

## LEPROSY IN EAST AFRICA\*

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In 1938 the writer undertook, on behalf of the British Empire Leprosy Relief Association, a tour of several countries, chiefly in North and East Africa but also including Malta and Aden. The objects of the journey were: (a) to make a study of leprosy as it is found in these countries, of the conditions which affect its incidence and distribution, and of the existing methods of treatment and control, and (b) to make, if necessary and desired, suggestions to governments, missions and others concerned in antileprosy work as to how these existing methods might be improved.

The countries in the order visited were Malta, Egypt, Anglo-Egyptian Sudan, Belgian Congo, Uganda, Kenya, Tanganyika Territory, Zanzibar, Aden, Somaliland and Palestine.

### DISTRIBUTION OF LEPROSY

*Malta.*—Leprosy is a minor problem in Malta, and it could probably be dealt with effectively in a comparatively short time. The main difficulty is that the leper hospital, in spite of lavish expenditure, is not popular and does not attract patients. Thus infectious cases often avoid detection and continue to remain at large and spread infection.

*Egypt.*—The object of the visit to this country was to attend the International Congress of Leprosy. That disease is still a serious problem in Egypt, but I will refrain from further reference to it here as it has recently been dealt with at length by Dalgamouni (2).

*Anglo-Egyptian Sudan.*—If we take the great block of country from the northern boundary of the Anglo-Egyptian Sudan to the southern boundary of Tanganyika Territory, including the Stanleyville province of the Belgian Congo and extending east-

\*This article, which deals with the broader features of the leprosy problem that were observed in the countries visited by the author, is supplemented elsewhere in this issue (p. 445) by a review of another report which appeared in *Leprosy Review* 10 (1939).—EDITOR.

ward to the Red Sea and the Indian Ocean, we find certain areas, not limited by territorial boundaries, in which leprosy is concentrated and other areas in which it is comparatively uncommon (see Text-fig. 1).



TEXT-FIG. 1. Map showing the areas in Central and East Africa in which leprosy is most highly endemic.

One of the most important of these highly endemic areas includes the equatorial province of the Anglo-Egyptian Sudan, especially the land to the west of the Nile, the adjoining northwest territory of the Belgian Congo, and the southwestern part of Uganda. Defining the eastern limit of this area, Atkey (1) states that "there are a few cases on the eastern side of the river (Nile) valley and neighboring hills, but as the country stretches up towards the Abyssinian border the cattle become numerous and leprosy is rare or absent." How far this leprous area extends west and south in the Belgian Congo I am unable to say. The disease is particularly uncommon among the nomadic Arab population in the northern and central Sudan, and when it is found it is among the Negro races and occasionally among the Arabs who have settled down in villages.

What are the factors which determine the wide variations of incidence in these regions? The most notable contrast is found between the nomadic and pastoral peoples and the agriculturalists, the former being almost exempt from leprosy and the latter showing a much higher infection rate. This is most strikingly seen where small agricultural foci are found in the midst of uncultivated areas inhabited by nomadic tribes. Thus, according to Atkey, in the Berber, Dongola, Fung, Kassala and Kordofan provinces of northern and central Sudan, out of 229 reported lepers 226 were settled or detribalized agriculturalists and only 3 were nomadic Arabs. In my visit to British Somaliland I found that the majority of the known lepers came from a small area where agriculture had been begun. In Arabia the same is found to be the case; it is in the fertile cultivated lands of the Yemen, with a more or less settled and often detribalized population, that leprosy is most common. Many years ago I found the same condition in India; nomadic tribes, even if they live in an area of high leprosy endemicity, are apt to be free from the disease.

It would therefore appear as if nomadic life makes for exemption from leprosy. What can be the causes of this? Possibly the hard life of the nomad tends to eliminate all but the physically fit, and therefore to get rid of the leper before he has a chance of spreading infection. Atkey, after considering such possible causative factors as rainfall, altitude and availability or otherwise of salt, discards them all and considers the determining one to be the presence or absence of cattle, sheep and goats, and the use of milk for food. The camel-owning Arabs have more milk than they can drink. He also mentions, as a second factor, their isolation from external contacts. Indian experience supports the milk hypothesis; the plains of the Punjab are, or were till recently, exempt from leprosy as compared with other parts of India, and there is probably no other region in India where milk forms so important an element of the diet.

Following up this suggestion still further, it is significant that Lowe (3) has observed that leprosy is much more severe in Burma than in India, the lepromatous type forming a much higher proportion of the total. Ryrie, according to Wade, (4) says that in Malaya a severer type of leprosy occurs in the Chinese as compared with that in Indians. Now one of the things which strikes the resident of India most forcibly when he travels to Burma and to China is that, after leaving Calcutta on his eastward

voyage, he seldom has an opportunity of drinking fresh cow's milk. This is a subject which appears to be worthy of further investigation.

Isolation from external contact as a cause of exemption from leprosy is another important suggestion. Nomadic life certainly makes for isolation, as the contact between one tribe and another is only occasional and when it occurs it is not close and is regulated by tribal customs. In the Stanleyville province of the Belgian Congo the opposite condition was seen. There promiscuousness exists, and chances of contact of healthy persons with lepers are increased by the fact that by government orders the population is concentrated within a few hundred yards of the main roads. This custom has suddenly changed a sparse population into a comparatively dense one. On the other hand it has generally been found in India and elsewhere that in the town and city, as compared with the rural area, leprosy is a less serious problem except in so far as a large floating population invades the town from rural areas.

*Uganda.*—Here also the distribution of leprosy, so far as it is known, is interesting. In the west, and especially in the southwest bordering on Ruanda and the Belgian Congo, leprosy is stated to be common though the land is high and the climate healthful on the whole. In the eastern part of Buganda and throughout the eastern province the disease seems to be even more common, the high incidence probably extending north into the Lango district. In this area the country is low-lying, hotter and more malarious than in the west, and the population is in a more backward condition than in Buganda. In the main part of Buganda, however, where the people are more advanced and educated, the incidence appears to be low. It is also low in the drier and more sparsely populated areas to the north, corresponding to the nonleprous region in southern Sudan east of the Nile.

*Kenya.*—When we come to Kenya we find leprosy common in Kavirondo, the western province adjoining the highly endemic eastern province of Uganda. As in the latter area, many regions in Kavirondo are highly malarious, and this may have a direct or indirect effect on the incidence of leprosy. In northern Kavirondo leprosy returns were recently collected from the chiefs. These give the number of lepers outside the leper camp as 450, but it is possible that this is an underestimate. More than

one-half of these cases are concentrated within three western locations (chiefdoms), and the disease is apparently much less common in the eastern part of the district. A probable partial explanation of this is that the eastern tribes dread leprosy and drive out their lepers. The western tribes, on account of debility, ignorance, tribal customs or whatever cause it may be, do not deal with their lepers in that way.

A similar explanation was given by Chief Paul Umbova of southern Kavirondo. He estimates some 1.7 percent of lepers in his location and believes that the disease is spreading. He says that up to twenty-five years ago people dreaded it and drove out the lepers, but now they are allowed to mix freely with others. One gathers that the abolition of war following the British occupation has led to a more humane spirit in the people, but humaneness has not been accompanied by a corresponding degree of public health precautions.

There is reason to believe that one of the most important factors in the control of leprosy in the community is what may be called "leprosy consciousness," a realization of the nature and dangers of the disease. Where this is present and is accompanied by an energetic communal spirit, cases are dealt with as they occur within the borders of the community or seek admission from outside. Both in India and in Africa the incidence of the disease is very much affected by this factor, and one of the best methods of controlling it is to engender well-informed leprosy consciousness by means of education.

Central Kenya is believed not to have a serious leprosy problem, though as yet no attempt at a survey has been made. Some 40 or 50 lepers are housed at the infectious diseases hospital in Nairobi and at two small leprosy hospitals at Tumutumu and Chogiria in the Nyeri and Meru districts. The comparative exemption of this region is possibly due to the healthful climate and the sparseness of the population. Now that law and order are secured and the population is increasing, the attendant danger of the spread of leprosy may be prevented by general sanitary improvement and education.

In the coastal province there seems to be much more leprosy. Here again no survey has been attempted, but there are several indications that the disease is common. In a time of famine a few years ago the number of lepers in the Kalo-leni leper camp rose to 100 instead of its usual twelve. Out

of 42 patients in the Mwambweni camp, 31 are infectious cases and patients are seldom admitted until the disease has reached a fairly advanced form, which indicates that many more potential sources of infection are at large. The coastal tribes are said to be physically and morally inferior to the Kikuyu and other tribes of central Kenya, and this, along with the less healthful climate, may account at least in part for the greater amount of leprosy.

*Tanganyika Territory.*—The area of comparatively high endemicity in eastern Kenya apparently extends into northeastern Tanganyika, and there seems to be a considerable amount of leprosy in places throughout that part of this country, though not nearly so much as in the southern province. In southern Tanganyika the condition appears to be comparable to that in the Stanleyville province of the Belgian Congo, where some four percent of the population is affected, at least in some parts. While malnutrition may be partly responsible for this high incidence in some districts, it is certainly not the principal cause in others. As in the Congo, promiscuity, close contact and the urge to scratch due to irritating skin diseases, appear to be at the root of this wide-spread infection. At almost all of the leprosy clinics and settlements I visited in southern Tanganyika, comparatively few patients appeared to be free from scabies and tinea, complicated by septic infections. Given contact with infectious leprosy cases the constant scratching of irritated skin must furnish an ideal method of introducing the germs, also the unhealthy skin presumably forms a suitable nidus for the multiplication of the germs introduced.

*Zanzibar.*—Here the incidence of leprosy seems to be very similar to that in the rest of the coastal area, but no survey has yet been attempted.

*British Somaliland.*—This region affords an interesting study in leprosy, not because it is a common disease there—there are perhaps some 400 cases among its one-third million inhabitants—but because in its next-door neighbor, Ethiopia, it is very common, and there is constant coming and going between these two countries. As yet the Somali is almost entirely a nomad, and little has been done to interfere with his wandering life. But now that Ethiopia is beginning to develop, and in proportion as peace and order, agriculture and commerce are introduced, the Somali is likely to settle down into



less scattered communities. It is significant that almost all of the cases in the Berbera leper camp came from the comparatively small area between Hargeisa and Borama, near the Ethiopian border, where agriculture has been introduced and where the people, though still living in their nomadic gurgis, are to a certain extent tethered to their cultivated land and live in comparatively close contact with one another.

*Aden.*—Here the problem is very similar, though less urgent. There is no indigenous leprosy in the colony, but it is comparatively common in the Yemen, where there is an agricultural population, and it exists to a certain extent in the Hadramaut. Patients come to Aden from these two regions to be treated for other diseases, and not infrequently are found to have leprosy. They are lodged in a mission leprosarium at Sheikh Othman.

#### DISCUSSION

A rapid survey of the several countries visited in this tour, chiefly of East Africa, shows certain areas in which leprosy is comparatively common and offers suggestions as to possible reasons for that fact. It would appear that nomadic life is peculiarly inappropriate to the occurrence of leprosy, because, in part, of the diet (milk being abundant), of the absence of contact with sources of infection, and of the rigors of life in the desert, which does not encourage the survival of those seriously ill with leprosy and likely to spread infection.

It is suggested that leprosy is particularly liable to occur when nomadic tribes settle down to a fixed or an agricultural life, and when primitive tribes are first brought into contact with a more developed civilization.

The prevalence of tinea, scabies and septic skin conditions, particularly in the highly endemic areas centering in the northeastern part of the Belgian Congo and in southern Tanganyika, is suggested as an important factor in spreading leprosy infection.

#### THE TYPES OF LEPROSY

Comparing leprosy as I found it in the equatorial area, centering in the Stanleyville province of the Belgian Congo, with the disease as it is found in northern India I noticed the following differences:

- (a) Absence of "lepra reaction." Among many hundreds of cases of

leprosy I only found one with this condition, which is comparatively common in India.

(b) Infrequency of L2 and L3 cases. Only some 10 percent of the cases are of these grades, as compared with 20 percent or more in northern India.

(c) Among the neural cases there appears to be a relatively large proportion with shortening of the digits of hands and feet, but claw hand is seldom seen and wasting of the small muscles of the hands and feet are not so marked. Trophic ulcers of the feet are fewer and not so deep. It is possible that the shortening of the fingers and toes may be due to jiggers; the anesthesia set up by leprosy prevents the patient from noticing the presence of the parasite until septic complications arise, resulting in destruction of the digit.

(d) The proportion of tuberculoid cases is perhaps almost as high as in northern India, but anesthesia to light touch is less marked.

(e) Thickening and tenderness of nerves is much less frequent, and when present it is less marked, than in northern India. In the whole of my tour I found only a single case of nerve abscess, that one being among the 16 cases examined at Omdurman, in northern Sudan.

(f) The proportion of neural to lepromatous macules is greater than in northern India, simple neural macules being largely responsible for this larger proportion.

Generally speaking, therefore, leprosy tends to be of a milder type than in northern India, and very much milder than in many other countries. Professor A. Dubois, of the Belgian Red Cross, who has long been engaged in leprosy research at Pawa, in the Belgian Congo, and who has visited northern India and studied leprosy there, agrees with the views I have expressed regarding those differences in the two regions.

Without further investigation one can only speculate on the possible causes of these differences. In the Belgian Congo I saw no reason to blame malnutrition for the very widespread incidence, which Dubois puts at 4 percent in places, or, if abortive cases are included, at 6 or 7 percent. The land is fertile, the population is not excessive, and the people appear to be well-nourished. We shall assume that the natural resistance of the general population is fairly high. We need not now discuss whether this high resistance is due to favorable conditions, such as good nutrition and a fairly good climate, or to the elimination of susceptible human strains in a population long subjected to the disease, or to some other, unknown factor. What we do know is that we find in this area unusually favorable circumstances for the dissemination of the infection. Promiscuousness abounds, social, sexual and sartorial. Not only



is polygamy widely practised, wealth being reckoned by the number of wives, but wives are also common currency, being frequently changed. It is not suggested that leprosy is spread as a venereal disease, but promiscuous close contact provides the most favorable condition for transmission.

The bark-cloth kilt is another danger. It is strong and lasting if it is not washed, and because in the family these kilts are communally owned, skin conditions such as tinea, scabies and streptococcal infections are harbored and distributed.

At Madje, where a complete census of the population was being carried out, I examined some 30 cases of leprosy that had been found. It was noticed that in almost all of them there were scabies and septic sores of the skin, that these sores were chiefly around the gluteal region, and that the majority of slight or early lesions also centered around the same part of the body.

I suggest that we have at least a partial explanation of the leprosy picture in the northeastern region of the Belgian Congo if we agree: (a) that resistance to leprosy varies in individuals but that the average resistance is high; (b) that the chances of infection spreading from open cases are extremely high; (c) that the total number of cases is in direct proportion to the number of persons infected; (d) that the severity of the disease or the number of severe cases is in inverse proportion to the average resistance of the population.

In comparing the type of leprosy in one place with that in another one has to be on guard against a common fallacy; the kind of leprosy seen depends to a large extent on local circumstances. Nowhere that I visited, except in the southern Sudan and in the northeastern part of the Belgian Congo, was there a chance of examining a complete cross-section of the leprosy population. One class of patients is attracted to leprosy outdoor clinics, another to voluntary settlements, and yet another is found in compulsory camps. A wrong impression of numbers and types of lepers in a community is often based upon the kind of institution visited. In any case Africa, with its innumerable tribes of various origins, with its varieties of climate, environment and vegetation, and the many other factors which affect leprosy, offers a most fruitful field for epidemiological research. Especially is this so in the regions which have not yet come into close contact with European influence.

## METHODS OF TREATMENT AND CONTROL

In the countries visited the methods employed in treatment and control vary greatly. The feeling against compulsion is gaining ground, but it is realized that voluntary methods, as compared with compulsory ones, require more work, money and personnel if they are to be effective; also that the personnel must be of a very special type, which can be supplied by missions but can seldom be recruited by governments.

Realizing this, it is usual for the government or the local administration to encourage missionary organizations to undertake antileprosy work, itself supplying the financial support or at least a part of it. Of the 41 leprosy centers that I visited, 26 were run by missions, 14 by governmental agencies, and 1 by the Croix Rouge. Dividing these centers according to their types, there were 11 agricultural settlements, 15 hospitals, 9 camps and 6 clinics. In only two of the residential institutions was there a full-time doctor, but in 13 there was full-time, expert European supervision.

The degree of efficiency of treatment varied very much in different institutions. In some the patients were left to look after themselves, with only an occasional visit from a sister or doctor. These places were generally small camps, at a distance from medical aid and not considered large enough to justify expert, whole-time supervision. Generally speaking, the compulsory institutions showed the worst results in treatment, partly because the patients had a grievance and refused to cooperate, and partly because compulsion tends to comb out from the community chiefly advanced and hopeless cases.

Of all the institutions visited one in particular combines the ideal conditions for leprosy relief and control. It has a moderately large agricultural settlement with 400 patients all except 50 of whom support themselves by their own labor, a children's home three miles distant with some 300 leper children under excellent educational and training facilities, and a crèche for healthy children of lepers. There is also a large outpatient department, and close touch is kept up with the villages in carrying out an educational campaign. Not only is this institution a potent force for dealing with leprosy in the district, but it sets an example as an educative force in general sanitation and improvement of the standard of living. The personality at the center of all this is a missionary nurse,

but there is close cooperation and financial aid from government officers, chiefs and the local administration.

Another personality is a missionary nurse who runs a chain of leprosy clinics with medical backing from the local mission doctors. As her assistants she employs only lepers or ex-lepers, and large numbers of patients flock to these treatment centers. The results are remarkably good, probably because the area is free from malaria and the people are well nourished.

These two centers of antileprosy work are mentioned as outstanding examples of devoted and successful service. They emphasize the importance of suitable personnel if good results are to be obtained.

The attitude of the medical authorities towards leprosy varies considerably in the different countries visited. The general administrative policy, the amount of money available and the seriousness with which the leprosy problem is considered, naturally affect the attitude. In some places it is argued that leprosy is only a symptom of general malnutrition and insanitary conditions, and that if these conditions are improved it will disappear. This is a comforting theory, especially when funds are low. One of the best answers to it is a visit to one of the excellent antileprosy centers I have described, where the measures taken are proving to be an important factor in improving the sanitation and standard of living in the district.

Throughout the whole tour I was struck with the excellent and willing work that was being done by missionaries, government doctors and African assistants. At the same time, it was clear that in many places efforts were being wasted or hampered by lack of sufficient knowledge. Like malaria, leprosy is a difficult and complicated disease and must be studied in relation to local conditions. Expert advice, based upon such study, is badly needed and would be welcomed by those engaged in the relief and control of leprosy.

#### SUMMARY

An account is given of the distribution of leprosy in ten countries visited, chiefly in East Africa. The possible causes of the varying endemicity are discussed, especially such factors as contact, diet and habits of the people.

The type of leprosy is found to be very mild in an area with its center in the northeastern Belgian Congo. The reasons for this are discussed.

The various methods employed in dealing with leprosy are reviewed, and their relative merits compared.

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