# LEPROSY AND LEPROSY WORK IN EAST AFRICA

JAMES ROSS INNES, M. D., D. T. M.
*Interterritorial Leprologist*
*Nairobi, Kenya*

It has long been known that leprosy is widespread throughout East Africa and that in some parts of this region its prevalence is high, but until 1947 no systematic effort had been made to find out how great the problem really is. In that year the writer was engaged by the East Africa High Commission to serve as leprologist for the area, and in the following three years was enabled to make at least preliminary surveys in all of the territories concerned. This region and the leprosy situation in it are so little known in many quarters that the principal facts about it and the findings of the surveys are summarized here.

## EAST AFRICA AND ITS ADMINISTRATION

British East Africa, which comprises the three contiguous territories of the Kenya Crown Colony, the Uganda Protectorate, and Tanganyika Territory, extends roughly from 30° to 41°30′ east longitude, and in latitude from 4°30′ north of the equator to 11°50′ south. In other terms, it lies between the Indian Ocean and the southern part of Italian Somaliland on the east, the Belgian Congo on the west, Ethiopa and the Anglo-Egyptian Sudan on the north, and, on the south, Mozambique and the northeast part of Northern Rhodesia, with slender Nyasaland between the two.

Geographically the region presents a great variety of climate and terrain, varying from the coastal zone of Tanganyika and Kenya to the Great Rift finger lakes at the western limit, the huge Lake Victoria and many other large lakes being entirely within the area. Apart from the coastal strip the country is high land, with a temperate tropical climate; and it includes mountains such as Elgon in Uganda (14,140 ft.), Kenya in that Colony (17,040 ft.), and permanently snow-capped Kilimanjaro (19,320 ft.), a few degrees south of the equator on the northern border of Tanganyika. To the wayfarer in that region the most impressive—and, sometimes, oppressive—thing about it is the African bush, seemingly endless in extent and variety.

Kenya, with an area of about 245,000 square miles, and Tanganyika, with about 365,000 square miles, have populations

of roughly 6,000,000 each, while Uganda, with 94,000 square miles, has almost 5,000,000. The greatest density of population is near the great lakes, while on the other hand large parts of the territories, especially in Tanganyika, are empty of humans because of tsetse fly infestation. While Kenya has, in its highlands, a European population which is large for such territories, and all have large East Indian populations, the predominant peoples are African of mainly Bantu race. These are composed of numerous tribes whose economy and mode of life are in the main simple, in many places and in many respects not fundamentally different from what they were before the region was explored. Hygienic conditions in the villages and homes, and especially the small, dark, ill-ventilated huts usually aggregated into crowded communities, offer conditions highly favorable for the transmission and maintenance of leprosy.

This extensive area, fully twelve times as large as England and about one-fourth the size of the United States, cannot be subjected to outright political union because of the diversity of status of its component parts. Uganda is a protectorate, and enshrines the African kingdom of Buganda with its ruler and institutions preserved; Kenya is a Crown Colony under the Colonial Office, and having a protectorate of its own in the coastal strip leased from the Sultan of Zanzibar; and Tanganyika, previously a German colony, is now a British trusteeship under the United Nations. Each has a certain degree of autonomy and its own administrative organization, including a medical service, but for certain purposes there has been established the East Africa High Commission, a sort of federal institution of government with headquarters in Nairobi which controls and consolidates various interests in the three territories. These include the postal services, railways and harbors, air control, and certain agricultural, veterinary, public health and medical research.

## EXISTING LEPROSY INSTITUTIONS

In this undeveloped and economically backward region the governments have been unable to develop more than the most essential activities, and of the public health problems which demanded first attention leprosy has not been one. Until recently, therefore, the initiative has been entirely with philanthropical—mainly religious—organizations. The leprosy institutions which exist in this region are the following:

*Uganda.*—There are four quite good leprosaria in Uganda, of which three have resident medical supervisors while the fourth

is so near to one of the others that it can share in its medical supervision; nurses and lay personnel are more abundant. These institutions are: (1) The Kumi leprosarium, which includes a subsection at Ongino a few miles away (the whole called, but with decreasing frequency, the Teso Leper Mission because it once dealt mainly with the Teso tribe). This place, located in the north of the Eastern Province of Uganda, has about 1,000 patients in residence, somewhat more at Kumi itself than Ongino, and 200 outpatients attend the clinics. The European staff consists of one physician, Dr. H. W. Wheate, and one lay worker of the British Empire Leprosy Relief Association; two nurses are being recruited to replace the veteran workers, Miss Laing, O. B. E., and Miss Kent, who retired in 1949. This institution is run by the Church Missionary Society, with partial support by the government.

(2) Also doing notable work is the Bunyoni leprosarium, located on an island in the beautiful Lake Bunyoni (altitude 6,500 ft.) in the Kigezi District which lies in the far southwest corner of Uganda. Here 800 inpatients are cared for and 100 outpatients. This institution is also under the C. M. S., and is staffed by Dr. L. E. S. Sharp, with two nurses, Miss M. Barley and Miss J. Metcalfe. It is in part supported by the government.

The other two leprosaria are: (3) The St. Francis Settlement at Buluba (also called Namagera) on the shore of Lake Victoria, with 300 patients, one physician, Dr. C. Quin, and three European Sisters of the Franciscan Order. (4) The St. Francis Settlement at Nyenga, 6 miles from the town of Jinja, with 160 inpatients and three Franciscan Sisters; the work is also supervised by Dr. Quin from Buluba, 30 miles distant.

*Kenya.*—There are four small leprosaria here: (1) A camp at Kakamega, in the north of the Nyanza Province of Kenya, with 200 patients; run by the government without European staff except by part-time supervision by the medical officers of the adjoining government hospital. The supervision has become close and energetic since 1949, and a trial of the sulfones has recently been started. (2) A camp at Msambweni, on the coast, with 60 patients, run by part-time supervision by the government medical officer. (3) Chogoria, Church of Scotland Mission, a small settlement of 30 patients run by Dr. Clive Irvine in addition to his ordinary medical work. (4) Tumutumu, also Church of Scotland Mission, with 20 patients, run as an annex to his ordinary medical work by Dr. W. Brown. The government of Kenya is in the process of choosing a site for a new

1,000-patient leprosarium in Nyanza Province, where the incidence of leprosy is highest.

*Tanganyika.*—The situation here is unusual because of the peculiar custom of running refuge camps with little or no supervision or treatment. There are ten such places, which because of their limited value need not be listed. Besides them there are seven functioning leprosaria which are doing good work under handicaps of lack of personnel and limited financial support: (1) Makete, near Tukuyu, in the Southern Highlands Province, with 600 patients, run by the government and staffed for many years with one European lay worker derived from BELRA, Mr. W. Lambert, M. B. E., but since 1949 by Dr. C. A. Wallace and Mrs. Wallace, helped by one lay worker temporarily. (2) Chazi, in the Eastern Province, with 200 patients, supervised formerly by Dr. C. A. Wallace and Mrs. Wallace, but since 1949 by a lay worker temporarily posted there. (3) Peramiho, in the neighborhood of Songea in the Southern Province, with 1,000 patients, run by the Benedictine Order and staffed by one part-time medical Sister of the Order, Sister Tetwigis, assisted by two Sisters of the Order. (4) Ndanda leprosarium of the Benedictine Order, located in the same Southern Province as Peramiho, but nearer the coast, with 600 patients, under the supervision of Sister Tecla, a veteran doctor of that Order, assisted by one Sister. (5) Mngehe leprosarium, near Liuli on the shore of Lake Nyasa in the Southern Province, run by the Universities Mission to Central Africa, under a lay worker derived from BELRA, Mr. W. A. Walters, and Mrs. Walters, with 100 patients. This work has part-time assistance from the medical and nursing staff of the general hospital at Liuli. The same Mission also runs an outpatient dispensary system dealing with 2,000 patients at 14 clinics in Masasi and Newala Districts, further towards the coast, under Mr. R. Heald, trained male nurse. This particular work was founded by the devoted Miss Edith Shelley, who died in 1943. (This clinic work, and Peramiho and Ndanda, have not used the sulfones on a large scale, but arrangements were made in June 1950 to supply full amounts of the drugs, and they will now be used.) (6) Kolandoto, near Shinyanga, in the Lake Province, with 260 patients, run by the African Interior Mission under the part-time supervision of Dr. A. M. Barnett, using the sulfones. (7) Makutapora, on the central railroad of Tanganyika, with 200 patients, supervised by two nurses of the C. M. S. mission.

The general situation in East Africa is that leprosy control

—if it can be called that—is in a rudimentary state. It is greatly hampered by lack of sufficient or adequate institutions to serve as centers of information and leadership, and everywhere there is a serious lack of full-time workers—physicians, nurses and technicians—but steps are being taken to establish leprosaria in all three territories. The governments provide a certain amount of financial support, the government of Uganda having been, as yet, the most active in bringing about improvements. Kenya has no adequate leprosarium at all, despite its estimated 35,000 cases, and has virtually to start from scratch. Uganda has been the first to begin the use of the sulfones, which the East African patient seems to take without trouble and with good response. Tanganyika with its estimated 100,000 cases, is seeking to establish a new large leprosarium near Kilosa. The numbers of cases under active treatment are: Uganda, 2,500; Kenya, 350; Tanganyika, 4,000.

## THE SURVEY WORK

The author's three years in East Africa, to the time of this report, have been devoted to the study of existing work and institutions, and to surveys designed to determine the prevalence of the disease. No adequate figures existed, and he decided to travel widely in the territories and to examine large samples of the population. This work has involved some 100,000 miles of road travel; and indispensable to its success has been the cooperation of administrative officers, medical officers, chiefs, and African peoples, which was freely given. The existence of large islands in Lake Victoria afforded the opportunity to do a few "whole population" surveys, which gave valuable checks on the sample surveys. As a result of all this, the prevalence figures arrived at can be accepted, with some confidence, as a reasonably accurate indication of the amount of existing leprosy.

The data accumulated in the eight surveys made are summarized in Table 1.

TABLE 1.—*Results of leprosy surveys in East Africa.*

| Area and dates | No. of persons examined | No. of cases found | Prevalence per thousand | Estimated total cases |
|---|---|---|---|---|
| Uganda, 1947-50 | 141,890 | 2540 | 17.8 | 80,000 |
| Kenya, 1948 | 53,814 | 552 | 10.2 | 35,210 |
| Tanganyika, 1947-50 | 166,239 | 3015 | 18.1 | 100,000 |
| Totals | 361,943 | 6107 | 16.8 | 215,210 |

*Uganda survey.*—The first survey, a preliminary sampling, was in Uganda in 1947-48 (1). With satisfactory cooperation of the people, samples of the population varying in different places from 114 to 1,530, and totaling, 14,808, were examined in a wide range of areas throughout the country. Altogether, 800 cases were found, which gives an average prevalence rate of 54 per thousand. The lowest rates obtained were around 6 per thousand in the Entebbe, Masaka, and Kampala areas, and 19.5 per thousand in the Sese Islands; while the highest rates, averaging 117 per thousand, were found around Fort Portal Masindi, and Arua. The prevalence was greater near the border of the Belgian Congo, and less near Sudan. It is of particular interest that the lepromatous cases found were only 15 to 20 per cent of the totals. In 1949 a more intensive survey of the Busoga District was carried out, and will be reported in a later paper in THE JOURNAL. Also in 1950 an intensive survey of the Kigezi District was made. In this mountainous district, the population was 400,000, and of these 91,964 persons were examined in 34 different places of the district, and a prevalence rate of 6.1 per thousand obtained (6). The average results for Uganda are a prevalence of 17.8 per thousand and an estimated number of existing cases of 80,000.

*Kenya.*—The next survey to the first survey in Uganda, was carried out in Kenya in the latter half of 1948 (2), and was more extensive and complete than the first one, sufficient to give a working knowledge of leprosy in the colony. It involved 53,814 persons in 62 places across the country, from the coast to the highlands and Lake Victoria. A total of 552 cases was found, which gives an average rate of 10.2 per thousand; and from that a total of around 35,000 was estimated. The observed local rates varied from 31.7 per thousand in the Nyanza area, bordering Lake Victoria, to 7.1 per thousand in the coastal zone near the sea and 1 to 3 per thousand in the high central belt. Again, only about 20 per cent of the cases were lepromatous.

*Tanganyika.*—Four surveys have been made in this country and reported separately. The four prevalences found, 14.3, 15.8, 12.0 and 26.5 are remarkably consistent for the first three, but show a sudden rise with the last, which was in the Southern Province bordering Portuguese East Africa (7).

(1) A preliminary wide range sampling was made in 1947 (3), as opportunity offered during journeys of inspection to the leprosaria. The examinations were of 8,572 people in 25 places, and 123 cases were found, a prevalence of 14.3 per thou-

sand. The highest rate, 35.7, was found at a place in the central region, while a low one, 5.3, was found at another place in the same district. At Dar Es Salaam, the capital and main port, the rate was 6.7. At two small places in the Usambara Mts., at an elevation of 6,000 ft., not a case was found among the 288 people examined.

(2) The second survey here was a relatively intensive one in the Lake Province, made early in 1949 (4). This province is much less fertile and arable than the corresponding parts of Kenya and Uganda, but it supports around 1,600,000 people. Here, in 36 localities, 61,607 people were examined and 979 cases found, which gives a prevalence rate of 15.8 per thousand. The highest local rate was 60.9, at a place near the Belgian territory where 77 cases were found in 1,264 people; the lowest rate was 0.7, where 1 case was found among 1,271 people. The lepromatous cases here were 21.4 per cent of the total. In two places, both of them islands, the entire populations were examined. On Ukara Island (15,506 people, prevalence rate 15.2), 52 of the 263 cases were in children, a child rate of 22 per cent.

(3) Another intensive survey was made, toward the middle of 1949, in the Southern Highlands Province (5), where the population is approximately 861,000. In 27 places a total of 43,846 people were examined and 529 cases of leprosy found, a prevalence of 12.0. The proportion of lepromatous cases here was 19.8 per cent.

This survey is of particular interest because of the wide range of terrain, altitude and climatic conditions in the province. Correlation of the findings with the elevations above sea level (rounding off the latter figures) is to be seen in Table 2.

From these figures it is concluded that neither altitude itself, nor the low temperatures of high altitudes, has any influence on incidence; nor could any influence with respect to clinical type be seen. There is, however, a very real indirect influence of high altitude in a tendency of the people to lesser crowding. Between the one thousand and three thousand feet localities, with a gross rate of 25.9 per thousand of leprosy, and the higher ones, with 8.4 per thousand, there is a real difference; but when the people living at high elevations do live crowded together the prevalence is as high as at the lower levels, as shown by rates of 20 and more in several of the high places.

(4) An intensive survey of the Southern Province was made in June, 1950. This province has an area of 55,223 square miles, a population of 884,679 and was found to have the highest

TABLE 2.—*Correlation of elevation and leprosy rates per thousand in the Southern Highlands Province.*

| Elevation | No. of places | Persons examined | Cases found | Range of rates | Av. rate |
|---|---|---|---|---|---|
| 1,000 | 1 | 727 | 11 | ----- | 15.1 |
| 1,500 | 2 | 5,394 | 158 | 28.7–31.0 | 29.4 |
| 2,000 | 1 | 2,052 | 46 | ----- | 22.4 |
| 2,500 | 1 | 770 | 17 | ----- | 22.0 |
| 3,000 | 1 | 200 | 5 | ----- | 25.0 |
| 3,500 | 2 | 2,706 | 39 | 12.5–15.5 | 14.4 |
| 4,000 | 1 | 3,016 | 16 | ----- | 5.3 |
| 4,500 | 3 | 5,214 | 54 | 4.7–21.1 | 10.4 |
| 5,000 | 6 | 7,706 | 66 | 5.0–14.2 | 8.6 |
| 5,500 | 3 | 7,060 | 61 | 2.5–20.4 | 8.6 |
| 6,000 | 4 | 5,257 | 29 | 4.0–10.0 | 5.5 |
| 6,500 | 1 | 680 | 2 | ----- | 2.9 |
| 7,000 | 1 | 3,064 | 25 | ----- | 8.1 |

prevalence of leprosy in Tanganyika (7). In 52,214 persons examined in 36 places across the Province from Lake Nyasa to the Indian Ocean, 1,384 cases were found, the rate being 26.5 per thousand, and the estimated number of cases existing, 23,500. The high rate is traceable in part to steady infiltrations of tribesmen from across the Portuguese border.

## SUMMARY AND CONCLUSIONS

Eight leprosy surveys were made in East Africa during the three years from 1947 to 1950, during which a total of 361,943 people were examined. The first survey was a wide-range sampling in Uganda, involving 14,808 people, and later two intensive surveys in its Busoga and Kigezi Districts brought the total examined to 141,890, in which total 2,540 cases were found. Kenya had an intensive survey in 1948, involving 53,814 persons, with 552 cases found. In Tanganyika, after an initial wide-range sampling survey, three intensive ones were made in the Lake Province, the Southern Highlands Province, and the Southern Province, the whole effort in Tanganyika involving totals of 166,239 people and 3,015 cases emerging. With pre-

valence rates of 17.8, 10.2 and 18.1 respectively, the whole region of East Africa has an average rate of 16.8 per thousand.

The 6,107 cases found in the whole region have provided a fine opportunity of studying the disease in its natural state amongst the tribes. The following are the features of special interest which have emerged.

(1) The highest prevalence of leprosy is found among the tribes living around Lake Victoria and the shores of other lakes. Prevalence is highest toward the west and moderate on the coast, suggesting that the heart of Africa may have been the ancient source of the disease.

(2) The prevalent type of leprosy found in this region is of moderate severity as compared with many other places. Only 20 per cent of the cases were of the lepromatous type, which is the most infectious one, while there was a large proportion of easily curable types.

(3) The strongest factor favoring high prevalence was found to be local overcrowding of the people in unfavorable home conditions, allied to general density of population.

(4) Poor living conditions and insufficiency of housing space was a strong factor relating to overcrowding. No evidence has been seen that diet has any appreciable effect.

(5) The strong influence of high atmospheric humidity, pointed out especially by Rogers, has been amply confirmed. Low prevalences are common in mountainous areas, but this is related to the scattering of the people by the terrain; altitude *pe se* has no effect.

(6) Grave lack of home segregation was found, only 5 per cent of the cases living alone. On the other hand, 81 per cent (4,947 cases) lived in house contact with a small army of 14,860 children, a serious factor in the perpetuation of leprosy in a community. The custom of multiple wives also bears on the matter by increasing the number of persons, including children, in home contact.

(7) Many native "cures" were encountered, but none that had more than a temporary and superficial effect.

(8) The general attitude of the chiefs and people as a whole is one of anxiety that something effective and thorough should be done to treat and control leprosy amongst them.

REFERENCES

1. INNES, J. R. Leprosy in Uganda. East African Med. J. **25** (1948) 379-381.
2. INNES, J. R. Leprosy in Kenya. East African Med. J. **26** (1949) 32-35.
3. INNES, J. R. Leprosy in Tanganyika; results of sample surveys in a wide range of places. East African Med. J. **26** (1949) 202-203.
4. INNES, J. R. Leprosy in Tanganyika; a survey of the Lake Province. East African Med. J. **26** (1949) 199-201.
5. INNES, J. R. Leprosy in Tanganyika; a survey in the Southern Highlands Province. East African Med. J. **26** (1949) 212-215.
6. INNES, J. R. Leprosy in Uganda; a survey in the Kigezi District. East African Med. J. **27** (1950) 278-283.
7. INNES, J. R. Leprosy in Tanganyika; a survey in the Southern Province. East African Med. J. **27** (1950) in press.