positive Kahn tests and were taken to be syphilitic. Two such cases presented avascular syphylomata of the iris, which responded well to potassium iodide.

Iritis is an uncommon but important complication of trypanosomiasis (Scott 1944b). Signs of iritis were found in 7 of 150 cases of trypanosomiasis but in 4 of 26 cases treated in hospital, irido-cyclitis was the presenting sign of the disease. Acute iritis with hyphaema was seen in one case of gonorrhoea.

Choroido-retinitis.—Patches of choroiditis were rare even in onchocerciasis, [cf. Bryant (1935) and Hissette (1937) who found them common].

Cases of retinitis with strongly positive Kahn test, tended to have exudate lining the vessels and a low grade oedema of the retina without patches of choroiditis.

It was not found possible to differentiate cuffing of the vessels in syphilitic cases from that in healthy eyes. Cuffing was found more often in cases with a positive Kahn test, but further work is required before any significance can be attached to this finding.

Cases of optic neuritis are included in this section. Retrobulbar neuritis associated with onchocerciasis, as described by Hissette (1937), was noted. The syndrome of oedema of the lid, ciliary flush, proptosis, and oedema of the optic nerve has been described elsewhere (Scott, 1944c.) This is believed to be an allergic response to *Onchocerca volvulus*. No optic atrophy

attributable to avitaminosis as described by Fitzgerald Moore (1928-37) was seen, though deficiency of B₂ was noted in 36 per cent. of Gambian soldiers.

F.B. and injuries.—When cutting firewood, many natives sit with the wood in front of them. Using a native axe, they chop towards themselves. Thus a wound of the lower half of the cornea is not uncommon.

A few cases were seen in which an insect wing or a husk of grain was attached to the palpebral conjunctiva by suction, giving rise to no pain or inflammation.

Small blue or black grains were found in some lower fornices. These were particles of "tiro stone" which the natives grind into a fine powder and apply to the lashes "to beautify and to cleanse the eye." It is said to be an antimony salt.

Other diseases.—The following case may be of interest.

A case of detached retina was incorrectly diagnosed as vitreous hæmorrhage, as the red reflex was abolished. Transillumination having failed (due to pigment), a needle was introduced into the vitreous to establish the diagnosis but straw coloured fluid was withdrawn.

As the retina fell back, a detachment and hole became visible, which was successfully treated by operation. Indirect and direct examination with + lenses had failed to show any sign of detachment previously in any quadrant of the fundus.

Summary

1. Pigment of the interpalpebral conjunctiva and a ring of pigment round the limbus are normal.
2. Vascularity of the cornea beyond the ring of pigment is pathological and is most frequently caused by trachoma which should be excluded before pannus is attributed to tropical diseases.
3. The negro fundus is red, not chocolate or slate grey, in appearance.
4. 2 per cent. homatropine and cocaine is not an efficient mydriatic.
5. Nebulae in the substantia propria are common and are most frequently caused by onchocerciasis and trachoma.
6. Iritis is caused by onchocerciasis and by trypanosomiasis as well as more usual diseases.
7. Microfilariae are not uncommon in the aqueous, where they are well tolerated. The most common, if not the only one, is M.f. *Onchocerca volvulus*.
8. The value of removal or destruction of nodules containing the adult *Onchocerca volvulus* is doubted as the non-encapsulated

worm plays an important part in infection and in producing ocular complications.

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EYE DISEASES IN THE EAST*

BY

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I WORKED in Iraq as Ophthalmologist to the Baghdad Military area in 1941 and 1942 when I also had the opportunity to study the eye diseases of the native population. I shall briefly describe these before giving an account of the eye diseases amongst the British and Indian troops then stationed in Iraq.

Epidemics of infective ophthalmias occur regularly every year in Iraq, Palestine and Egypt. They begin in May and last until December. The out-patient departments of the hospitals are then crowded with patients amongst whom infants and children predominate. A small eye hospital in Baghdad had an average daily attendance of over 200 patients. There was only one ophthalmic surgeon to look after them. Male and female nurses assisted him. Infective ophthalmias largely attack children under twelve. They develop a severe mucopurulent conjunctivitis which is usually associated with ulceration of the cornea. This conjunctivitis is caused by a variety of organisms (Koch-Weeks,

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