TRACHOMA IN FIJI—AN ORIGINAL INVESTIGATION

BY

R. STUPPEL, M.R.C.S., L.R.C.P.

(LATE ACTING INSPECTING MEDICAL OFFICER, FIJI)

THE islands of Fiji lie in the Southern Pacific, between latitudes 16 and 20 South, and longitude 177 East, and 178 West. The climate is subtropical, the mean maximum temperature being about 82° Fahrenheit, and the mean minimum temperature about 72° Fahrenheit. In the rainy season there is a heavy rainfall—over 100 inches a year, and the relative humidity is very high, the average for the year being about 75° of saturation.

Trachoma is endemic, and very widespread in its incidence amongst the Natives, although no race which lives in the Colony is exempt.

It is remarkable that so serious a disease, which has such crippling effects should have received so little attention in the past by scientific investigators in these islands, but no earlier records are available, and this brief paper appears to be the first serious study of the disease as it occurs in the native Fijians.

The colony of Fiji is remarkable for having a number of distinct races living in close proximity. The vital statistics in round numbers for the year 1929 are as follows:—

Europeans	5,000
Half Castes	3,000
Fijians	92,000
East Indians	73,000
Polynesians	2,000
Chinese	1,500
Others	1,000

The incidence of trachoma amongst the natives varies from district to district. Thus in villages where the general state of cleanliness is low the incidence of trachoma is high. In some villages almost every adult, and most of the children are affected by the disease. On the other hand, in districts where a better type of native is found, and where the general state of living and hygiene is good, cases of trachoma are the exception. This happy state of affairs is the only bright spot in an otherwise dark picture, and incidentally points the way to the only effective means of control.

My investigations were carried out entirely amongst the Fijian natives, and this paper deals with the condition as it occurs amongst them, but the disease is also seen in all the other races that live in Fiji, and can be contracted by recent arrivals in the Colony.

Of the total Fijian population, I should say that at least 20,000 are affected by trachoma. This very wide incidence is not generally recognized for several reasons. In the first place, trachoma, as we see it in Fiji, is an insidious disease. It is not ushered in with any alarming symptoms. In the majority of cases, the disease is contracted in childhood, and the parents are either not aware of, or else pay no attention to, the condition. Later, when the patient is an adult, and the disease has progressed to a stage when the signs of its presence are more obvious, the changes in the eye are frequently attributed to the excessive drinking of Yaqona, the native drink which is prepared from the roots of the Piper Methysticum, or Kava plant, and which is familiar in most of the Pacific islands.

Such indifference to so dreadful a disease is typical of the native indolence; and in my experience, the only patients who ever presented themselves for treatment were those who suffered from ulceration of the cornea, which is a comparatively late complication. Native Fijians regard it almost as a matter of course that old people should suffer destructive changes in the eye, with total or partial loss of vision, and the blindness with which so many of the older members of their race are afflicted is more a matter for ridicule than pity.

Owing to the lack of earlier investigations, no history of the disease in Fiji is available, and its original source is buried in doubt. Either the disease has been with the Fijians since time immemorial, or else it has been introduced into these islands by early visitors.

There is no evidence to show that trachoma amongst the Fijians is of foreign, and, therefore, of comparatively recent origin. All the evidence points in the opposite direction. Thus there are several genuine Fijian words for the disease and its various manifestations—it is known as *Bulewa*. All Fijians are familiar with the gross physical signs; they regard the disease with indifference, as I have already mentioned, and certain native remedies are practised throughout Fiji.

Were trachoma of foreign origin, we would expect some indication of its source by the name by which it is known to the natives, just as measles, for example, is known to them as *Misila*, which is sufficient evidence of whence it came.

Symptoms and Signs

No child, in my experience, was ever brought up for treatment in the early stages, and the condition was seen only during routine examination.

The granules vary to some extent in size and position. They may be present over the whole of both upper and lower lids, in

which case they bear a striking resemblance to the follicles of follicular conjunctivitis, and can be distinguished from that disease only by their subsequent course. This stage is known to the Fijians as *Kakandra* (Fig. 1).

In other less exuberant cases, the granules are scattered more sparsely over the palpebral conjunctiva (Fig. 2.)

When the disease has been present for a year or more, a very definite facies—the trachomatous facies—results, which a little

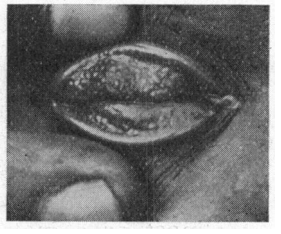

FIG. 1.

Trachoma in a Fijian boy aged four years.

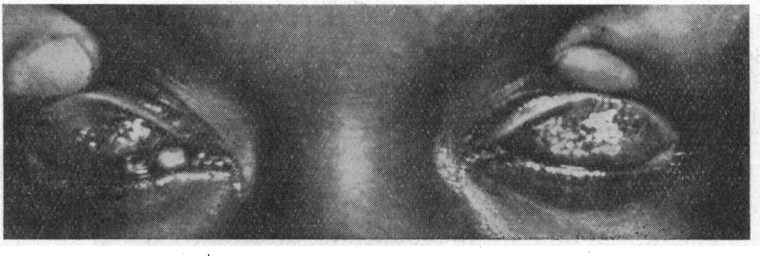

FIG. 2.

Showing typical 'Sago Grains' scattered in upper lid, in a child aged seven years.

experience allows to be recognized at a glance. It is due to the ptosis and photophobia which characterize this condition (Fig. 3.)

Fig. 3 is of a comparatively early case, in which marked ptosis has not yet occurred, but in which the thickening of the lower lid can be recognized by the groove below it. The thickening of the upper lid is more obvious when it is everted.

The ptosis is produced by the involvement in the inflammatory process of the musculus tarsalis superior, first described by Heinrich Müller. This involuntary muscle lies immediately beneath the retro-tarsal conjunctiva, and shares in the inflammation of the latter. As a result, it is more or less paralysed, and the

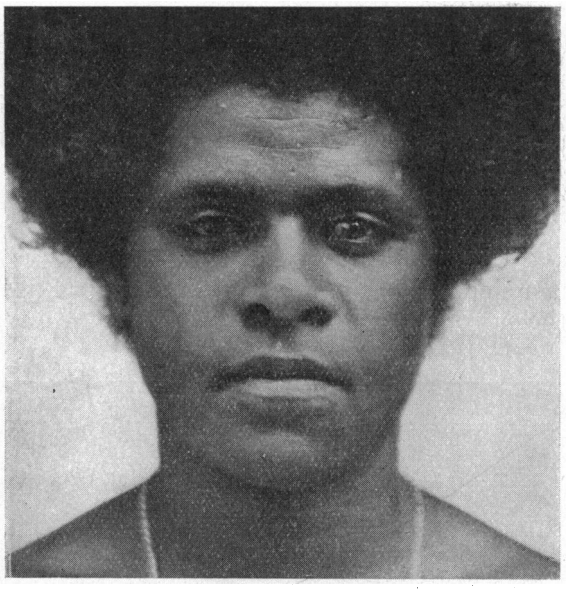

FIG. 3.

Girl aged twenty-three years. Note the slight ptosis more marked on the right, and the thickening of the lower lids.

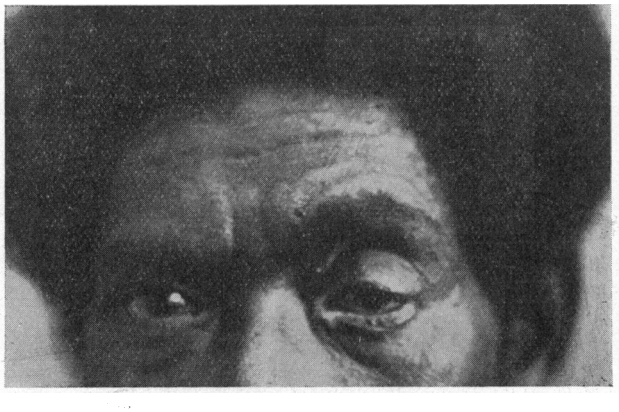

FIG. 4.

Woman aged about 40 years. Left eye shows scaphoid tarsal plate, thickening of upper and lower lids and pronounced ptosis.

consequence is a drooping of the upper lid. (Fuchs.) The amount of ptosis bears a direct relation to the extent and duration of the disease of the conjunctiva, and is doubtless augmented by the increased weight of the thickened lid (Figs. 4 and 5.)

The less severe forms of the disease resolve, before they have advanced very far, and a thin superficial scar, with little or no pannus, may be all that there is left to show that the disease has been present in the past (Fig. 6.)

Scar tissue first appears in the thickened conjunctiva of the upper lid. There is a special seat of predilection—the middle of the tarsus, 4 or 5 mm. from the free edge of the lid. It is first seen as a smooth shining bluish-white patch, lying below the surface of the surrounding thickened epithelium.

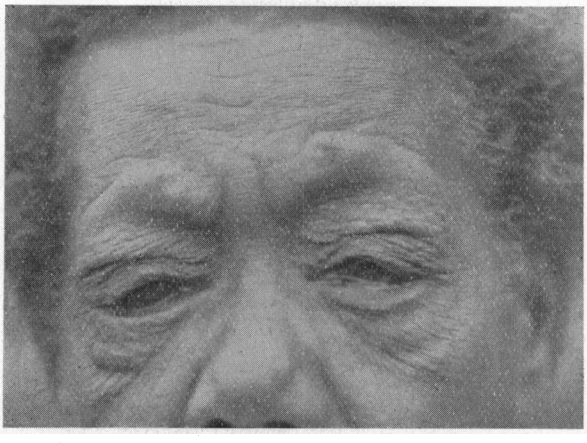

FIG. 5.

Woman aged about 60 years. Note the sinuous margin of the upper lid, and bilateral ptosis. The general infiltration of the cornea can also be made out.

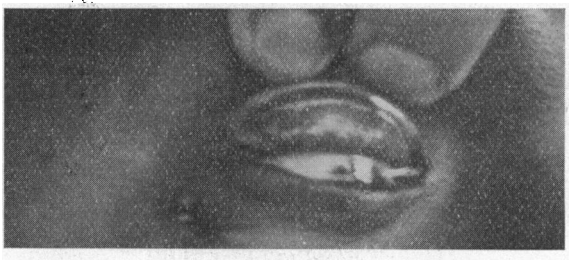

FIG. 6.

Everted upper lid showing homogeneous pink gelatinous surface, in an adult male.

From this nucleus, slender processes of fibrous tissue grow out in a branching manner, which can readily be made out with a magnifying lens. The branching processes unite with each other, and gradually increase in thickness, until the whole width of the tarsal conjunctiva is covered with a network of fibrous tissue. In

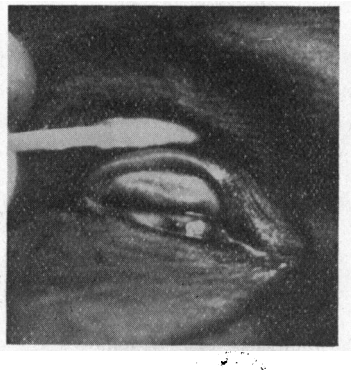

FIG. 7.

Male aged 30 years. Dense white scar occupying central portion of tarsal conjunctiva; rough papillae still visible over zone between sulcus subtarsalis and free border of lid, where scar tissue has not yet advanced.

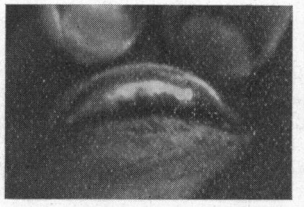

FIG. 8.

Male, aged 35 years. Band of scar tissue occupies central portion of tarsal conjunctiva of right eye.

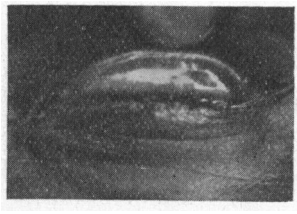

FIG. 9.

Same patient as in Fig 8; showing scar tissue in left eye. It has advanced to a greater extent in the left eye than in the right—compare Fig. 8.

between the strands of this young scar tissue the much redder conjunctival tissue can be seen protruding slightly above the general surface of the newer and paler network.

The formation of this scar tissue advances from the fornix to the free edge of the lid, so that the upper half of the palpebral conjunctiva may be scarred over and smooth, while the lower half, *i.e.*, the part nearest the free border, is still rough and velvety from the enlarged papillary processes (Fig. 7).

Eventually the whole of the meshwork of scar tissue is filled in by union of adjacent fibrils, resulting in a perfectly smooth shining surface.

Where the scarring has been so deep that it will eventually progress to buckling of the tarsal plate and entropion, a dense white band of scar tissue occupies the central portion of the tarsus. All this scar tissue is highly refractile, and appears white and glistening in photographs (Figs. 7. 8 and 9).

Concurrently with the changes that are taking place in the lids, changes of a similar nature occur in the limbus and cornea, but

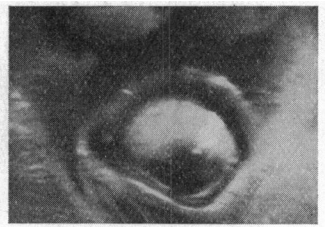

FIG. 10.

Female, aged about 40 years. Showing growth of pannus.

owing to the variation in their anatomical features the manifestations of the inflammatory processes are different.

The first obvious naked eye change is the development of pannus (Fig. 10).

As the disease progresses, pannus forms all round the periphery of the cornea, and grows toward the centre. When the pupillary cornea becomes occluded by the new tissue, vision is greatly reduced, and eventually consists merely in the perception of light.

Where the pannus has progressed to such an extent, the cellular infiltration becomes permanently transformed into fibrous tissue. When this has occurred, most of the blood vessels have disappeared, and all that is left is a thin layer of scar tissue—just as in the tarsal conjunctiva—which forms a permanent opaque film incapable of absorption.

Ulceration of the cornea is a very frequent complication amongst the Fijians as a direct result of the pannus, or of the trichiasis which so often follows on the scarring of the lids. Healing of the ulcers leaves permanent opacities, which, according to their density, interfere more or less with the clearness of vision. Such corneal opacities are known to the Fijians by the native name of *seila*.

Sequelae

All degrees of scarring of the lids are met with in the later stages of the disease, when the active infectious processes have yielded to the healing stage which always follows on. In the severer cases, the scarring and subsequent contraction of the conjunctiva and tarsus cause a distortion of the upper lid, which is obvious from the outside (Fig. 4). The lid is seen to have assumed a scaphoid or boat-like shape.

On everting the upper lid, the bend is at once very obvious (Fig. 11).

The most acute angle of curvature occurs along a line corresponding to the sulcus subtarsalis, where the blood vessels pierce

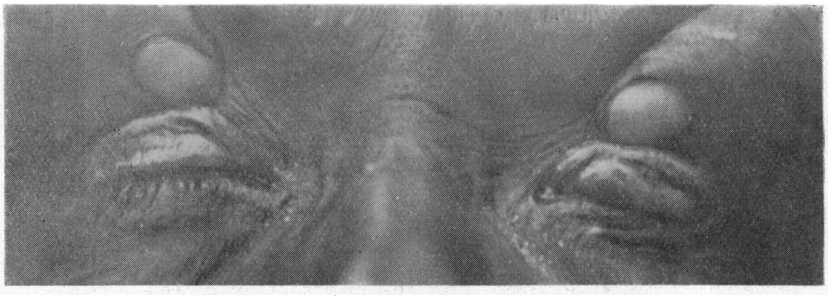

FIG. 11.

Female, aged 36 years. Note the buckling of the tarsal plate, and the acute angle of curvature at the sulcus subtarsalis, where the infiltration of the infectious process, and the subsequent scarring have been greatest.

the tarsus to reach the lower part of the conjunctiva, and where the infiltration of the diseased elements has been greatest.

The distortion of the lids is the result of changes in the conjunctiva and in the tarsal plate itself, both of which are involved in the inflammation, and the subsequent contraction of the scar tissue.

The sharp internal border of the lids becomes altered by the pressure of the eyeball, until it is no longer recognizable with distinctness, but becomes rounded and swollen, and is frequently the seat of blepharitis (Fig. 12). This condition is extremely common amongst the native Fijians.

As a result of the sharp angle which the tarsal plate makes inward, the free border of the lid, with its attached cilia, is brought into contact with the ocular conjunctiva, and with the corneal surface itself, giving rise to entropion. In the more severe cases, the contracting conjunctiva tarsi draws the skin of the lid over

the free border of the latter, and produces the condition of trichiasis (Fig. 13).

In these cases of entropion, on dissecting away the tissue over the tarsal plate during operation, the *crumpled* appearance of the cartilage is very obvious. In addition to the horizontal curvature, there is a series of vertical folds.

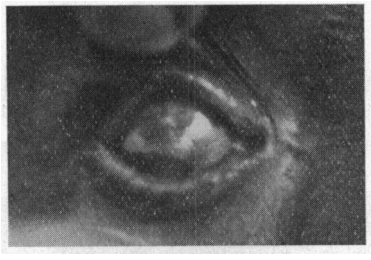

FIG. 12.

Destructive changes in lid margins. The sharp internal border of the lid is lost, and is now rounded and swollen.

In the lower lid, both entropion and ectropion occur. The swelling of the fornical conjunctiva of the lower lid pushes the latter away from the globe, and the contraction of the orbicularis muscle produces permanent eversion of the lid.

In old people—aged 60 years or more—the scarring and contraction of the fornical conjunctiva causes a marked diminution in

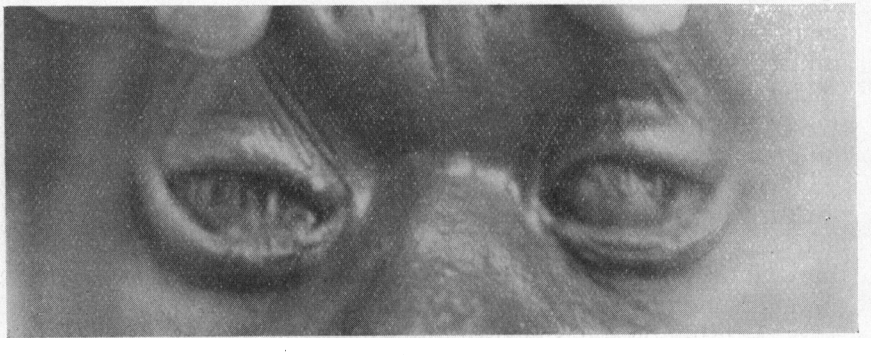

FIG. 13.

Female, aged about 40 years. Bilateral entropion, thickened upper and lower lids, and widespread corneal opacities. (Note how the cilia lie against the corneal surface.)

the depth of the fornices and in the palpebral aperture, producing the condition of symblepheron posterius.

Where the pannus formation has been very dense, it is not uncommon to find in very old people, the condition of xerophthalmos in which the corneal epithelium has become thick, dry, epidermoid and quite opaque. As a result, the unfortunate person is rendered totally blind.

Constitutional Effects

In addition to the local manifestations of the disease which have been described, there are accompanying effects of a constitutional nature, which are not generally realised.

Thus, in the early stages, when there are present photophobia, lacrymation and slight discharge, the glare of the light is distressing to the sensitive conjunctiva, and there is a natural inclination to remain in the shade. This photophobia frequently amounts to actual pain, and is especially marked in the morning, when the patient first awakes.

Later, the infiltration and thickening of the tissues of the lids causes a diminution in the flow of lymph through the capillaries of the affected tissue, with resulting stasis. The direct effect is a sense of heaviness and drowsiness, which is associated with the typical facies which I have described.

This feeling of inertia is rendered all the more obvious by the extraordinary sense of relief that is obtained when the lids are scarified with the blue stone, or even vigorously rubbed with some hard object, so as to encourage the flow of lymph through the blocked and distended vessels.

When the stage of entropion and pannus, with corneal ulceration, has developed, the unfortunate patient is in a state of constant distress and pain. They may be seen everywhere, going about with their eyes screwed up, and suffering without complaint what they regard as their inevitable lot.

It should not be difficult to believe that such conditions exert a profound effect upon the body generally; and I am convinced that in this disease lies, to a large extent, the cause of the apparent indolence of which the Fijians are so often accused.